



# 2ND INTERNATIONAL CONFERENCE ON CYBER SECURITY AND COMPUTER SCIENCE



# ICONCS 2020

## 2<sup>nd</sup> International Conference on Cyber Security and Computer Science

15-16 February, 2020

Organized By:

**Department of Software Engineering (SWE)**



A landmark to create the Future



# ICONCS 2020

## 2<sup>nd</sup> International Conference on Cyber Security and Computer Science

© 2020 by the Department of Software Engineering, DIU, Dhaka, Bangladesh. All right reserved.

### Contact Address:

Daffodil Tower-04 (Main Campus)  
Department of Software Engineering (SWE)  
102/1, (4th floor), Shukrabad, Mirpur Road, Dhanmondi, Dhaka-1207  
Phone: 9138234-5, 9136694, 9116774  
Fax: +88-02-9131947  
<https://swe.daffodilvarsity.edu.bd/index.php>

Conference Website: <http://iconcs.daffodilvarsity.edu.bd/>

### Design, Illustration & Compose:

Sumon Ahmad, Eshrakur Rahman, Monowar Kayser, Md Shakhawat Hossain, Tohidul Noor, Mahmudul Hasan  
Daffodil International University



# Contents

## Message

**Md. Rezaul Karim *ndc***, Chief Guest, ICONCS 2020

**Brig. Gen. Md. Mustafa Kamal**, ICONCS 2020

**Dr. M. Kaykobad**, Special Guest, ICONCS 2020

**Dr. Md. Sabur Khan**, Chief Patron, ICONCS 2020

**Prof Dr Refik Polat**, Patron, ICONCS 2020

**Yousuf Mahbubul Islam, PhD**, Patron, ICONCS 2020

**Professor Dr. S. M. Mahbubul Haque Majumder**,  
Patron, ICONCS 2020

**Professor Dr. Mostafa Kamal**, Special Guest, ICONCS  
2020

**Professor Dr. Touhid Bhuiyan**, General Chair, ICONCS  
2020

**Table of Keynote Speeches, Invited Talks and Technical Papers**

**Program Schedule**

**Conference Committees and Sub-Committees**

**General Statistics of 2<sup>nd</sup> ICONCS 2020**

**Department of Software Engineering at a Glance**

**Daffodil International University at a Glance**

**Abstracts and Biography of Keynote Addresses and Plenary Session**

**Abstracts of Accepted Papers**

## Page

i

ii

iii

v

vi

vii

viii

ix

x





## Message from the Chief Guest



**Md. Rezaul Karim**  
Chief Guest, ICONCS 2020  
Director General  
Digital Security Agency  
Agargaon, Dhaka-1207

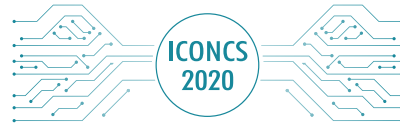
### Message

The first step to make Digital Bangladesh is to digitalize every services that both government and private sectors provide. The second important part would be to emphasize on security as the services may associate with confidential or private data. The security in the cyber space would be the most important arena that we should focus on, in the upcoming years and this 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020) is in right moment to be on track.

ICONCS 2020 which will be held from 15th to 16th February, 2020 at the permanent campus of Daffodil International University in Ashulia Dhaka. The conference is going to be organized by Department of Software Engineering under the Faculty of Science and Information Technology of Daffodil International University in association with Dongseo University, South Korea, BAKKA and Karabuk University, Turkey. I am also happy to learn that this conference proceedings will be published in Springer Lecture Note Series and will be indexed by SCOPUS.

Government of Bangladesh always felt the necessity of digital security and from that necessity, Government has enacted Digital Security at 2018. Under this act Digital Security Agency, was established. Prime objective of this agency is to keep cyber space of Bangladesh safe and secure. This agency is committed to establish a platform to work together Academia, IT Industry and Government to keep our cyber space safe and secure. I think this conference will give its participants a scope to explore the possible security measures that can be implemented on cyber space. I truly hope the internationally well know speakers will surely take the participants and authors into the realm of knowledge in the fields of cyber security and computer science.

Daffodil International University has always taken one step forward towards the digital enlightenment and I am sure Department of Software Engineering will organize this event successfully and will continue organizing such events in future to make its students in line with the world of technology and security. I congratulate all the participants and authors and would like to extend my heartfelt thanks to the organizers who make this conference a great success.



## *Message from the Chief Guest*



**Brig. Gen. Md. Mustafa Kamal**  
Chief Guest, ICONCS 2020  
Director General  
Bangladesh Telecommunication  
Regulatory Commission (BTRC)

### | Message |

Cyber Security and Computer Science, undoubtedly, are the most talked about issues of fourth industrial revolution. Despite many conferences being arranged in this field worldwide, no significant academic conference has yet been arranged by any of the university or academic institution in Bangladesh till date. As a result, an imperceptible desolation was developing within the arena includes industry and academia where knowledge gap was becoming wider day by the day. Therefore, I feel extremely delighted to note that Daffodil International University is going to organize 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020). The conference is arranged by Department of Software Engineering under the Faculty of Science and Information Technology and hosted at their own beautiful and green campus at Ashulia.

The advantages of arranging such conference are manifold. This type of attempt will bridge the knowledge gap of the students on concurrent issues, create the linkage between academic-industry, strengthen the bondage between the collaborative researches worldwide and bring recognition for the organizing institution. Where it is not easy to organize a standard conference, Daffodil International University shows its true capacity for arranging such international conferences. It's nice to comprehend that conference proceedings will be published in Springer Lecture Note Series and later be indexed by SCOPUS, the database which most researchers and organizations trust for indexing quality research articles. As far as the research and number of publications in SCOPUS are concerned, Daffodil International University has come up among the top positions in recent years. This type of conference would surely boost up that number of publications to a great extent.

In this joyous occasion, I would like to congratulate the brilliants whose articles are accepts for presenting in the conference. My sincere gratitude is protracted to the keynote speakers and panel experts for sharing the latest innovations in the field. It would be unjust if I do not mention and recognize the participants who would come all the way to gain knowledge and glorify the event. Finally, I would like to extend my heartfelt appreciation to all the stakeholders who worked hard to organize and make the conference ICONCS 2020 a successful one.



**Dr. M. Kaykobad**  
Special Guest, ICONCS 2020  
Professor (PRL)  
Department of Computer  
Science and Engineering  
Bangladesh University of Engineering  
and Technology (BUET) Fellow,  
Bangladesh Academy of Sciences

## *Message from the Special Guest*

### | Message |

It has been a common scenario in the past where we have seen an invention of the modern civilization which was used or implemented in civilized countries, took a longer time to reach or implemented in developing or under developed countries. In spite of being transferred from under developed to a developing nation, Bangladesh still has many areas to be vastly improved as well as many areas to be followed as a role model for other nations. It is also a good news that Bangladesh has realized the benefits of modernization as far as Information Technology is concerned and now we are not far behind from any developed country implementing a new technology especially in the field of computer science and software engineering.

In recent era, cyber space has brought both opportunities and threats. To digitize every service from banking management to health care, from education to communication, from citizen services to retirement benefits, which are only a few of the major plans for developing a Digital Bangladesh, the benefits of cyber space and computer science is required in all perspective. At the same time all these services which come with a huge amount of confidential data, may pose threat to the data and to the owner. Every good intention, every good initiative will be counterattacked by ill-doers. If those threats are considered as sins, conferences like International Conference on Cyber Security and Computer Science (ICONCS 2020) then can be considered as salvations. I am very glad to hear that Department of Software Engineering of Daffodil International University is going to organize such a conference on a time demanding issue that goes in line to enlighten the educationists and researchers regarding the new and upcoming innovations in the field of cyber security and computer science. I believe the 2nd ICONCS 2020 will bring the opportunity of collaborative research among the international authors. Since this conference proceedings will be indexed in SCOPUS and published in Springer, it will provide a strong motivation to the authors in the near future to contribute more to this arena of research and take part in the next conference of this series.



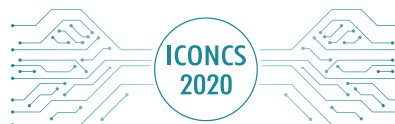
## *Message from the* Special Guest

### | Message |

would like to express my heartfelt thanks to the authors and reviewers, conference technical committee, the participants, the keynotes, and panel experts without whom a conference is impossible. I would like to thank and congratulate the organizers, the volunteers, the stakeholders without whom a conference cannot be arranged successfully. I wish my wholehearted congratulations to ICONCS 2020.







**Md. Sabur Khan**  
Chief Patron, ICONCS 2020  
Honorable Chairman  
Board of Trustees  
Daffodil International University  
Dhaka, Bangladesh.

## *Message from the Chief Patron*

### | Message |

I hope International Conference on Cyber Security and Computer Science (ICONCS) will focus on the state of the art innovation in the field of cyber security and computer science. Researchers from both academics and industry can find a scope to share their ideas and views in the fields which will eventually rule the industry revolution four. Numerous career options will be created in future and scope of entrepreneurship will emerge if we can go in line with these fields. Everything needs a proper beginning in right time and I think this conference finds the right time to be held in Bangladesh.

I am extremely glad to learn that Department of Software Engineering under the Faculty of Science and Information Technology is going to organize the 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020) which will be held from 15th to 16th February, 2020 at the permanent campus of Daffodil International University in Ashulia Dhaka. I am also happy to learn that this conference proceedings will be published in Springer Lecture Note Series and will be indexed by SCOPUS. Since DIU is focusing in research and has become top ranked among the universities in Bangladesh, arranging such conference has now become the need of time.

To represent the university in truly international level, the Board of Trustees of Daffodil International University always encourages such activities which will focus on research and collaboration in international scale. I really hope our students, teachers, researchers and IT professionals will get benefit from this conference through its technical sessions, panel discussions and academic and professional networking. I am sure this ICONCS 2020 will be a real success.

I would like to express my heartfelt thanks to all the stakeholders, participants and organizers for their support and wholehearted participation in the event to make it a successful one.



## Message from the Patron

### Message

Relations between the Turkey and Bangladesh have strong historical and cultural roots, dating back to the late Ottoman period and decades before the founding of the People's Republic of Bangladesh. The bilateral relation between Bangladesh and Turkey is based on a firm and common sentiment of establishing peace and prosperity everywhere.

**2nd International Conference on Cyber Security and Computer Science (ICONCS 2020) organized by Daffodil International University, Karabuk University, Dongseo University and BAKKA will definitely contribute to existing relations between these countries.**

A key benefit of an international university partnership is the opportunity for graduate and undergraduate students and post-doctoral fellows to study abroad. Of greatest importance is learning from each other. International university partnerships need to ensure there is mutual benefit. Such Academic Conferences are the Right place to meet the Researchers working in the same area. The researchers can know about the Future Research trends from the invited talks and Keynote Addresses. The joy of attending conferences brings with it improvement and incremental growth in our approach to do things, in the broader manner to see things, and the beauty to live international diversity.

Through collaborating in research and co –organizing conferences, internationally minded and mobile academics help to increase opportunities for globally impactful research, and high citation impact.

The theme of the conference 'Cyber security' is the array of measures you take to protect yourself from unauthorized access to your information systems. Cyber security risk is increasing, driven by global connectivity and usage of cloud services. Presumably, you will be very much aware that cyber security is something nobody can afford to ignore after participating in this conference.

I hope this conference will pave the way for initiatives that will sustain the productive relations among the participated universities .



**Prof Dr Refik Polat**  
Patron, ICONCS 2020  
Rector, Karabuk University (UNIKA)  
Turkey





**Yousuf Mahbubul Islam, PhD**  
Patron, ICONCS 2020  
Vice Chancellor  
Daffodil International University  
Dhaka, Bangladesh.

## *Message from the Patron*

### | Message |

As recently ranked by QS world rankings, Daffodil International University (DIU) has focused on its research activities to which a conference presents a vital point of communication to network with other researchers and research in the field. DIU has successfully arranged a number of such international conferences, however, this is the first time in Bangladesh where an International conference is being held focusing on Cyber Security together with Computer Science. The 1st International Conference on Cyber Security and Computer Science was held in Karabuk University, Turkey and this 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020) will be held in the Permanent Campus of Daffodil International University, organized by the Department of Software Engineering under the Faculty of Science and Information Technology on the 15th and 16th of February, 2020.

As far as the 4th Industrial Revolution is concerned, Cyber Security is a field to be focused on this decade. The mainstream computer science research along with its collaboration in cyber security will create a scope to bring positive changes in the academia and society in the field of cyber space security. Robotics, Artificial Intelligence and Internet of Things will bring the opportunities to make life easier at the same time raise security concerns that may threaten the peace of life and society. A great number of experts, will therefore be required to maintain security in cyberspace. As an educational institution, Daffodil International University is providing the educational platform for its students to become pioneer in this field and this ICONCS 2020 will bring great opportunity for its teachers and students as well as the participants to create a global platform and network to conduct collaborative research in future.

Since this conference's proceedings will be published in Springer and will be indexed in SCOPUS, the conference will have high acceptability in academia and I hope, the success of this conference will attract the future authors in the upcoming years.

I would like to express my heartfelt thanks to all the stakeholders of this conference and I wish it to be a successful platform for collaboration and advancement in the area of Cyber Security and Computer Science.



## *Message from the Patron*



**Professor Dr. S. M. Mahbubul  
Haque Majumder**  
Patron, ICONCS 2020  
Honorable Pro-Vice Chancellor  
Daffodil International University  
Dhaka, Bangladesh.

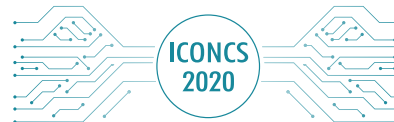
### | Message |

I am extremely pleased to extend my warm welcome to the stakeholders, students, participants and organizers of the 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020) to be held on February 15th to 16th, 2020 in Daffodil International University at their Permanent Campus in Ashulia. I am glad that the Department of Software Engineering under the Faculty of Science and Information Technology of Daffodil International University is going to organize it in association with Dongseo University, South Korea, BAKKA and Karabuk University, Turkey.

In the recent years, the field of Cyber Security has become the topic of the era and researchers have found scope to conduct research in this field in line with the fields of computer science. Since this conference cover both the areas, it will be very beneficiary to the participants to explore the fields and conduct and share research ideas and thoughts. Through its numerous technical sessions and keynote presentations, participants can learn state of the art technology in this field. Daffodil International University and its Faculty of Science and Information is pioneer in research in their field and for their continuous effort Daffodil International University has become a top ranked university as far as the publication is concerned.

I hope arranging such conferences will take this university to a new height, not only performing research but also providing a platform and place to network and collaborate between researchers on international scale. It is a matter of sheer pleasure that this conference proceedings will be published in Springer in its Lecture Note Series and later will be indexed by SCOPUS.

I wish this ICONCS 2020 a great success.



**Professor Dr. Mostafa Kamal**  
Special Guest, ICONCS 2020  
Dean, Permanent Campus  
Daffodil International University

## *Message from the Special Guest*

### | Message |

It is a matter of pleasure that Department of Software Engineering under the Faculty of Science and Information Technology of Daffodil International University is going to organize the 2nd International Conference on Cyber Security and Computer Science to be held on February 15th to 16th, 2020 in permanent campus of Daffodil International University. First Conference of this series was held in Karabuk, Turkey and this time along with Karabuk University, Dongseo University, South Korea and BAKKA, Turkey being organizing partners, Daffodil international University is going to organize it. Moreover, this time the conference proceedings will be published in Springer Lecture Note Series and will be indexed by SCOPUS. This signifies the true capacity of being an international quality conference.

Daffodil International University has always focused on research and it education. Permanent campus of this university, situated in Ashulia, is the green campus tagged for many years. In recent years authors from this campus as well as this university have become the top author of this university as well as among top ten of this country as far as number of SCOPUS indexed article publication is concerned in international conferences and journals, which makes me proud being the Dean of the permanent campus.

Organizing such an event with three dozen of sessions, three international keynote speeches, several technical and panel discussion sessions, is not an easy task. I express my thanks to the organizers of such an wonderful event and I cordially welcome all the participants, volunteers, stakeholders, authors, students, faculty members, session chairs, industry experts, and guests to the beautiful campus of Daffodil International University and to this conference, ICONCS 2020. With all you presence, I surely hope ICONCS 2020 will be a very successful one.



## Message from the General Chair

### Message

I am extremely glad to organize 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020), to be held on February 15 to 16, 2020 in the permanent campus of Daffodil international University. As a General Chair of the Conference Committee, I welcome all the special guests, participants, session chairs, panelists and keynote speakers to this conference.

As the Head of the Department of Software Engineering, the organizer of this ICONCS 2020, I felt the necessity to establish the major study in cyber security, which we successfully started 2 years ago. We have arranged numerous workshops and seminars in association with other institutions in this field to motivate the young generations and students to study in this field. We felt that only study may not be enough to reach certain expertise in this field, however, research and other collaborative study with other institutions in abroad and with the industry may minimize this learning gap that education alone may not provide. From that perception we have always been eager to organize an international conference in relevant filed. ICONCS 2020 has brought us that scope and opportunity.

One of the major areas in which the teachers and students of our department are doing research is this cyber security and it is one of the areas in which we have a good number of publication in the recent years, for which Daffodil International University has become the top ranked. Arranging such conferences will definitely boost that number and enthusiasm among researchers.

I am very glad for the opportunity to express my thanks to the authors and the reviewers around the globe who have submitted and reviewed the papers. The competition was great, since we received almost 300 articles and less than a quarter of the articles have been accepted for presentation



**Professor Dr. Touhid Bhuiyan**  
General Chair, ICONCS 2020  
Head, Department of  
Software Engineering  
Daffodil International University  
Dhaka, Bangladesh.



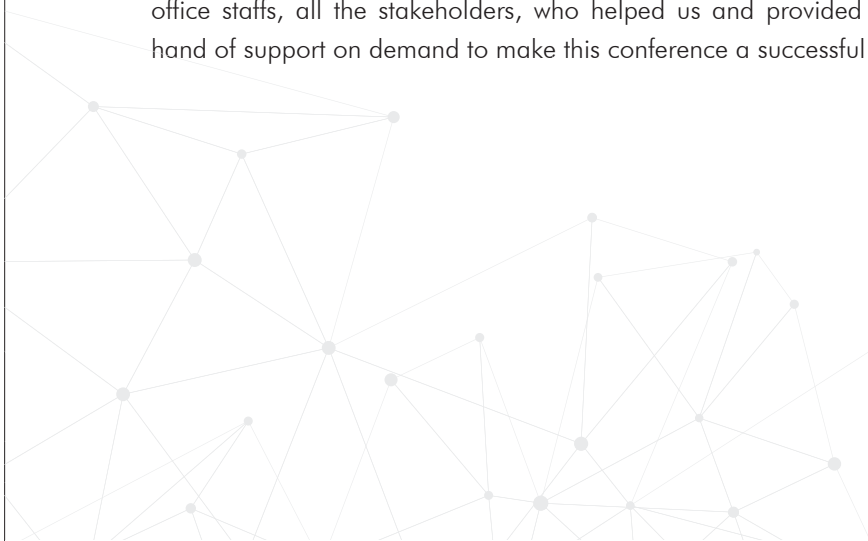
## *Message from the* General Chair

### | Message |

and publication. I am truly thankful to the session chairs from more than twenty different universities domestic and international. It is also a great news to the authors that the proceedings will be published in Springer Lecture Note Series and the series is indexed in SCOPUS, which is well known and prestigious among the researchers.

For the students, this conference will bring the opportunities to learn and grow the networks with the experts in the field. Technical sessions, and keynote speech sessions will bring the innovative ideas and technologies in this field. The panel discussion will enable them to ask questions and hear answers from the experts. Further opportunities of study in abroad may also happen since this network is considered as stronger among the academia. The teachers will also be greatly benefited due to the opportunities of collaborative research among international colleagues and authors. Diversity is the greatness of nature and a team with diversified members may result in excellent outcome performing a research, and the global society as a greater perspective will be benefited from such researches.

Arranging an international conference is a mammoth task and without the help of the several committees, it would not be possible. I would like to express my thanks and heartfelt congratulations to the members of the Technical Committee, members of Organizing Committee, all the teachers and students, International Affairs, Administration, volunteers, office staffs, all the stakeholders, who helped us and provided their hand of support on demand to make this conference a successful one.





## Tables of Keynote Speeches, Invited Talks and Technical Papers

Paper#	Authors	Paper Title	Session	Date
N/A	Jemal H. Abawajy	Talk Title: Cyber Physical System Cyber Security Challenges and Opportunities	KN1	15 Feb
N/A	Assoc. Prof. Dr. Oguz Findik	Talk Title: Spam Mail Detection using Hierarchical Temporal Memory	KN2	15 Feb
N/A	Mamoun Alazab, Phd	Talk Title: Malware Analysis using Artificial Intelligence and Deep Learning	KN3	16 Feb
2	Mostafijur Rahman, Khandker M Qaiduzzaman, Dalia Sultana*, Md. Hasibul Hasan, R. B. Ahmad	T-way Strategy For Test Case Generation inspired by Fish Swarm Searching Algorithm	T.S- 1.1	15 Feb
6	Md. Elias Hossain*, Khandker M Qaiduzzaman, Mostafijur Rahman	Sightless Helper: A Mobile Application for Blind Assistance and Safe Navigation	TS- 3.4	15 Feb
32	Md. Asaduzzaman*, Proteeti Prova Rawshan, Nurun Nahar Liya, Muhmmad Nazrul Islam, Nishith Kumar Dutta	A Vulnerability Detection Framework for CMS Using Port Scanning Technique	TS- 1.2	15 Feb
37	Md. Zaki Muzahid*, Mahsin Bin Akram, A K M Alamgir	Analysis of Agent-based & Agent-less Sandboxing for Dynamic Malware Analysis	TS- 3.2	15 Feb
42	Pritom Mojumder*, Mahmudul Hasan, Md. Faruque Hossain, K.M Azharul Hasan	A study on fastText word embedding of Bangla language using document classification	TS- 4.4	15 Feb
45	Munira Tabassum*, Afjal H. Sarower, Ashra a Esha, Md. Maruf Hassan	An Enhancement of Kerberos Using Biometric Template and Steganography	TS-1.2	15 Feb
46	Joy Roy, Md. Asraf Ali*, Md. Razu Ahmed, Md. Razu Ahmed, Kenneth Sundaraj	Machine learning techniques for prediction of EMG activity on upper limb muscle: A systematic review	TS- 2.3	15 Feb
60	Christopher A. Kanter-Ramirez*, Josue A. Lopez-Leyva, Lucia Beltran-Rocha, Dominica Ferková	Framework for the Optimal Design of an Information System to Diagnostic the EnterpriseSecurity Level and Management the Information Risk Based On ISO/IEC-27001	TS- 4.3	16 Feb
62	Rejaul Islam Royel*, Md. Hasan Sharif, Rafika Risha, Touhid Bhuiyan, Md. Maruf Hassan	A Risk Based Analysis on Linux Hosted E-Commerce Sites in Bangladesh	TS- 4.3	15 Feb
72	Sheikh Shah Mohammad Motiur Rahman*, Khalid Been Md. Badruzzaman Biplob, Md. Habibur Rahman, Kaushik Sarker, Takia Islam	Evaluation of N-Gram Techniques with TF-IDF for Classifying the User Sentiment using Ensemble Methods	TS- 4.3	15 Feb



Paper#	Authors	Paper Title	Session	Date
73	Mohammad Tareq Hosain*, Md. Zahidul slam, Abdullah Al Arif, Ahmed Iqbal Pritom, Md Rashedur Rahman	Development of a Tangent Based Robust Speech Feature Extraction Model	TS- 2.2	15 Feb
81	Md. Fahimuzzaman Sohan*, Md Alamgir Kabir, Mostafijur Rahman, Touhid Bhuiyan, Md Ismail Jabiullah, Ebubeogu Amarachukwu Felix	Prevalence of Machine Learning Techniques in Software Defect Prediction	TS- 2.1	15 Feb
84	Md. Omar Faruque Khan Russel*, Sheikh Shah Mohammad Motiur Rahman, Takia Islam	A Large Scale Investigation to Identify the Pattern of Permissions in Obfuscated Android Malwares	TS- 3.2	15 Feb
89	Sudarshan Mondal*, Nagib Mahfuz	Convolutional Neural Networks Based Bengali Handwritten Character Recognition	TS- 3.3	15 Feb
91	Nurbinta Sultana*, Khaled Sohel Mohammad, Hassanat Touhid	Retrospective Analysis of Hematological Cancer by Correlating Hematological Malignancy with Occupation, Residence, Associated Infection, Knowledge and Previous Cancer History in Relatives	TS- 1.4	15 Feb
100	Md. Habibur Rahman*, Nazrul Islam, Asma Swapna, Md. Ahsan Habib	Analysis of Software Defined Wireless Network with IP Mobility in Multiple Controllers Domain	TS- 4.1	16 Feb
102	Md. Habibur Rahman*, Ziaur Rahman, Md. Al - Mustanjid, Muhammad Shahin Uddin, Mehedy Hasan Rafsan Jany	Software Process Improvement based on Defect Prevention using Capability and Testing Model Integration in Extreme Programming	TS- 2.1	15 Feb
103	Shakhawat Hossain, Md. Zahid Hasan*, Aniruddha Rakshit	A Novel Disease Diagnosis Tool from Patient's Symptoms	TS- 1.4	15 Feb
104	Rejwana Tasnim Rimi*, K. M. Azharul Hasan	Efficient Query Processing for Multidimensional Data Cubes	TS- 4.2	16 Feb
105	Dr. Bimal Chandra Das*, Dr. Mohammad Monir Uddin, Md. Mosfiqur Rahman, Dr. Momotaz Begum	Conic Programming Approach to Reduce the Congestion Ratio in Communication Network	TS- 4.1	16 Feb
106	Sadia Narjim, Abdullah Al Mamun*, Diponkar Kundu	Diagnosis of Acute Lymphoblastic Leukemia from Microscopic Image of Peripheral Blood Smear Using Image Processing Technique	TS- 3.1	15 Feb
107	Bivash Kanti Mukherjee*, Md. Sadiqul Islam Pappu, Md. Jahidul Islam, Uzzal Kumar Acharjee	An SDN Based Distributed IoT Network with NFV Implementation for Smart Cities	TS- 4.1	16 Feb
112	Sumayea Benta Hasan*, Shakila Rahman, Md. Khaliluzzaman, Siddique Ahmed	Smoke Detection from Different Environmental Conditions using Faster R-CNN Approach Based on Deep Neural Network	TS- 3.3	15 Feb
116	Ohiduzzaman Shuvo*, Md Rafiqul Islam	Chemical Reaction Optimization for Solving Resource Constrained Project Scheduling Problem	TS- 1.1	15 Feb
117	Md. Khairul Islam, Sultana Umme Habiba	Human Age Estimation And Gender Classification Using Deep Convolutional Neural Network	TS- 3.1	15 Feb

Paper#	Authors	Paper Title	Session	Date
119	Md. Fazla Rabbi*, Md. Saddam Hossain Mukta, Tanjima Nasreen Jenia, A.K.M. Najmul Islam	Predicting Fans' FIFA World Cup Team Preference from Tweets	TS- 2.1	15 Feb
120	Md. Hasibur Rahman, Chowdhury Rafeed Rahman, Ruhul Amin, Md. Habibur Rahman Sifat, Afra Anika*	A Hybrid Approach Towards Two Stage Bengali Question Classification Utilizing Smart Data Balancing Technique	TS- 4.4	16 Feb
126	Nuruzzaman Faruqui*, Mohammad Abu Yousuf, Partha Chakraborty, Md. Safaet Hossain	Innovative Automation Algorithm in Micro-multination al Data-entry Industry	TS- 4.2	16 Feb
140	Md. Sohag Hossain*, Abdullah Al Mamun, Tonmoy Ghosh, Md. Galib Hasan, Md. Motaher Hossain, Anik Tahabilder	Ulcer Detection in Wireless Capsule Endoscopy Using Locally Computed Features	TS- 3.1	15 Feb
150	Md. Khalid Mahbub Khan*, Sujan Chandra Roy, Muhammad Sajjadur Rahim, Abu Zafor Md. Touhidul Islam	On the Energy Efficiency and Performance of Delay Tolerant Routing Protocols	TS- 1.4	15 Feb
159	Md. Moynul Hossain*, Md. Anowar Kabir, Md. Mehedi Hassan, Md. Ashikur Rahman Parag, Md. Nadim Hossain, Bikash Kumar Paul, Muhammad Shahin Uddin, Kawsar Ahmed	Proposal of a Highly Birefringent Bow-Tie Photonic Crystal Fiber for Nonlinear Applications	TS- 4.2	16 Feb
160	Dip Bhakta*, Avimonnu Arnob Dash, Md. Faisal Bari, Swakkhar Shatabda	Supervised Machine Learning for Multi-Label Classification of Bangla Articles	TS- 4.4	16 Feb
163	Md. Kowsher*, Nusrat Jahan Prottasha, Anik Tahabilder, Md. Babul Islam	Machine Learning-Based Recommendation Systems for the Mode of Childbirth	TS- 2.3	15 Feb
168	Mohammed Mahmudur Rahman, Tajnim Jahan*, Tanjima Nasrin, Zinnia Sultana, Salma Akter	Sustainable Rice Production Analysis and Forecasting Rice Yield Based on Weather Circumstances Using Data Mining Techniques for Bangladesh	TS-1.3	15 Feb
178	Noor Farjana Firoz, Md. Taslim Arefin*, Md Raihan Uddin	Performance Optimization of Layered Signature Based Intrusion Detection System Using Snort	TS- 4.3	16 Feb
185	Md Moniruzzaman*, Farida Chowdhury, Md Sadek Ferdous	Examining Usability Issues in Blockchain-Based Cryptocurrency Wallets	TS- 2.4	15 Feb
192	Bibhas Roy Chowdhury, Md. Sabir Hossain*, Alve Ahmad, Mohammad Hasan, Md. Al-Hasan	A New Approach to Solve Quadratic Equation Using Genetic Algorithm	TS- 1.1	15 Feb
203	Ashik Kumar Das*, Md. Asif Iqbal, Bidhan Paul, Aniruddha Rakshit, Md. Zahid Hasan	Smoke Detection from Different Environmental Conditions using Faster R-CNN Approach Based on Deep Neural Network	TS- 3.3	15 Feb
215	Arpita Howlader*, Samrat Kumar Dey	RP-DMAC: Receiver Pivotal Directional MAC with Multichannel for IoT Based WSN	TS- 4.3	16 Feb
220	Sajib Das, Syeda Sumbul Hossain, Md. Sanzidul Islam, Farhan Anan Himu, Asif khan Shakir, Md. Shohel Arman*	Bangladeshi Stock Price Prediction and Analysis with Potent Machine Learning Approaches	TS- 1.3	15 Feb



Paper#	Authors	Paper Title	Session	Date
223	Md. Mahbub Hasan, Ms. Farzana Sadia, Asif Khan Shakir, Kaushik Sarker, Farhan Anan Himu, Md. Shohel Arman*	Detection and Classification of Road Damage Using RCNN and Faster R-CNN: A Deep Learning Approach	TS- 3.3	15 Feb
227	Md. Rakibul Islam*, Bikash Kumar Paul, Kawsar Ahmed, Touhid Bhuiyan	A Bioinformatics Analysis to Identify Hub Genes from Protein-Protein Interaction Network for Cancer and Stress	TS- 4.2	16 Feb
223	Golam Moktader Nayeem, Mingyu Fan, Shanjun Li, Khalil Ahammad*	A Modified Particle Swarm Optimization for Autonomous UAV Path Planning in 3D Environment	TS- 1.1	15 Feb
242	Sumnoon Ibn Ahmad, Mohammed Moshui Hoque*, Lamia Alam	An Empirical Framework to Identify Authorship from Bengali Literary Works	TS- 4.4	16 Feb
244	Md Shajalal*, Masaki Aono	Semantic Sentence Modeling for Learning Textual Similarity Exploiting LSTM	TS- 2.2	15 Feb
246	Md Fahimuzzman Sohan*, Md Alamgir Kabir, Mostafijur Rahman, S. M. Hasan Mahmud, Touhid Bhuiyan	Training Data Selection Using Ensemble Dataset Approach for Software Defect Prediction	TS- 2.1	15 Feb
248	Sabrina Haque*, Tasnim Rahman, Asif Khan Shakir, Md. Shohel Arman, Khalid Been Badruzzaman Biplob, Farhan Anan Himu, Dipta Das	ASPECT BASED SENTIMENT ANALYSIS IN BANGLA DATASET BASED ON ASPECT TERM EXTRACTION	TS- 2.2	15 Feb
257	Omar Altwijri, SAM Matiu Rahman*, Md. Asraf Ali, Mahdi Alqahtani	EMG-based Classification of Forearm Muscles in Prehension Movements: Performance Comparison of Machine Learning Algorithms	TS- 2.3	15 Feb
262	Kabid Hassan Shibly*, Sazia Rahman, Samrat Kumar Dey	Advanced Artistic Style Transfer Using Deep Neural Network	TS- 3.4	15 Feb
265	Md Kamrul Hossain*	Prediction Model for Self-Assessed Health Status in Flood-Prone Area of Bangladesh	TS- 2.3	15 Feb
266	Md Rashedul Hasan*, Afsana Begum, Fahad Bin Zamal, Lamisha Rawshan, Touhid Bhuiyan	Android Malware Detection by Machine Learning Apprehension and Static Feature Characterization	TS- 3.2	15 Feb
270	Burhan Selçuk*, Ayşe Nur A. Tankül	Designing A New Hybrid Cryptographic Model	TS- 4.3	16 Feb
273	Oğuz FINDIK*, Emrah ÖZKAYNAK	Link Prediction on Networks Created from UEFA European Competitions	TS- 1.3	15 Feb
274	Minarul Islam, Sabira Khatun*, Nusrat Jahan Shoumy, Md Shawkat Ali, Mohamad Shaiful Abdul Karim, Bifta Sama Bari	Non-Invasive Diabetes Level Monitoring System using Artificial Intelligence and UWB	TS- 1.4	15 Feb
275	Bifta Sama Bari, Sabira Khatun*, Kamarul Hawari Ghazali, Mamunur Rashid, Minarul Islam, Mostafijur Rahman	Performance Comparison of Early Breast Cancer Detection Precision Using AI and Ultra-wideband (UWB) Bio-Antennas	TS- 1.4	15 Feb
280	Delwar Alam*, Md. Takasur, Rahman Chowdhury Nayan, Umme Jannath Tamanna, Md. Asrafuzzaman, Tanjila Farah	An E-Commerce Supply Chain Traceability System Using Blockchain Technology	TS- 2.4	15 Feb
282	Shanjita Akter Prome*, Ms. Farzana Sadia, Umme Jannath Tamanna, Delwar Alam, Moniruz Zaman	Automated Border Control System Using Blockchain Technology	TS- 2.4	15 Feb



# Program Schedule

## Day 1: 15 February, 2020

### Reporting & Bus Departure towards venue

**Time:** 7:00AM-7:15AM

**Venue:** AR Plaza & other designated bus stoppages, Dhaka

### Registration and Breakfast at Venue

**Time:** 8:30AM-9:15AM

**Venue:** AB-4 Building

### Inaugural Session

**Time:** 9:15AM-11:00AM

**Venue:** Ground Floor, AB-4 Building

Description
National Anthem DIU Theme Song Recitation from the Religious Books Welcome Address by <b>Dr. Md Sabur Khan</b> , Chairman, BoT, DIU, Chief Patron of ICONCS 2020 Speech by Honorable <b>Pro-Vice Chancellor</b> , DIU, Patron of ICONCS 2020 Speech by Honorable <b>Vice Chancellor</b> , DIU, Patron of ICONCS 2020 Speech by Rector, <b>Dr. Refik POLAT</b> , Karabük University, Patron of ICONCS 2020 Speech by <b>Md. Rezaul Karim</b> , Director General, Digital Security Agency, Bangladesh, Chief Guest of ICONCS 2020 Crests Hand Over Vote of Thanks from <b>Dr. Touhid Bhuiyan</b> , Head, Dept. of SWE, DIU, Conference General Chair Photo Session

### Tea/Coffee Break

**Time:** 11:00AM-11:30AM

**Venue:** Ground Floor, AB-4 Building

### Keynote Session 1

**Time:** 11:30 AM-12:00 PM

**Venue:** Ground Floor, AB-4 Building

Session#	Description
KN1	<b>Keynote Address I</b> <b>Jemal H. Abawajy</b> Professor, PhD, DSc., SMIEEE Faculty of Science, Engineering and Built Environment, Deakin University, Australia Email: jemal.abawajy@deakin.edu.au  <b>Talk Title:</b> Cyber Physical System Cyber Security Challenges and Opportunities

## Keynote Session 2

**Time:** 12:00 PM-12:30 PM

**Venue:** Ground Floor, AB-4 Building

Session#	Description
KN2	<p><b>Keynote Address II</b>  <b>Dr. Oguz Findik</b>  Associate Professor  Karabuk University, Turkey</p> <p><b>Talk Title:</b>  Spam Mail Detection using Hierarchical Temporal Memory</p>

## Plenary Session 1

**Time:** 12:30PM-01:00PM

**Venue:** Ground Floor, AB-4 Building

Session#	Description
PS1	<p><b>Prof. Dr. Md. Abdur Razzaque</b>  Pro Vice-Chancellor, Green University of Bangladesh  Chair, IEEE Computer Society Bangladesh Chapter</p> <p><b>Talk Title:</b>  IEEE Computer Society: Prospects and Opportunities for Researchers in Bangladesh</p>

## Lunch/Prayer Break

**Time:** 01:00 PM-02:00 PM

**Venue:** Food Court

## Technical Session I

Four Parallel Sessions (TS- 1.1, TS- 1.2, TS- 1.3, TS- 1.4)

**Time:** 02:00 PM-03:30 PM

## Session I Information

**Session Number:** TS- 1.1

**Date:** 15-02-2020

**Time:** 02:00 PM-03:30 PM

**Room:** 217, AB-4 Building

## Chairs:

**Dr. Md. Fokhray Hossain**, Professor, Director of IA, DIU

**Dr. Sabira Khatun**, Professor, Universiti Malaysia Pahang

**Title:** Technical Session 1.1: Optimization Problems

## Presentations

Paper#	Authors	Title	Presenter
2	Mostafijur Rahman, Khandker M Qaiduzzaman, Dalia Sultana*, Md. Hasibul Hasan, R. B. Ahmad	T-way Strategy For Test Case Generation Inspired by Fish Swarm Searching Algorithm	Elias Hossain
116	Ohiduzzaman Shuvo*, Md Rafiqul Islam	Chemical Reaction Optimization for Solving Resource Constrained Project Scheduling Problem	Ohiduzzaman Shuvo
233	Golam Moktader Nayeem, Mingyu Fan, Shanjun Li, Khalil Ahammad*	A Modified Particle Swarm Optimization for Autonomous UAV Path Planning in 3D Environment	Khalil Ahammad
192	Bibhas Roy Chowdhury, Md. Sabir Hossain*, Alve Ahmad, Mohammad Hasan, Md. Al-Hasan	A New Approach to Solve Quadratic Equation Using Genetic Algorithm	Md. Sabir Hossain

## Session II Information

**Session Number:** TS- 1.2

**Date:** 15-02-2020

**Time:** 02:00 PM-03:30 PM

**Room:** 218, AB-4 Building

## Chairs:

**Jemal H. Abawajy**, PhD, Professor, Deakin University

**Dr. Oguz Findik**, Associate Professor, Karabük University

**Title:** Technical Session 1.2: Image Steganography and Risk Analysis on Web Applications

## Presentations

Paper#	Authors	Title	Presenter
32	Sheikh Thanbir Alam*, Nusrat Jahan, Md. Maruf Hassan	A New 8-Directional Pixel Selection Technique of LSB Based Image Steganography	Mr. Sheikh Thanbir Alam
45	Munira Tabassum*, Afjal H. Sarower, Ashraa Esha, Md. Maruf Hassan	An Enhancement of Kerberos Using Biometric Template and Steganography	Miss. Munira Tabassum Mou
17	Md. Asaduzzaman*, Proteeti Prova Rawshan, Nurun Nahar Liya, Muhmmad Nazrul Islam, Nishith Kumar Dutta	A Vulnerability Detection Framework for CMS Using Port Scanning Technique	Mr. Md. Asaduzzaman
62	Rejaul Islam Royel*, Md. Hasan Sharif, Rafika Risha, Touhid Bhuiyan, Md. Maruf Hassan	A Risk Based Analysis on Linux Hosted E-Commerce Sites in Bangladesh	Mr. Rejaul Islam Royel



### Session III Information

**Session Number:** TS- 1.3

**Date:** 15-02-2020

**Time:** 02:00 PM-03:30 PM

**Room:** 219, AB-4 Building

#### Chairs:

**Dr. Md Kabirul Islam**, Professor, Director of Research, DIU

**Dr. M. M. Mahbubul Syeed**, Associate Professor, Head, CSE, AIUB

**Title:** Technical Session 1.3: Data Mining

#### Presentations

Paper#	Authors	Title	Presenter
273	Oğuz FINDIK*, Emrah ÖZKAYNAK	Link Prediction on Networks Created from UEFA European Competitions	Dr Oğuz Findik
168	Mohammed Mahmudur Rahman, Tajnim Jahan*, Tanjima Nasrin, Zinnia Sultana, Salma Akter	Sustainable Rice Production Analysis and Forecasting Rice Yield Based on Weather Circumstances Using Data Mining Techniques for Bangladesh	Tajnim Jahan
220	Sajib Das, Syeda Sumbul Hossain, Md. Sanzidul Islam, Farhan Anan Himu, Asif Khan Shakir, Md. Shohel Arman*	Bangladeshi Stock Price Prediction and Analysis with Potent Machine Learning Approaches	Sajib Das

### Session IV Information

**Session Number:** TS- 1.4

**Date:** 15-02-2020

**Time:** 02:00 PM-03:30 PM

**Room:** 220, AB-4 Building

#### Chairs:

**Dr. Md. Ismail Jabiullah**, Professor, CSE, DIU

**Dr. Md. Asraf Ali**, Associate Professor, SWE, DIU

**Title:** Technical Session 1.4: Machine Learning in Disease Diagnosis and Monitoring

## Presentations

Paper#	Authors	Title	Presenter
91	Nurbinta Sultana*, Khaled Sohel Mohammad, Hassanat Touhid	Retrospective Analysis of Hematological Cancer by Correlating Hematological Malignancy with Occupation, Residence, Associated Infection, Knowledge and Previous Cancer History in Relatives	Nurbinta Sultana
275	Bifta Sama Bari, Sabira Khatun*, Kamarul Hawari Ghazali, Mamunur Rashid, Minarul Islam, Mostafijur Rahman	Performance Comparison of Early Breast Cancer Detection Precision Using AI and Ultra-wideband (UWB) Bio-Antennas	Bifta Sama Bari
103	Shakhawat Hossain, Md. Zahid Hasan*, Aniruddha Rakshit	A Novel Disease Diagnosis Tool from Patient's Symptoms	Zahid Hasan
274	Minarul Islam, Sabira Khatun*, Nusrat Jahan Shoumy, Md Shawkat Ali, Mohamad Shaiful Abdul Karim, Bifta Sama Bari	Non-Invasive Diabetes Level Monitoring System using Artificial Intelligence and UWB	Md Shawkat Ali

## Tea/Coffee Break

**Time:** 03:30 PM - 03:45 PM

**Venue:** Ground Floor, AB-4 Building

## Technical Session II

Four Parallel Sessions (TS- 2.1, TS- 2.2, TS- 2.3, TS- 2.4)

**Time:** 03:45 PM - 05:15 PM

## Session I Information

**Session Number:** TS- 2.1

**Date:** 15-02-2020

**Time:** 03:45 PM-05:15 PM

**Room:** 217, AB-4 Building

## Chairs:

**Dr. Muhammet Tahir GÜNEŞER**, Professor, Karabük University

**Dr. Imran Mahmud**, Assistant Professor, Head, ITM, DIU

**Title:** Technical Session 2.1: Computer Vision and Image Processing in Health Care

## Presentations

Paper#	Authors	Title	Presenter
104	Rejwana Tasnim Rimi and K. M. Azharul Hasan	Efficient Query Processing for Multidimensional Data Cubes	Rejwana Tasnim Rimi
159	Md. Moynul Hossain, Md. Anowar Kabir, Md. Mehedi Hassan, Md. Ashikur Rahman Parag, Md. Nadim Hossain, Bikash Paul, Muhammad Shahin Uddin and Kawsar Ahmed	Proposal of a Highly Birefringent Bow-Tie Photonic Crystal Fiber for Nonlinear Applications	Md. Moynul Hossain
227	Md. Liton Ahmed, Md. Rakibul Islam, Bikash Kumar Paul, Touhid Bhuyian, Kawsar Ahmed and Mohammad Ali Moni	Topology Analysis of Protein-protein Interaction Network for Cancer and Stress a Bioinformatics Approach	Md. Liton Ahmed
126	Nuruzzaman Faruqui, Mohammad Abu Yousuf, Partha Chakraborty and Md. Safaet Hossain	Innovative Automation Algorithm in Micro-multinational Data-entry Industry	Nuruzzaman Faruqui

## Session II Information

**Session Number:** TS- 2.2

**Date:** 15-02-2020

**Time:** 03:45 PM-05:15 PM

**Room:** 218, AB-4 Building

## Chairs:

**Prof. Md. Abdul Mottalib, PhD**, Professor, Head, CSE, ULAB

**Dr. Shazzad Hosain**, Professor, ECE, NSU

**Title:** Technical Session 2.2: Text and Speech Processing

## Presentations

Paper#	Authors	Title	Presenter
72	Sheikh Shah Mohammad Motiur Rahman*, Khalid Been Md. Badruzzaman Biplob, Md. Habibur Rahman, Kaushik Sarker, Takia Islam	Evaluation of N-Gram Techniques with TF-IDF for Classifying the User Sentiment using Ensemble Methods	Sheikh Shah Mohammad Motiur Rahman
248	Sabrina Haque*, Tasnim Rahman, Asif khan Shakir, Md. Shohel Arman, Khalid Been Badruzzaman Biplob, Farhan Anan Himu, Dipta Das	ASPECT BASED SENTIMENT ANALYSIS IN BANGLA DATASET BASED ON ASPECT TERM EXTRACTION	Miss. Sabrina Haque
73	Mohammad Tareq Hosain*, Md. Zahidul Islam, Abdullah Al Arif, Ahmed Iqbal Pritom, Md Rashedur Rahman	Development of a Tangent Based Robust Speech Feature Extraction Model	Ahmed Iqbal Pritom
244	Md Shajalal*, Masaki Aono	Semantic Sentence Modeling for Learning Textual Similarity Exploiting LSTM	Md. Shajalal

## Session III Information

**Session Number:** TS- 2.3

**Date:** 15-02-2020

**Time:** 03:45 PM-05:15 PM

**Room:** 219, AB-4 Building

## Chairs:

**Dr. Md Hasanuzzaman**, Professor, CSE, DU

**Dr. Shaikh Muhammad Allayear**, Associate Professor, Head, MCT, DIU

**Title:** Technical Session 2.3: Machine Learning in Health Care

## Presentations

Paper#	Authors	Title	Presenter
163	Md. Kowsher*, Nusrat Jahan Prottasha, Anik Tahabilder, Md. Babul Islam	Machine Learning-Based Recommendation Systems for the Mode of Childbirth	Md. Kowsher
257	Omar Altwijri, SAM Matiur Rahman*, Md. Asraf Ali, Mahdi Alqahtani	EMG-based Classification of Forearm Muscles in Prehension Movements: Performance Comparison of Machine Learning Algorithms	Prof. S A M Matiur Rahman
265	Md Kamrul Hossain*	Prediction Model for Self-Assessed Health Status in Flood-Prone Area of Bangladesh	Dr. Md Kamrul Hossain
46	Joy Roy, Md. Asraf Ali*, Md. Razu Ahmed, Md. Razu Ahmed, Kenneth Sundaraj	Machine learning techniques for prediction of EMG activity on upper limb muscle: A systematic review	Joy Roy



## Session IV Information

**Session Number:** TS- 2.4

**Date:** 15-02-2020

**Time:** 03:45 PM-05:15 PM

**Room:** 220, AB-4 Building

### Chairs:

**Dr. Md. Nasim Akhtar**, Professor, CSE, DUET

**LT Col Dr. Muhammad Nazrul Islam**, Associate Professor, MIST

**Title:** Technical Session 2.4: Blockchain Applications

### Presentations

Paper#	Authors	Title	Presenter
280	Delwar Alam*, Md. Takasur, Rahman Chowdhury Nayan, Umme Jannath Tamanna, Md. Asrafuzzaman, Tanjila Farah	An E-Commerce Supply Chain Traceability System Using Blockchain Technology	Delwar Alam
281	Shanjita Akter Prome*, Ms. Farzana Sadia, Umme Jannath Tamanna, Delwar Alam, Moniruz Zaman	Automated Border Control System Using Blockchain Technology	Shanjita Akter Prome
185	Md Moniruzzaman*, Farida Chowdhury, Md Sadek Ferdous	Examining Usability Issues in Block- chain-Based Cryptocurrency Wallets	Md Moniruzzaman

### Tea/Coffee Break

**Time:** 05:15 PM- 05:30 PM

**Venue:** Ground Floor, AB- 4 Building

### Technical Session III

Four Parallel Sessions (TS- 3.1, TS- 3.2, TS- 3.3, TS- 3.4)

**Time:** 05:30 PM-07:00 PM

### Session I Information

**Session Number:** TS- 3.1

**Date:** 15-02-2020

**Time:** 05:30 PM-07:00 PM

**Room:** 217, AB-4 Building

### Chairs:

**Dr. Kahndaker A Mamun**, Professor, CSE, UIU

**Dr. Swakkhar Shatabda**, Associate Prof, UIU

**Title:** Technical Session 3.1: Computer Vision and Image Processing in Health Care

## Presentations

Paper#	Authors	Title	Presenter
140	Md. Sohag Hossain*, Abdullah Al Mamun, Tonmoy Ghosh, Md. Galib Hasan, Md. Motaher Hossain, Anik Tahabilder	Ulcer Detection in Wireless Capsule Endoscopy Using Locally Computed Features	Md. Sohag Hossain
117	Md. Khairul Islam, Sultana Umme Habiba	Human Age Estimation And Gender Classification Using Deep Convolutional Neural Network	Sultana Umme Habiba
106	Sadia Narjim, Abdullah Al Mamun*, Diponkar Kundu	Diagnosis of Acute Lymphoblastic Leukemia from Microscopic Image of Peripheral Blood Smear Using Image Processing Technique	Sadia Narjim

## Session II Information

**Session Number:** TS- 3.2

**Date:** 15-02-2020

**Time:** 05:30 PM- 07:00 PM

**Room:** 218, AB-4 Building

### Chairs:

**Dr. Mohammed Nasir Uddin** Professor, Chair, CSE, JnU

**Mamoun Alazab**, PhD, Associate Professor, Australia

**Title:** Technical Session 3.2: Malware Analysis

## Presentations

Paper#	Authors	Title	Presenter
266	Md Rashedul Hasan*, Afsana Begum, Fahad Bin Zamal, Lamisha Rawshan, Touhid Bhuiyan	Android Malware Detection by Machine Learning Apprehension and Static Feature Characterizations	Md Rashedul Hasan
37	Md. Zaki Muzahid*, Mahsin Bin Akram, A K M Alamgir	Analysis of Agent-based & Agent-less Sandboxing for Dynamic Malware Analysis	Md. Zaki Muzahid
84	Md. Omar Faruque Khan Russel*, Sheikh Shah Mohammad Motiur Rahman, Takia Islam	A Large Scale Investigation to Identify the Pattern of Permissions in Obfuscated Android Malwares	Md. Omar Faruque Khan Russel

## Session III Information

**Session Number:** TS- 3.3

**Date:** 15-02-2020

**Time:** 05:30 PM-07:00 PM

**Room:** 219, AB-4 Building

### Chairs:

**Dr. Mohammad Shorif Uddin**, Professor, CSE, JU

**Dr. Taskeed Jabid**, Associate Professor, Head, CSE, EWU

**Title:** Technical Session 3.3: Computer Vision

### Presentations

Paper#	Authors	Title	Presenter
203	Ashik Kumar Das*, Md. Asif Iqbal, Bidhan Paul, Aniruddha Rakshit, Md. Zahid Hasan	Classification of Succulent Plant using Convolutional Neural Network	Ashik Kumar Das
112	Sumayea Benta Hasan*, Shakila Rahman, Md. Khaliluzzaman, Siddique Ahmed	Smoke Detection from Different Environmental Conditions using Faster R-CNN Approach Based on Deep Neural Network	Sumayea Benta Hasan
89	Sudarshan Mondal*, Nagib Mahfuz	Convolutional Neural Networks Based Bengali Handwritten Character Recognition	Sudarshan Mondal
223	Md. Mahbub Hasan, Ms. Farzana Sadia, Asif khan Shakir, Kaushik Sarker, Farhan Anan Himu, Md. Shohel Arman*	Detection and Classification of Road Damage Using RCNN and Faster R-CNN: A Deep Learning Approach	Md. Shohel Arman

## Session IV Information

**Session Number:** TS- 3.4

**Date:** 15-02-2020

**Time:** 05:30 PM-07:00 PM

**Room:** 220, AB-4 Building

### Chairs:

**Dr M Shamim Kaiser**, Professor, IIT, Jahangirnagar University

**Dr. Md. Motaharul Islam**, Professor, CSE, UIU

**Title:** Technical Session 3.4: Future Technology Applications

## Presentations

Paper#	Authors	Title	Presenter
6	Md. Elias Hossain*, Khandker M Qaiduzzaman, Mostafijur Rahman	Sightless Helper: A Mobile Application for Blind Assistance and Safe Navigation	Elias Hossain
262	Md. Iftekhharul Alam Efat*, Shoaib Rahman, Tasnim	IoT Based Smart Health Monitoring System for Diabetes Patients using Neural Network	Md. Iftekhharul Alam Efat
267	Md Omar Hasan*, Khandakar Razoan Ahmed, Md. Motaharul Islam	Parking Recommender System using Q-Learning and Cloud Computing	Md Omar Hasan
261	Kabid Hassan Shibly*, Sazia Rahman, Samrat Kumar Dey	Advanced Artistic Style Transfer Using Deep Neural Network	Kabid Hassan Shibly

## Conference Dinner

**Time:** 07:30 PM-08:30 PM

**Venue:** Green Garden

## Buses Leave from Permanent Campus

**Time:** 8:45PM

**Venue:** Designated Bus Stoppages

## Day 2: 16 February, 2020

### Reporting and Bus Departure towards venue

**Time:** 07:00 AM-07:15 AM

**Venue:** AR Plaza & other designated bus stoppages, Dhaka

### Registration and Breakfast at Venue

**Time:** 08:30 AM-09:15 AM

**Venue:** Ground Floor, AB- 4 Building

## Plenary Session 2

**Time:** 09:15AM-09:45 AM

**Venue:** Conference Room, 3rd Floor, AB-4

**Title:** Government, Research and Industry Synergy for Economic Development - A Bangladeshi Perspective

Session#	Description
PS2	<b>Dr. Fakhrul Islam</b> , Director, Private University Division, UGC <b>Prof. Dr. Syed Akhter Hossain</b> , Head, Dept. of CSE, DIU <b>Tapan Kanti Sarkar</b> , President, CTO Forum <b>Abul Kashem Md. Shirin</b> , Managing Director, DBBL

## Keynote Session 3

**Time:** 09:45 AM-10:15AM

**Venue:** Conference Room, 3rd Floor, AB-4 Building

Session#	Description
KN3	<b>Keynote Address II</b>  Prof. Mamoun Alazab Associate Professor Charles Darwin University, Australia Email: mamoun.alazab@cdu.edu.au  <b>Talk Title:</b> Malware Analysis using Artificial Intelligence and Deep Learning

## Tea/Coffee Break

**Time:** 10:15AM-10:30AM

**Venue:** Ground Floor, AB- 4 Building

## Technical Session IV

Four Parallel Sessions (TS- 4.1, TS- 4.2, TS- 4.3, TS- 4.4)

**Time:** 10:30 AM-12:00 PM

### Session I Information

**Session Number:** TS- 4.1

**Date:** 16-02-2020

**Time:** 10:30 AM-12:00 PM

**Room:** 217, AB- 4 Building

### Chairs:

**Dr. Abu Raihan Mostafa Kamal**, Professor, CSE, IUT

**Dr. Kazi Muheymin-Us-Sakib**, Professor, IIT, University of Dhaka

**Title:** Technical Session 4.1: Computer Networks

## Presentations

Paper#	Authors	Title	Presenter
100	Md. Habibur Rahman, Nazrul Islam, Asma Swapna and Md. Ahsan Habib	Analysis of Software Defined Wireless Network with IP Mobility in Multiple Controllers Domain	Mr. Md. Habibur Rahman
107	Bivash Kanti Mukherjee, Md. Sadiqul Islam, Md. Jahidul Islam and Uzzal Kumar Acharjee	An SDN Based Distributed IoT Network with NFV Implementation for Smart Cities	Mr. Bivash Kanti Mukherjee
150	Md. Khalid Mahbub Khan, Sujana Chandra Roy, Muhammad Sajjadur Rahim and Abu Zafor Md. Touhidul Islamz	On the Energy Efficiency and Performance of Delay-Tolerant Routing Protocols	Mr. MD.Khalid Mahbub Khan
105	Dr. Bimal Das, Dr. Momotaz Begum, Dr. Monir Uddin and Mr. Mosfiqur Rahman	Conic Programming Approach to Reduce Congestion Ratio in Communications Network	Dr. Bimal Chandra Das

## Session II Information

**Session Number: TS- 4.2**

**Date:** 16-02-2020

**Time:** 10:30 AM-12:00 PM

**Room:** 218, AB- 4 Building

### Chairs:

**Dr. Shamim H Ripon**, Professor, CSE, East West University

**Dr. Md. Khalilur Rahman**, Assistant Professor, Brac University

**Title:** Technical Session 4.2: Machine Learning on Imbalanced Data

## Presentations

Paper#	Authors	Title	Presenter
246	Md Fahimuzzman Sohan*, Md Alamgir Kabir, Mostafijur Rahman, S. M. Hasan Mahmud, Touhid Bhuiyan	Training Data Selection Using Ensemble Dataset Approach for Software Defect Prediction	Mr. Md Fahimuzzman Sohan
81	Md. Fahimuzzaman Sohan*, Md Alamgir Kabir, Mostafijur Rahman, Touhid Bhuiyan, Md Ismail Jabiullah, Ebubeogu Amarachukwu Felix	Prevalence of Machine Learning Techniques in Software Defect Prediction	Mr. Md Fahimuzzman Sohan
102	Md. Habibur Rahman*, Ziaur Rahman, Md. Al - Mustanjid, Muhammad Shahin Uddin, Mehedy Hasan Rafsan Jany	Software Process Improvement based on Defect Prevention using Capability and Testing Model Integration in Extreme Programming	Mr. Md. Habibur Rahman
119	Md. Fazla Rabbi*, Md. Saddam Hossain Mukta, Tanjima Nasreen Jenia, A.K.M. Najmul Islam	Predicting Fans' FIFA World Cup Team Preference from Tweets	Mr. Md Fazla Rabbi

### Session III Information

**Session Number:** TS- 4.3

**Date:** 16-02-2020

**Time:** 10:30 AM-12:00 PM

**Room:** 219, AB- 4 Building

#### Chairs:

**Dr. M. Ameer Ali**, Professor, Chair, CSE, BUBT

**Dr. Muhammad Shahin Uddin**, Professor, Chair, ICT, MBSTU

**Title:** Technical Session 4.3: Computer Security

#### Presentations

Paper#	Authors	Title	Presenter
60	Christopher Kanter, Josue Lopez, Lucia Beltran and Dominica Ferková	Framework for the Optimal Design of an Information System to Diagnostic the Enterprise Security Level and Management the Information Risk Based On ISO/IEC-27001	Mr. Christopher Alan Kanter
178	Md. Taslim Arefin	Performance Optimization of Layered Signature Based Intrusion Detection System Using Snort	Mr. Md Taslim Arefin
270	Burhan Selçuk	Designing A New Hybrid Cryptographic Model	Dr. Burhan Selcuk
215	Samrat Kumar Dey and Arpita Howlader	RP-DMAC: Receiver Pivotal Directional MAC with Multichannel for IoT Based WSN	Miss. Arpita Howlader

### Session IV Information

**Session Number:** TS- 4.4

**Date:** 16-02-2020

**Time:** 10:30 AM-12:00 PM

**Room:** 220, AB- 4 Building

#### Chairs:

**Dr. M. Kaykobad**, Professor, CSE, BUET

**Dr. Syed Akhter Hossain**, Professor, Head, CSE, DIU

**Title:** Technical Session 4.4: Bangla Language Processing

## Presentations

Paper#	Authors	Title	Presenter
42	Pritom Mojumder, Mahmudul Hasan, Md. Faruque Hossain and K.M Azharul Hasan	A study on fastText word embedding of Bangla language using document classification	Pritom Mojumder
120	Md.Hasibur Rahman, Chowdhury Rafeed Rahman, Ruhul Amin, Md. Habibur Rahman Sifat and Afra Anika	A Hybrid Approach Towards Two Stage Bengali Question Classification Utilizing Smart Data Balancing Technique	Afra Anika
242	Sumnoon Ibn Ahmad, Lamia Alam and Mohammed Moshiul Hoque	An Empirical Framework to Identify Authorship from Bengali Literary Works	Prof. Mohammed Moshiul Hoque
160	Dip Bhakta, Avimonnu Arnob Dash, Md. Faisal Bari and Swakkhar Shatabda	Supervised Machine Learning for Multi-Label Classification of Bangla Articles	Mr. Dip Bhakta

## Closing Session

**Time:** 12:15PM-01:15PM

**Venue:** Conference Room, 3rd Floor, AB-4 Building

Description
<p>Closing Ceremony</p> <p>Speech by <b>Dr. M. Kaykobad</b>, Professor, BUET, Special Guest, ICONCS 2020</p> <p>Speech by <b>Dr. Mostafa Kamal</b>, Dean, DIU, Special Guest, ICONCS 2020</p> <p>Speech by <b>Brig. General Md. Mostafa Kamal</b>, Director General (SS), BTRC</p> <p>Chief Guest, ICONCS 2020</p> <p>Best Paper Award</p> <p>Concluding Remarks by General Chair</p>

## Lunch Distribution

**Time:** 1:15PM-1:30PM

**Venue:** Food Court

## Bus Departure from Permanent Campus

**Time:** 1:45PM

**Venue:** Designated Bus Stoppages



## Conference Committees and Sub-Committees

### Chief Patron

Dr. Md Sabur Khan, Chairman,  
BoT, DIU

### Patron

Dr. Yousuf Mahbubul Islam,  
VC, DIU

Dr. Refik POLAT, Rector  
Karabük University

Professor Dr. S.M. Mahbub Ul Haque Majumder,  
Pro-VC, DIU

### General Chair

Professor Dr. Touhid Bhuiyan,  
DIU, Bangladesh

### General Co-Chair

Dr. Md Kabirul Islam, DIU, Bangladesh  
Dr. Mehmet AKBABA, Karabük University, Turkey

### Secretary

Dr. Md. Mostafijur Rahman, DIU, Bangladesh

### Joint Secretary

Md. Maruf Hassan, DIU, Bangladesh  
Dr. Muhammet Tahir GÜNEŞER, Karabük University, Turkey  
Dr. Yüksel ÇELİK, Karabük University, Turkey  
Dr. Zafer ALBAYRAK, Karabük University, Turkey

### Advisory Committee

Dr. Md. Lutfar Rahman,  
DIU, Bangladesh  
Professor Dr. Engr. A. K. M. Fazlul Hoque, DIU,  
Bangladesh  
Mr. Mominul Haque Majumder,  
DIU, Bangladesh  
Dr. Syed Akhter Hossain, DIU, Bangladesh

Dr. Ljiljana Trajkovic, Simon Fraser University,  
Canada  
Dr. Zaid Ameen Abduljabbar, Iraq  
Dr. Khan Iftekharuddin, Old Dominion University,  
USA  
Dr. Rasib Khan, Northern Kentucky University, USA  
Dr. Nizam U. Ahamed, University of Pittsburgh, PA,  
USA

Dr. Mostafa Kamal, DIU, Bangladesh  
 Dr. Mohammed Masum Iqbal, DIU, Bangladesh  
 Dr. A. M.M. Hamidur Rahman, DIU, Bangladesh  
 Dr. M. Shamsul Alam, DIU, Bangladesh  
 Dr. Ahmad Ismail Mustafa, DIU, Bangladesh  
 Dr. Md. Ismail Jabiullah, DIU, Bangladesh  
 Dr. Md. Fokhray Hossain, DIU, Bangladesh  
 Dr. Mohammad Shorif Uddin, Jahangirnagar University, Bangladesh  
 Dr. Md Abdur Razzaque, Dhaka University, Bangladesh  
 Dr. M Shamim Kaiser, Jahangirnagar University, Bangladesh  
 Ir Ts. Dr. R. Badlishah Ahmad, UNIMAP, Malaysia  
 Dr. Kenneth Sundaraj, UTeM, Malaysia

Dr. Suraiya Pervin, DU, Bangladesh  
 Dr. Kamal Zuhairi Zamli, UMP, Malaysia  
 Dr. Sabira Khatun, Professor, UMP, Malaysia  
 Dr.K.L.Sumathy, DMGRJCSW, India  
 Dr. Mamoun Alazab, Charles Darwin University, Australia  
 Dr. Sk Md Mizanur Rahman, Centennial College, Canada.  
 Dr. T. Ramayah, Universiti Sains Malaysia, Malaysia  
 Dr. Brenda Scholtz, Nelson Mandela University, South Africa  
 Dr. André Calitz, Nelson Mandela University, South Africa  
 Dr. Jyoti Choudrie, University of Hertfordshire, UK

### Technical Program Committee

Dr. Md. Asraf Ali, DIU, Bangladesh (Chair)  
 Dr. Muhammet Tahir GUNESER, Karabuk University, Turkey (Co-Chair)  
 Dr. Md. Ismail Jabiullah, DIU, Bangladesh  
 Dr. Shaikh Muhammad Allayear, DIU, Bangladesh  
 Dr. Imran Mahmud, DIU, Bangladesh  
 Dr. Sheak Rashed Haider Noori, DIU, Bangladesh  
 Dr. İdris KAHRAMAN, Karabuk University, Turkey  
 Dr. Kadir İLERİ, Karabuk University, Turkey  
 Dr. Caner ÖZCAN, Karabuk University, Turkey  
 Dr. Ameer Ali, BUBT, Bangladesh  
 Dr. Md Mijanur Rahman, Uttara University, Bangladesh  
 Dr. Kasım ÖZACAR, Karabuk University, Turkey  
 Dr. Emrullah SONUC, Karabuk University, Turkey  
 Dr. Ferhat ATASOY, Karabuk University, Turkey  
 Dr. Zafer ALBAYRAK, Karabuk University, Turkey  
 Dr. Khan Iftekharuddin, Old Dominion University, USA  
 Dr. Rasib Khan, Northern Kentucky University, USA  
 Dr. Nizam U. Ahamed, University of Pittsburgh, PA, USA  
 Dr. Md Anamul Islam, City University of New York, USA  
 Dr. Robert S Laramée, Swansea University, UK  
 Dr. Kaniz Fatema, University of Derby, UK

Dr. Surendran Rajendran, AMA International University, Kingdom of Bahrain  
 Dr. V. Rajesh Kumar, VIT University, India  
 Dr. V. Nithish Kumar, VIT University, India  
 Dr. Md. Masbaul Alam Polash, Jagannath University, Bangladesh  
 Dr. Md. Abu Layek, Jagannath University, Bangladesh  
 Dr. Mohammad Ismat Kadir, Khulna University, Bangladesh  
 Dr. Md. Shamim Ahsan, Khulna University, Bangladesh  
 Dr. G M Atiqur Rahaman, Khulna University, Bangladesh  
 Dr. Mostafa Zaman Chowdhury, KUET, Bangladesh  
 Dr. Md. Salah Uddin Yusuf, KUET, Bangladesh  
 Dr. K. M. Azharul Hasan, KUET, Bangladesh  
 Dr. Mohiuddin Ahmad, KUET, Bangladesh  
 Dr. Monir Hossen, KUET, Bangladesh  
 Dr. Md Foisal Hossain, KUET, Bangladesh  
 Dr. Md. Shahjahan, KUET, Bangladesh  
 Dr. Mohammad Osiur Rahman, University of Chittagong, Bangladesh  
 Dr. Jamal Uddin Ahamed, University of Chittagong, Bangladesh  
 Dr. Md. Shahjahan Ali, Islamic University, Bangladesh  
 Dr. Md Manjur Ahmed, University of Barishal, Bangladesh

Dr. Ljiljana Trajkovic, Simon Fraser University, Canada

Dr. Mohammad Rashid, Massey University, New Zealand

Dr. Fakhrul Alam, Massey University, New Zealand

Dr. Nasim Ahmed, Massey University, New Zealand

Dr. Yuvaraj Rajamanickam, Nanyang Technological University, Singapore

Dr. A. R. Jac Ferodo, Nanyang Technological University, Singapore

Dr. Mahdi H. Miraz, CFRED, CUHK, Hong Kong

Dr. Hamed Vahdat-Nejad, University of Birjand, Iran

Dr. Zaid Ameen Abduljabbar, University of Basrah, Iraq

Dr. Zaid Alaa Hussien, Southern Technical University, Iraq

Dr. Muhammad Imran Ahmad, UniMap, Malaysia

Dr. Zahereel Ishwar Abdul Khalib, UniMap, Malaysia

Mohammad Kamrul Islam, Google Inc., USA

Dr. Sathees Kumar Nataraj, AMA International University, Kingdom of Bahrain

Dr. Rajkumar Palaniappan, AMA International University, Kingdom of Bahrain

Dr. Mohammad Nurul Huda, United International University, Bangladesh

Dr. Md. Sajjadur Rahman, JU, Bangladesh

Dr. Md. Mahabub Hossain, HSTU, Bangladesh

Dr. Mohammad Abdur Rouf, DUET, Bangladesh

Dr. Md Nasim Akhtar, DUET, Bangladesh

Dr. Brenda Scholtz, Nelson Mandela University, South Africa

Dr. André Calitz, Nelson Mandela University, South Africa

Dr. Md. Motaharul Islam, BRAC University, Bangladesh

Dr. Hasan Sarwar, United International University, Bangladesh

Dr. Md. Khalilur Rahman, BRAC University, Bangladesh

Dr. Imtiaz Mahmud, Kyungpook National University, Korea

Dr. You-Ze Cho, Kyungpook National University, Korea

Dr. Teoh Ai Ping, USM, Malaysia

Dr. Yulita Hanum P Iskandar, USM, Malaysia

Dr. Mathias Hatakka, Orebro University, Sweden

Dr. Vito Veneziano, University of Hertfordshire, UK

Dr. Ghossoon Mohammed Waleed AlSadoon, AMA International University, Bahrain

### Scientific Committee

Dr. Chandan Karmakar, Deakin University, Australia.

Dr. Iqbal Ahmed, University of Chittagong, Bangladesh

Dr. Muhammad Nazrul Islam, Military Institute of Science and Technology, Bangladesh

Dr. Kazi Tanvir Ahmmmed, University of Chittagong, Bangladesh

Ts Dr. Nik Adilah Hanin Zahri, UniMAP, Malaysia

Dr. Naimah Yaakob, UniMAP, Malaysia

Ts Dr. Ku Nurul Fazira Ku Azir, UniMAP, Malaysia

Dr. Shahrul Nizam Yaakob, UniMAP, Malaysia

Ts. Dr. Phaklen Ehkan, UniMAP, Malaysia

Dr. Rozmie Razif Othman, UniMAP, Malaysia

Dr. Latifah Munirah Kamarudin, UniMAP, Malaysia

Dr. Ruzelita Ngadiran, UniMAP, Malaysia

Dr. Muhammad Imran Ahmad, UniMAP, Malaysia

Dr. Nesrin AYDIN ATASOY, Karabük University, Turkey

Dr. Nursel YALÇIN, Gazi University, Turkey

Dr. Onur İNAN, N.Erbakan University, Turkey

Dr. Şafak BAYIR, Karabük University, Turkey

Dr. Ümit ATİLA, Karabük University, Turkey

Bayezid Islam, Rajshahi University of Engineering & Technology (RUET), Bangladesh

Akrati Saxena, National University of Singapore, Singapore

Sourav Roy, KUET, Bangladesh

Al-Farabi Akash, Ahsanullah University of Science and Technology, Bangladesh

Shah Md. Salimullah, Bangladesh Army International University of Science and Technology, Bangladesh

Md. Saiful Islam, SAir AIR BD Ltd, Bangladesh

Liton Chandra Paul, Pabna University of Science and Technology, Bangladesh

Dr. Norsuhaida Ahmad, UniMAP, Malaysia  
 Dr. Zahereel Ishwar Abdul Khalib, UniMAP, Malaysia  
 Dr. Rafikha Aliana A. Raof, UniMAP, Malaysia  
 Dr. Ong Bi Lynn, UniMAP, Malaysia  
 Dr. Amiza Amir, UniMAP, Malaysia  
 Dr. Yasmin Mohd Yacob, UniMAP, Malaysia  
 Dr. Abdrakhmanov RUSTAM, Ahmet Yesevi University, Turkey  
 Dr. Amirtayev KANAT, Ahmet Yesevi University, Turkey  
 Dr. Aslıhan TÜFEKÇİ, Gazi University, Turkey  
 Dr. Huseyin SEKER, Northumbria University, UK  
 Dr. Mustafa Servet KIRAN, Selcuk University, Turkey  
 Dr. Oğuz FINDIK, Karabük University, Turkey  
 Dr. Abdulkadir KARACI, Kastamonu University, Turkey  
 Dr. Burhan SELÇUK, Karabük University, Turkey  
 Dr. Caner ÖZCAN, Karabük University, Turkey  
 Dr. Emrullah SONUÇ, Karabük University, Turkey  
 Dr. Erkan ÇETİNER, Bulent Ecevit University  
 Dr. Ferhat ATASOY, Karabük University, Turkey  
 Dr. Hakan KUTUCU, Karabük University, Turkey  
 Dr. Hakkı SOY, N.Erbakan University, Turkey  
 Dr. İbrahim Berkant AYDİLEK, Harran University, Turkey  
 Dr. İlhami Muharrem ORAK, Karabük University, Turkey  
 Dr. İlker TÜRKER, Karabük University, Turkey  
 Dr. M. Ali AYDIN, Istanbul University, Turkey  
 Dr. Mehmet HACIBEYOĞLU, N.Erbakan University

Md. Ahsan Habib, Mawlana Bhashani Science and Technology University, Bangladesh  
 Subrato Bharati, Ranada Prasad Shaha University, Bangladesh  
 Nayan Banik, Green University of Bangladesh, Bangladesh  
 Mosabber Uddin Ahmed, University of Dhaka, Bangladesh  
 Md. Sakibul Islam, Shahajalal University of Science and Technology, Bangladesh  
 Sampad Ghosh, Kyushu University, Japan  
 Mohammad Ali Moni, University of Sydney, Australia  
 Md Gulzar Hussain, Green University of Bangladesh, Bangladesh  
 PRAJOY PODDER, BUET, Bangladesh  
 Shadman Sakib, University of Hyogo, Japan  
 Mahmudul Hasan, Ministry of Science and Technology, Bangladesh  
 Piyas Saha, Bangladesh Army University of Engineering and Technology, Bangladesh  
 Muhammad Kamal Hossen, Chittagong University of Engineering & Technology, Bangladesh  
 Md. Anik Hossain, City University, Bangladesh  
 Tamim Al Mahmud, Green University of Bangladesh, Bangladesh  
 Magnus Eriksson, Mid Sweden University, Sweden  
 Manahan Siallagan, Institute Teknologi Bandung, Indonesia

### Program Organizing Committee

#### Organizing Chair

K.M. Imtiaz-Ud-Din, DIU, Bangladesh

#### Co-Chair

S A M Matiur Rahman, DIU, Bangladesh

Fahad Bin Zamal, DIU, Bangladesh

Kaushik Sarker, DIU, Bangladesh

#### TPC Secretariat

Dr. Asraf Ali, DIU, Bangladesh

Dr. Imran Mahmud, DIU, Bangladesh

Dr. Mostafijur Rahman, DIU, Bangladesh

Maruf Hassan, DIU, Bangladesh

Afsana Begum, DIU, Bangladesh

Nusrat Jahan, DIU, Bangladesh

Sheikh Shah Mohammad Motiur Rahman, DIU, Bangladesh



### **Logistics & Venue Management**

Md. Shohel Arman, DIU, Bangladesh  
Farhan Anan Himu, DIU, Bangladesh  
Khalid Been Badruzzaman Biplob, DIU, Bangladesh  
Mahmuda Rawnak Jahan, DIU, Bangladesh  
Bikash Kumar Paul, DIU, Bangladesh  
Rajib Mia, DIU, Bangladesh

### **Technical Sessions**

Md. Anwar Hossain, DIU, Bangladesh

### **Refreshment & Food Management**

Khalid Been Badruzzaman Biplob, DIU, Bangladesh  
Md. Shohel Arman, DIU, Bangladesh  
Farhan Anan Himu, DIU, Bangladesh  
Mahmuda Rawnak Jahan, DIU, Bangladesh

### **Proceedings**

Farzana Sadia, DIU, Bangladesh

### **Sponsorship Committee**

M. Khaled Sohel, DIU, Bangladesh  
Abul Kalam Ahsanul Azad, DIU, Bangladesh  
Lamisha Rowshan, DIU, Bangladesh  
Mahmuda Rawnak Jahan, DIU, Bangladesh

### **Finance**

Fahad Bin Zamal, DIU, Bangladesh  
Abul Kalam Ahsanul Azad, DIU, Bangladesh

### **Invitation**

Nusrat Jahan, DIU, Bangladesh

### **Public Relation**

Afsana Begum, DIU, Bangladesh

### **International Guest Management**

Fatama Binta Rafiq, DIU, Bangladesh  
Mahmuda Rawnak Jahan, DIU, Bangladesh  
Hasan Sharif, DIU, Bangladesh

### **Certificate & Crests**

Md. Mushfiquir Rahman, DIU, Bangladesh  
Md. Shohel Arman, DIU, Bangladesh

### **Website Management**

Sheikh Shah Mohammad Motiur Rahman, DIU, Bangladesh  
Muntachir Razzaque, DIU, Bangladesh  
Md. Mahfuzur Rahman, DIU, Bangladesh

### **Design Support**

Dr. Shaikh Muhammad Allayear, DIU, Bangladesh  
Farzana Sadia, DIU, Bangladesh  
Sumon Ahmad, DIU, Bangladesh

### **Transport Management**

Md. Sanzidul Islam, DIU, Bangladesh  
Rajib Mia, DIU, Bangladesh

### **IT Support**

Raiyan Mostofa, DIU, Bangladesh

### **Conference Support**

Sayed Asaduzzaman, DIU, Bangladesh  
Raihana Zannat, DIU, Bangladesh  
Nayeem Hasan, DIU, Bangladesh  
Syeda Sumbul Hossain, DIU, Bangladesh  
Tapushi Rabeya Toma, DIU, Bangladesh  
Asif Khan Shakir, DIU, Bangladesh  
Shariful Islam, DIU, Bangladesh  
Marzia Ahmed, DIU, Bangladesh  
Redwanullah Yousuf, DIU, Bangladesh  
Sk. Fazlee Rabby, DIU, Bangladesh  
Afjal Hossan Sarower, DIU, Bangladesh  
Diljib Kabir, DIU, Bangladesh

## General Statistics of 2<sup>nd</sup> ICONCS 2020

### Countries from where authors are involved with the 2<sup>nd</sup> ICONCS 2020, Daffodil International University

Bangladesh, Turkey, Malaysia, China, Saudi Arabia, Australia, Austria, Bahrain, Brazil, Germany, India, Japan, Korea, Mexico, Morocco, Portugal, Sweden, Taiwan, United Kingdom, United States.

Total 909 authors from home and abroad submitted 281 papers out of which 79 are foreign authors and 830 are domestic authors.

<b>Total Submissions</b>	281
<b>Total Accepted Papers</b>	60
<b>Acceptance Rate</b>	~21.35%
<b>Total Reviews</b>	543

**Total number of authors from different institutions: 30**

**Total number of session chairs from different institutions: 19**

<b>List of Universities who have submitted papers more than 5</b>	<b>Numbers of Papers</b>
Daffodil International University	98
Jahangirnagar University	11
International Islamic University	9
BRAC University	8
Noakhali Science and Technology University	8
American International University, Bangladesh University of Professionals, Chittagong University of Engineering and Technology, Karabuk University, Khulna University of Engineering & Technology, World University of Bangladesh	7



## Department of Software Engineering at a Glance

Department of Software Engineering started its journey with a few students in the late 2009 and in recent year number of students surpassed our expectation, which now exceeds 100 times the number of students that admitted in the first semester at the beginning of the program. This department offers B.Sc. in Software Engineering and M.Sc. in Software Engineering along with majors in Cyber Security, Data Science, Cloud Computing and Digital Marketing that can be chosen by students with specific requirements. This department has been working with a vision of developing vibrant software and IT professionals to meet twenty first century challenges. In today's competitive working environment, earning an advanced academic degree is the first step to a highly successful career and if the degree could lead to one of the highest paid jobs in the world then it just gives the career a few steps head start.

Our beloved country is full of young people who have the necessary intellectual potential and patriotism to bring about enormous changes to everything concerning the economic welfare of its people. We in the software Engineering are here to help students burgeon their potential into complete professional person.

It is really difficult to make a decision when it comes to decide for higher studies. To make the right decision at right time does matter a lot with respect to fulfillment of students' desired goal. Software Engineering invites students to the realm of knowledge and sharing an experience with a difference.

### **M.Sc. in Software Engineering:**

The Master of Science Degree in Software Engineering provides specialized knowledge and experience in developing and modifying large, complex software systems. It emphasizes technical and management aspects of the software engineering process. Software engineering is an established discipline based on requirement analysis, design, construction, testing, maintenance, economics, and management issues of software engineering. A pragmatic approach to problem solving is the hallmark of a software engineer. Software engineers are concerned with the theoretical and practical aspects of technology, cost, and social impact of software systems that are both effective and efficient.

Software engineers are in demand in every segment of society affected by computing technology. Potential employers include all software vendors and Internet-based companies, electronic business organizations, businesses that build and sell computers, research and development laboratories, aerospace companies, government contractors, banks, insurance companies, and manufacturing organizations. The master's program is concerned with both technical and managerial issues, but primary emphasis is placed on the technical aspects of building and modifying high quality software systems.

M.Sc. in software Engineering is now being offered with four majors, Cyber Security, Data Science, Cloud Computing and Digital Marketing.

### **B.Sc. in Software Engineering:**

The program is designed to satisfy the growing demands of software professional throughout the country and to produce skilled manpower for global IT market. It provides the students and opportunity to obtain a broad knowledge of software engineering, programming, software development engineering, computer systems engineering and software management. The goal of this degree is the generation of competent software engineering graduates to meet the increasing demands for the area in both domestic and international market.



### **B.Sc. in Software Engineering Major in Cyber Security:**

Cyber security has now become one of the high demanded domains in the job market of Bangladesh. The need for skilled manpower who understands business, software and cyber security is significant and growing. The program is designed to satisfy the rising demands of the software engineers having knowledge and skills in cyber security. This program not only focusses on software engineering processes but also provides more specific knowledge and skills on systems security, application security, ethical hacking techniques, security analysis and penetration testing, network and communication security, information security risk management, information system audits and assurance, digital forensic, and cyber law and ethics. The major objective of this program is to produce capable software engineering graduates with in depth knowledge on different domains of cyber security to meet the growing demands for the information security arena both in home and abroad.

### **Achievements of this Department at a glance:**

1. Organized 2nd International Conference on Cyber Security and Computer Science 2020 in permanent campus, Ashulia, Bangladesh and put its efforts to publish all accepted and presented papers in Springer Lecture Note Series this time.
2. Last three years Department of Software Engineering has become among the top positions in research publication in SCOPUS indexed journals and conferences.
3. Highest number of publication was awarded to an author from the Department of Software Engineering in the last three years, and one of the awardees is among the top ten in Bangladesh.
4. Department of Software Engineering has supported universities in Somalia and Nigeria to establish Bachelor and Masters Program in Software Engineering there.
5. 1st International Conference on Cyber Security and Computer Science was vigorously supported by Department of Software Engineering, held in Karabuk, Turkey.
6. Graduates of this Department are now working in several well-known organizations including Eally, Pathao, Samsung R& D, Leads Corporation Ltd., Telenor, Wedevs, Shohoz, Citi Bank Ltd., EBL, Media Soft Data System Ltd., Service Engine, SSL, Wipro Limited, Newscrad, Infolytx Bangladesh Ltd., Prime Tech Solutions Ltd., Spring Ring Technologies Ltd. (USA Based), Guru Graphics Ltd. (UK Based), SELISE Rockin' Software (Switzerland Based), Enosis Solutions (USA Based), Wanderly Nurses (USA Based), Wicresoft (China), Marvel Semiconductor (Germany), Delivery Hero (Germany), Orbund LLC (Qatar) etc. and many more.
7. Graduate of this Department have successfully initiated startups many of which are in very good position now. A few of them are BugsBD, SoftcareIT, Virtue5, FeatherIT, Datagram Solutions, DhruboHost, Soft IT Security, Coders CMS, Shadow White Animation, Craftic Arts etc. and many more.
8. Graduates of this department are doing higher study with scholarships in Sweden, Japan, Finland, China, Germany, and Russia and in many other international famous institution around the globe.
9. Students and faculty members of this department successfully organized several national and international contests including, DIU App Contest, Regional Programming Contest, Capture the Flag Contest, Ethical Hacking Contest and supported to organize NASA Space Apps Challenge, BASIS Soft Expo etc.
10. Students from Software Engineering has participated in student exchange and training program in several countries including England, United States of America, Poland, China, Japan, South Korea, Malaysia, Indonesia, India.
11. Teachers from Software Engineering department has taken part in teaching exchange program in several countries including Malaysia, Indonesia, Philippine, Australia, China, India, South Korea.
12. Faculty members of this department have foreign higher degrees and training as well as studying for higher education in several countries including USA, England, Australia, Sweden, Norway, Japan, China, Malaysia, Germany, Canada, Ireland, Finland and Hong Kong.

## Daffodil International University at a Glance

### Glorious Past... Thriving Present... Promising Future...

**Introduction:** Since inception in 2002, Daffodil International University (DIU) has been focused on creating a self-motivated and self-employed generation. With a view to be the leading entrepreneurial university, DIU shapes all graduates through effective guidance, career counseling, grooming, personality and confidence development, modern facilities, quality education, regular monitoring and leadership development. In the scenic beauty of a spacious green campus, students are nurtured in academic harness, IT, ethics, honesty, career specialization, leadership and entrepreneurship under supervision of experienced and renowned faculty members.

**PhD programs at DIU:** DIU has introduced PhD programs in collaboration with many foreign universities like USIM, CNU, KIIT, UniMAP, OUM, and UM.

**International Campuses:** With approval from UGC, DIU is planning to establish its overseas campuses in Dubai, UAE and Sri Lanka and in a few other countries.

**Faculty Members:** A total of 607 Full Time and 153 Part Time faculty members.

**Officials and Supporting Staff:** 309 Officials, 301 supporting and 360 outsourced staff.

**International Students:** A total of 650 students from 10 countries are currently studying at DIU.

**Scholarship and Waiver:** Currently over 7300 DIU students are enjoying scholarships in each semester. One Student One Laptop: More than 30000 laptops have already been distributed among students in order to create an IT friendly future generation.

**Award, Honor and Ranking:** DIU has been ranked within top 500 Universities in Asia and as one of the best ranked Bangladeshi Universities by QS Asia University Rankings-2019; ranked No. 1 among Bangladeshi universities and 153 globally at 'UI Greenmetric World University Ranking 2017. Among the International Awards, "World Congress of IT (WCIT) 2017 Merit Award", "Global Inclusion Awards 2017", "Merit Award in WITSA 2017", "Merit Award in WITSA 2014, Global ICT Excellence Awards 2016", "MTC Global Outstanding Corporate Award 2016", "Asia's Best Business School Award 2013", "World Education Congress Global Award 2013", "Asia's most inspiring Nation Builder Award 2013", Prime Minister's Award for Beautification (2006), are significant examples.

DIU also achieved the Bangladesh Government's City Beautification Award 2006, President's Crest, Bangladesh; National ICT Award 2016; AHR Award, UK; World Quality Commitment Award, Amity Global Academic Excellence Award, Golden Star Academic & Educational Excellence Award. DIU has been ranked highly by UGC of Bangladesh and NAHE, Sweden.

**Linkage Programs:** DIU has established academic links with more than 320 prestigious universities from over 50 countries around the world. Entrepreneurs Network: DIU produced more than 4000 entrepreneurs worldwide and established Business Incubator, Entrepreneurs' Club, Venture Capital Ltd., Startup Market, Startup Bangladesh, Bachelor of Innovation and Entrepreneurship, Entrepreneurship Guidance Program

(EGP), Industrial and Innovation Park, Enterprise Competitiveness Institute (ECI), Makers' Lab, Startup Market & Lab, Startup Restaurant & Café, Makers' Lab, Startup Grind, Young Women Entrepreneurs Forum, Are you the next Startup, Entrepreneurship Development Fund, etc. DIU has introduced Industry-Academia Lecture Series to promote and encourage young new Entrepreneurs. It takes part in HULT, Global Money Week, TeDx Daffodil, Startup Huddle, Get in the Ring, Daffodil ICT Carnival, and Global Entrepreneurship Network, DCCI E2K project, Global Entrepreneurship Summer Camp, International Social Business Summer Program, Global Entrepreneurship Research Network, Global Entrepreneurship Camp (GEC), Global Entrepreneurship Week, Daffodil Alumni UK Reunion, among others.

### **DIU is a center of International Mega Events in Bangladesh:**

DIU hosts many International Programs every year. Participants from Bangladesh and overseas appreciate the environment and facilities for Mega Events at DIU, among others: Youth4SDG Asia Leadership Program 2019; 'DIU Winter Camp-2019' with the participants of SIAS International University; ACM-ICPC 2018 Asia Regional Dhaka; 1st International Education & Cultural Carnival Bangladesh; 21st International Convention on Students Quality Control Circles (ICSQCC); International Social Business Summer Program; a 15 member delegation from NYSC of Sri Lanka attended Bangladesh–Sri Lanka Youth Exchange Program at DIU; WCIT 2016 recommendations for IT education' at BICC; local event of Hult Prize, Global Entrepreneurship Week, 22 students of University of Oxford visited DIU as a part of Cross Cultural Exchange Program; Innovative Teaching and Learning Expo (ITLE 2017); International Social Business Summer Program; Dr. Achyuta Samanta speaks on 'Social Entrepreneurship; International Seminar on 'Entrepreneurship in the 21st Century'; International Summit on Employability and Soft Skills; 3-day workshop on "Universal Human Values and Professional Ethics" held during 2-4 May 2016; International HR Conference 'Career Bytes' Employability First; International workshop on "Global People Paradigm Shifting the Frontier of People Management; International Seminar on "Magic of Mind; Bangladesh Summit-Featuring Google for Education; ACM ICPC Dhaka Regional; International Conference on Tertiary Education: Realities & Challenges; XI Asian-Pacific Astronomy Olympiad; Social Business Youth Convention; Workshop for the teachers on "Teaching Skill Enhancement (NBI Training for Professionals); Global Money Week.

**Research:** DIU conducts many professional research based projects under many prominent national and international bodies, such as: HEQEP, IQU, UGC, ISP, LEADHER, IAU, IEEE, DCCP, Ministry of Science and Technology, Government of People's Republic of Bangladesh, Sweden Uppsala University, Cloud Computing, CGC, BBC Media Action, Taiwan Foundation for Democracy, British Council, IBM, BFF, WHO, KOHA, e-resources, INASP, UNICEF, FnF, USAID, among others.

**Memberships:** To provide students with opportunities to achieve global fitness, DIU is always in touch with world organizations, among others: ITU, UNGC, ACBSP, ACU, ESRUC, IAU, IAUP, IIE, ACE, AUPF, ANUB, ALA, AMDISA, AmCham, ATIFTAP, EAIE, CEA, IEEE, ISTQB, NAFSA, UNAI, APUCEN, TBCCI, KBCCI, JBCCI, BMCCI, GUPES, CYFI, Kauffman, GAA, ACD, EURAS, KISS, Guide Association, ARI, IamSMEofIndia, Magna Charta Observatory, IFLA and UMAP International Secretariat.

**Permanent Campus:** The permanent campus of DIU is situated in Ashulia, near Uttara, Dhaka in about a hundred acres of calm, serene, green and open environment and free from the hustle and bustle of the city. It has separate academic and administrative infrastructures and residential halls. Mega events are held on a regular basis. Students in this campus have recently launched a **Green Movement** for keeping this campus free from all sorts of pollutions. Bio Gas plant, massive plantation, deer feeding, solar energy infrastructure and a large cycling track are some of the features of green movement of DIU. A 6000-seat auditorium in

permanent campus, a 100-seat mini hall with electronic writing board, removable sound and multimedia system, Media Lab, Mobile Apps Development Research Lab, Innovation Lab, facilities of all indoor games, hygienic canteens, lucrative lounges, digital classroom, gymnasium, Medical Center, Green garden Café, 400-seat auditorium at city campus, LED, large transport pool, standard football and cricket grounds, English language lab, Self-Assessment Center (SEC), MCT Lab, Golf drive and practice range and Startup market have made this campus an attractive location for education and recreation for all.

**Clubs and Associations:** DIU runs 35 student clubs for extra and co-curricular activities.

**Research Centers:** (i) Research Center for Business and Economics, (ii) Research Center for Science and Information Technology, (iii) Research Center for Humanities and Social Sciences, (iv) Research Center for Allied Health Science, and (v) Bureau of Business and Economics Research.

#### **Achievements at a Glance:**

- DIU has hosted the 18th Asian University Presidents Forum (AUPF) in 2019
- The Asian-Oceanian Computing Industry Organization (ASOCIO) has recognized Daffodil International University with ASOCIO 2018 ICT Education Award
- Mr. Md. Sabur Khan, Founder and Chairman, DIU received Honorary Doctorate from KIIT University, India
- Mr. Md. Sabur Khan, Founder and Chairman, DIU has been elected as the 2nd Vice-President of Association of Universities of Asia and the Pacific (AUAP)
- Mr. Md. Sabur Khan, Founder and Chairman, DIU has been conferred upon an Honorary D Litt. from Techno India University, West Bengal, India
- Largest number of International students are pursuing higher studies in DIU
- Mr. Md. Sabur Khan, Founder and Chairman, DIU received Honorary Fellowship on Entrepreneurship and Education in Said Business School, the University of Oxford by ABRM (Academy of Business & Retail Management)
- Teachers' participation around the world under PhD & Teacher exchange programs.
- 'Introducing 360° Education' as the students now getting summer program/students exchange/scholarship etc.
- Gold Medal won by DIU student (Sun-Moon) in SAF Games and Bangladesh Olympic.
- DIU Student Hemanta Sadik's film 'A Letter to God' won 'Best Drama' & 'Jury Award' at Hollywood and Norway
- DIU student Mohua Afroz obtained 7th position in 34th BCS Admin Cadre.
- Students' projects: Solar Car, Drone, Humanoid Robot "Dbot"
- First ever private university in Bangladesh to confer D.Litt. degree upon Dr. Achyuta Samanta, Founder of KIIT University and KISS, India.
- Especially known for its ICT-based academic and administrative services and ranked high by Web metrics.
- Ranked No. 1 among all Bangladeshi universities for its green campus by 'UI Green Metric World University Ranking 2017'
- The Duke of Edinburgh's International Award has been launched at DIU.



## Graphic presentation of growth of DIU from 2012 to 2018 is shown below:

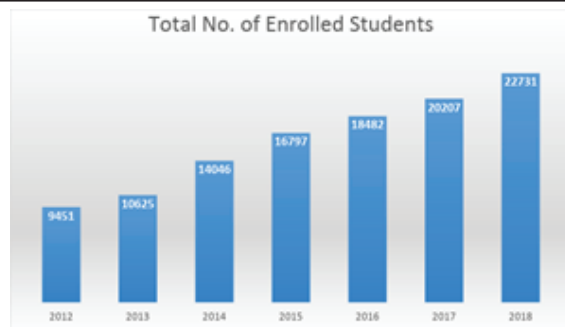


Figure 1: Growth of student enrolment from 2012 to 2018

During the last 6 years, student enrollment at DIU has increased steadily. In 2012 the total number of registered students was 9451 whereas in 2018, the total number of registered students was 22731.



Figure 3: Growth of Faculty Members from 2012 to 2018

The number of Faculty Member is also increasing. The total number of teachers in 2012 was 224 whereas in 2017 the total number of teachers were increased to 871

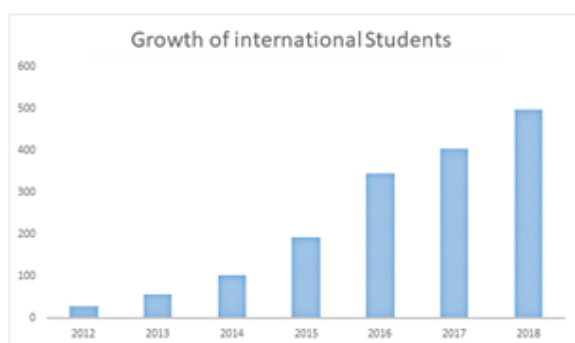


Figure 2: Growth of International student enrolment from 2012 to 2018

In 2012, a total number of 29 foreign students were admitted, 404 in 2017 and 498 in 2018. Out of the 498 foreign students admitted in 2018, 266 students were admitted in Master's degree programs and the rest in Bachelor's degree programs. The international students have been from Turkey, Nepal, Somalia, Nigeria, Ethiopia, Kenya, Italy and Djibouti.

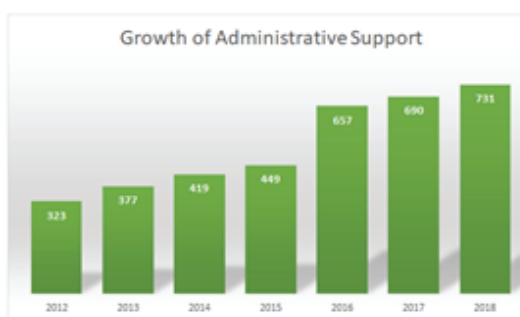


Figure 4: Growth of Administrative Support from 2012 to 2018

In 2012, the total number of Administrative Officials was 323 whereas in 2018 the number is increased to 731.



Figure 5: Growth of Number of Approved Programs from 2012 to 2018

DIU started its journey in 2002 with only 5 undergraduate programs. With the advancement of Science and Technology and the demand of the local and international market, DIU opened different programs from time to time. DIU is the first university in the country which offered CSE, SWE, TE, Real Estate, ESDM, MCT and Entrepreneurship, among others with a view to building up skilled manpower for local and international markets.

In 2018, DIU offered a total of 36 programs, out of which 13 were Master's programs, 21 were Bachelor's programs and one was Post Graduate Diploma program.

DIU has introduced PhD programs in collaboration with many foreign universities like USIM, CNU, KIIT, UniMAP, OUM, and UM. A total of 16 teachers and officials are pursuing their PhDs under these programs.



Figure 6: Growth of Foreign collaboration from 2012 to 2018

To provide its students with a global fitness, DIU is always in touch with world organizations, among others: ITU, UNGC, ACBSP, ACU, ESRUC, IAU, IAUP, IIE, ACE, AUPF, ANUB, ALA, AMDISA, ATIFTAP, EAIE, CEA, IEEE, ISTQB, NAFSA, UNAI, APUCEN, GUPES, CYFI, Kauffman, GAA, GEN, ACD, EURAS, Magna Charta Observatory, IFLA and UMAP International Secretariat

## Keynote Address I

**Talk Title: Cyber Physical System Cyber security Challenges and Opportunities.**



**Jemal H. Abawajy**

Professor, PhD, DSc., SMIEEE

Faculty of Science, Engineering and Built Environment,  
Deakin University, Australia

Email: jemal.abawajy@deakin.edu.au

**Abstract:**

Industrial Control Systems (ICS) are critical industrial infrastructures that control physical processes such as power, water, gas, and transport infrastructure. Until recently, industrial networks were isolated from the business network and the Internet. The necessity to improve existing processes and extend operational systems have meant extending ICS connectivity to the business network and the Internet. This connectivity exposes the previously isolated ICS to a variety of cyber threats. A successful cybersecurity attacks on ICS can seriously undermine the social welfare, ecological and economics of a nation. In this talk, we will discuss cybersecurity trends, issues and challenges facing various critical components of ICS such as the controller, supervisory software and control network. We will present state-of-the-art approaches developed to address the cybersecurity issues of ICSs. We will also introduce our latest work that is based on deep learning to detect various anomalies and the results of practical experiments.

**Biography:**

Jemal H. Abawajy is a full professor at the Faculty of Science, Engineering and Built Environment, Deakin University. His research spans cyber-security, Internet of Things (IoT), Cloud Computing, Data Science and Big Data Intelligence. He is a Senior Member of IEEE Society; and serves as an associate editor on many journals. He has also served on numerous international conferences as a chair and vice chair. He has published more than 350 research papers and several books. He is currently the leader of the cyber-physical systems research group at Deakin University.

## Keynote Address II

### Talk Title: Spam Mail Detection using Hierarchical Temporal Memory



#### **Assoc. Prof. Dr. Oguz Findik**

Associate Professor Dr.

Karabük University, Turkey

Email: oguzfindik@karabuk.edu.tr

#### **Abstract:**

The Internet offers powerful technology that enables people to communicate and interact around the world. In e-mail systems, which are a common communication tool in the internet environment, spam used to spread threats has become an important problem in computer security. Generally, anti-spam strategies have been developed with statistical or trained machine learning approaches to solve the problem robustly. In this study, Hierarchical Temporal Memory (HTM), which aims to mimic the architecture and algorithmic properties of the neocortex, has been created with a spam filter. In this study, input data is encoded and converted into semantically converted input data. As the first step for semantic coding, the semantic distances of the documents are taken into consideration. After that semantic fingerprints of sentences were created for the contents. The Spatial Pooling (SP) model, an important component of HTM, is required for the creation of sparse distributed representations (SDR) for semantic fingerprints as input. The SP model provides to learn the feedforward connections of neurons and converting input into efficient representations. When SDRs with SP model's output are classified, it is observed that the HTM approach gives successful results over 90%.

#### **Biography:**

Dr. Oguz FINDIK received his Bachelor's, Master's and PhD degrees in the Computer Engineering from Selcuk University, Engineering Faculty, Turkey. He worked in Encryption in Master's thesis and watermarking in PhD. He started working at Selçuk University Computer Engineering Department in 2000 as a research assistant. In 2012, he worked as an assistant professor at Abant İzzet Baysal University in Computer Engineering Department. He is an Associate Professor in the Computer Engineering Department in the Karabuk University, Turkey. His research about artificial intelligence, swarm optimization and natural language processing.

In addition to the articles he published in his fields of study, he launched the International Conference on Advanced Technologies, Computer Engineering and Science (ICATCES) (icatces.org) conference series. He has been working as a chair at the 3rd Conference held in 2020. He is also one of the organizers of the first ICONCS conference in Turkey. Also, He is an editor in Engineering Science and Technology an International Journal (JESTECH) that is belong to Karabuk University, and this Journal covered by Science Citation Index Expanded since 2017.



## Keynote Address III

### Talk Title: Malware Analysis using Artificial Intelligence and Deep Learning



#### Mamoun Alazab, Phd

Associate Professor

Charles Darwin University, Australia

Email: [mamoun.alazab@cdu.edu.au](mailto:mamoun.alazab@cdu.edu.au)

#### Abstract:

Malicious software is one of the most serious threats to information security today. Malware analysis is a fast-growing field demanding a great deal of attention because of remarkable progress in social networks, cloud and web technologies, e-commerce, mobile environments, smart grids, Internet of Things (IoT), etc. Due to this evolving cyber threat landscape, legacy solutions built on specified rule sets, such as signature-driven security capabilities, cannot scale to fully meet the demand of advanced malware and other cybercrime detection and prevention. Artificial Intelligence (AI) and Deep Learning (DL) techniques have been successfully applied to many computer applications. These solutions often provide significant study, Hierarchical Temporal Memory (HTM), which aims to mimic the architecture and algorithmic properties of the neocortex, has been created with a spam filter. In this study, input data is encoded and converted into semantically converted input data. As the first step for semantic coding, the semantic distances of the documents are taken into consideration. After that semantic fingerprints of sentences were created for the contents. The Spatial Pooling (SP) model, an important component of HTM, is required for the creation of sparse distributed representations (SDR) for semantic fingerprints as input. The SP model provides to learn the feedforward connections of neurons and converting input into efficient representations. When SDRs with SP model's output are classified, it is observed that the HTM approach gives successful results over 90%.

#### Biography:

Mamoun Alazab is the Associate Professor of cybersecurity at Charles Darwin University, he is a cybersecurity researcher and practitioner with industry and academic experience. In 2012, He completed his Ph.D. degree in Computer Science from the Federation University of Australia. His research is multidisciplinary that focuses on cybersecurity and digital forensics, with a focus on cybercrime detection and prevention. His cybersecurity research includes current and emerging issues in Cyber-Physical Systems (CPS) and the Internet of Things (IoT) systems, taking into consideration the unique challenges present in these environments. He looks into the intersection use of machine learning as an essential tool for cybersecurity, for example, detecting attacks, analyzing malicious code or uncovering vulnerabilities in software. He has more than 100 research papers, including his three recent edited books (Deep Learning Applications for Cyber Security, 2019, Springer), (Blockchain for Cybersecurity and Privacy: Architectures, challenges, and applications, 2019, CRC Press, Taylor & Francis), and the new upcoming book (Malware Analysis using Artificial Intelligence and Deep Learning, 2020, Springer).

He delivered many invited and keynote speeches, 24 events in 2019 alone including panel participation. He convened and chaired more than 50 conferences and workshops. He works closely with the government and industry on many projects. He is an editor on multiple editorial boards including Editor of the Security and Communication Networks Journal, and Book Review Section Editor: Journal of Digital Forensics, Security and Law (JDFSL). He is a Senior Member of the IEEE. Currently, he is the founding chair of the IEEE Northern Territory Subsection, since Feb 2019. He worked closely on several governments and industry cybersecurity collaborative projects, including IBM,

Microsoft, the Australian Federal Police (AFP), Northern Territory (NT) Department of Information and Corporate Services, Australian Communications and Media Authority (ACMA), Westpac Bank, TrendMicro, Computer Emergency Response Team (CERT) Australia, National Police Agency (Japan), Oman Computer Emergency Response Team (OCERT), and Attorney General's Department. He also consulted for the United Nations Office on Drugs and Crime (UNODC), and other industry groups.

## Planary Session I

### Talk Title: IEEE Computer Society: Prospects and Opportunities for Researchers in Bangladesh

#### Prof. Dr. Md. Abdur Razzaque

Pro Vice-Chancellor, Green University of Bangladesh &  
Chair, IEEE Computer Society Bangladesh Chapter

IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity with the vision of pioneering and recognizing research activities throughout the world. Standing on the same ground, IEEE Computer Society (IEEE CS) acts as the premier source for information, inspiration, and collaboration in computer science and software engineering arena. By connecting researchers worldwide, IEEE CS empowers the people who advance technology by delivering tools for individuals at all stages of their computing professional careers. It provides resources include international conferences, peer-reviewed publications, a robust digital library, globally recognized standards, and continuous learning opportunities. As it has more than 70 years of innovation and leadership involvements, strong research networks among 170+ countries, 200+ conferences, a digital library with 800k articles, online education and a solution center, therefore, we believe it can be a great resource for the Bangladeshi researchers to develop and organize their research activities and keep them paced with the diversified emerging technologies. This talk will deliver diverse international fund opportunities, scholarships, and special technical communities offered by IEEE Computer Society for Bangladeshi researchers.

Dr. Md. Abdur Razzaque received his BS in Applied Physics and Electronics and MS in Computer Science from the University of Dhaka, Bangladesh in 1997 and 1999, respectively. He obtained PhD in Computer Engineering from Kyung Hee University, South Korea in August, 2009. He was a research professor, College of Electronics and Information, Kyung Hee University, South Korea during 2010-2011. He worked as a visiting professor in Stratford University, Virginia, USA in 2017. He is a Professor (on leave) in the Department of Computer Science and Engineering, University of Dhaka, Bangladesh. He is the director of Green Networking Research Group (<http://gnr.cse.uni-vdhaka.edu>) of the same department. He is now working for Green University of Bangladesh as Pro Vice Chancellor and Dean of Faculty of Science and Engineering. He has been promoting Outcome Based Education for Science and Engineering Faculties of leading universities of the country. He was the principal investigators of some national and international research projects funded by Government of Bangladesh and Information Society Innovation Fund (ISIF) Asia. His research interest is in the area of modeling, analysis and optimization of wireless networking protocols and architectures, Wireless Sensor and Body Area Networks, Sensor Data Clouds, Internet of Things, Cognitive Radio Networks, etc. He has published 130+ research papers in international conferences and journals. He is an Associate Editor of IEEE Access, editorial board member of Journal of Networks and Applications (JNCA, Elsevier), and International Journal of Distributed Sensor Networks, General Chair of STI 2020-2019, TPC Chair of ICIET 2019-2018, TPC member of IEEE HPCC, ICOIN, SCALCOM, SKIMA, ICIEV, ADM, NSysS, ICACCI, etc. He is a senior member of IEEE, member of IEEE Communications Society, IEEE Computer Society, Internet Society (ISOC), Pacific Telecommunications Council (PTC) and KIPS.

## Paper #002

### T-way Strategy for Test Case Generation (Sequence less Input Interaction) Inspired by Fish Swarm Searching Algorithm

**Dalia Sultana<sup>1</sup>, Mostafijur Rahman<sup>1\*</sup>, Khandker M Qaiduzzaman<sup>1</sup>,  
Md. Hasibul Hasan<sup>1</sup>, R. B. Ahmad<sup>2</sup>, Rozmie Razif Othman<sup>2</sup>**

<sup>1</sup>*Department of Software Engineering, Daffodil International University, Bangladesh*

<sup>2</sup>*School of Computer and Communication Engineering, Universiti Malaysia Perlis, Malaysia*

*Email: mostafijur.cse@gmail.com*

**Abstract.** Since twenty years, several t-way strategies have been developed for Combinatorial Input Interaction (CII) based system to reduce the number of test cases in the test suite. The t-way strategy can be applied to Sequence-less CII system, where all inputs are parameterized and parallel. From the literature, the searching methods used in t-way strategies are divided into deterministic and nondeterministic to generate several test cases for reducing test cases for all test configurations. There are few t-way deterministic strategies (such as: AETG, IPOG, Jenny, TVG, Tconfig, GTway, ITTSG, etc.) and t-way non-deterministic strategies (such as: HSS, PSTG, CSS, SA, GA, BTS, TWIIT) are developed. It is found that t-way strategy is an NP-hard problem; no deterministic and nondeterministic t-way strategies able to claim that their strategy can generate the optimal number of test cases for all test configurations. In this research, an Interactive t-way Test Case Generation (ITCG) algorithm is proposed to integrate with t-way strategy and evaluate the generated number of test cases comparing with existing t-way strategies. The results show that the proposed t-way test case generation inspiring Fish Swarm Searching Algorithm for sequence-less combinatorial input interaction able to generate optimal and feasible results for the different test configurations.

**Keywords:** Software testing, Combinatorial input interaction, T-way test strategy, Sequence less input interaction, Fish swarm search

## Paper #006

### Sightless Helper: An Interactive Mobile Application for Blind Assistance and Safe Navigation

**Md. Elias Hossain\*, Khandker M Qaiduzzaman, Mostafijur Rahman**  
*Department of Software Engineering, Daffodil International University, Bangladesh*  
*Email: elias35-1426@diu.edu.bd*

**Abstract.** This paper proposes a mobile application named “Sightless Helper”, for assisting blind or visually impaired people. The application uses footstep counting and GPS for indoor and outdoor navigation. It can detect objects and unsafe areas to ensure safe navigation. The system consists of voice recognition, touchpad, button and shaking sensor for easy interaction between the user and the system. During any kind of accident, it can detect unusual shaking of the user, and send his/her location to some emergency contacts. “Sightless Helper” provides several useful additional features such as calendar, news reading, barcode reading, battery monitoring, etc. The performance of the application is tested considering voice recognition time and location sending time. The experimental result shows that the voice recognition time of the application is around 6.303 ms and 6.375 ms for male and female voices respectively. The average location sending time is nearly 7.629 ms to any distance. The usability test result reveals that the proposed application has an average 72.2% System Usability Scale (SUS) score, showing its suitability for practical implementation.

**Keywords:** Android application, Visually impaired people, Object identifications, GPS navigation

## Paper #017

### A Vulnerability Detection Framework for CMS Using Port Scanning Technique

**Md. Asaduzzaman\*, Proteeti Prova Rawshan, Nurun Nahar Liya, Muhmmad Nazrul Islam, Nishith Kumar Dutta**

*Department of Computer Science and Engineering, Military Institute of Science and Technology, Dhaka-1216, Bangladesh  
Email: asadbd45@gmail.com*

**Abstract.** In the era of technology, attack on computer infrastructure is considered as the most severe threat. Web server is one of the most important components of this infrastructure. Preventive measures must be taken to deal with these attacks on the web servers. For this reason, vulnerability detection needs to be carried out in an effective way and should be mitigated as soon as possible. In this paper, an effective framework for vulnerability detection of web application is proposed. This framework targets the web applications developed with content management systems (CMSs). It obtains prior knowledge of the vulnerable extensions of a specific CMS from its contributors. The framework is run against a target web server using a well-known port scanning tool, Nmap. It checks if there is any existing matches for the vulnerable extension installed in that web application. Finally, the framework gives an output comprised of the installed extensions along with the installed vulnerable extensions in that web application. Although the output result is shown in the Nmap console, the framework is a segregated entity that works in collaboration with Nmap. Thus this framework can be well-utilized by the security specialists to assess the security of a web application in an easier and effective way and also to evaluate vulnerability of web servers; hence shielding the web applications from various kinds of security threats.

**Keywords:** Security scanner, Port scanning, Content management system, CMScan, Nmap Scripting Engine

## Paper #032

### A New 8-Directional Pixel Selection Technique of LSB Based Image Steganography

**Sheikh Thanbir Alam<sup>1,2</sup>, Nusrat Jahan<sup>1</sup>, Md. Maruf Hassan<sup>1,2</sup>**

<sup>1</sup> Daffodil International University, Dhaka, Bangladesh

<sup>2</sup> Cyber Security Center, DIU, Dhaka, Bangladesh.

Email: maruf.swe@diu.edu.bd

**Abstract.** Pixel selection for data hiding becomes crucial for the solutions in spatial domain of steganography to ensure imperceptibility. This paper presents an efficient approach of pixel selection technique for hiding secret data in cover object of image steganography. After reviewing recent literature, it has been observed that most of the works on pixel selection uses zig-zag technique for their solution. However, it becomes very prone to steganalysis based attacks by the intruders. In this study, 8-directions pixel selection technique is proposed to embed data in the cover image where Least Significant Bit (LSB) method has been used on Red, Green and Blue (RGB) color image especially focused on JPG, JPEG, and PNG. Since this projected procedure avoids the known steganalysis techniques, it will be challenging for the attacker to recognize the presence of secret information from the stego image. To measure the quality, statistical analysis has been performed where the value of the quality measurement matrices has provided better results.

**Keywords:** Image Steganography, Pixel selection technique, Least significant Bit (LSB), RGB.

## Paper #037

## Analysis of Agent-based &amp; Agent-less Sandboxing for Dynamic Malware Analysis

Md. Zaki Muzahid<sup>1\*</sup>, Mahsin Bin Akram<sup>1</sup>, A K M Alamgir<sup>2</sup><sup>1</sup>Dept. of Computer Science & Engineering, University of Dhaka<sup>2</sup>Dept. of Electrical & Electronic Engineering,

Daffodil International University Dhaka, Bangladesh

Email: emonssj7@gmail.com

**Abstract.** Observing and experimenting with malware with full user control have been complex and difficult to say the least. As time goes on, malwares are becoming more advanced and has the ability to realize that the environment they are targeting is virtual, thus shutting their process and leaves the testers unable to analyze further. To combat this problem, a sandbox can be used to test these malwares through modifications. The sandbox is needed to create a dummy virtual environment to test the malwares on, and modifications on the said environment will allow more controlled and specified testing. Bypassing intelligent Malware for in depth analysis will be successful. Dynamic analysis will be performed, specifically agent-based using Cuckoo open-source sandbox and agent-less using DRAKVUF by hypervisor and virtualization extension. Analysis result will be classified over few pre-defined criteria including network requests, system injections and modifications, security measures and kernel alteration; ultimately proving which technique is appropriate and reliable for prominent malware analysis.

**Keywords:** Malware, Sandbox, Virtualization, Agent-based, Agent-less, Hypervisor, Analysis.

## Paper #042

## A Study of FastText Word Embedding Effects in Document Classification in Bangla Language

Pritom Mojumder<sup>1</sup>, Mahmudul Hasan<sup>2</sup>, Md. Faruque Hossain<sup>1</sup>, K.M Azharul Hasan<sup>2</sup><sup>1</sup> Department of Electronics and Communication Engineering, Khulna University of Engineering & Technology, Khulna 9203, Bangladesh <sup>2</sup>

Department of Computer Science and Engineering, Khulna University of Engineering &amp; Technology, Khulna 9203, Bangladesh

Email: pritom@ieee.org

**Abstract.** Natural language processing is the current topic due to many important tasks like document classification, named entity recognition, opinion mining, sentiment analysis, textual entailment, etc. Such types of task in the Bangla language is also important. This research work endeavored to find out the word embedding of the Bengali language. Leveraging the fastText word embedding, it has shown significant performance in Bangla document classification without any preprocessing like lemmatization, stemming, and others. For the extrinsic evaluation of our word vectors, a classification problem-solving strategy has been used which showed an outstanding result. In the classification module, attempts have been made to classify 40 thousand News samples into 12 categories. For this purpose, three deep learning techniques have been used: Convolutional Neural Network (CNN), Bi-Directional LSTM (BLSTM) and Convolutional Bi-Directional LSTM (CBLSTM) alongside fastText. From the analogous study of all the parameters of every classifier implemented here, we found that the BLSTM technique is the most promising technique for this task. This technique achieved 91.49%, 87.87%, and 85.5% accuracies for Training, Testing, and Validation set, respectively.

**Keywords:** Natural language processing, Word embedding, Deep learning.



## Paper #045

### An Enhancement of Kerberos Using Biometric Template and Steganography

Munira Tabassum<sup>1,2</sup>, Afjal H. Sarower<sup>1</sup>, Ashrafia Esha<sup>2</sup>, Md. Maruf Hassan<sup>1,2</sup>

<sup>1</sup>*Daffodil International University, Dhaka, Bangladesh*

<sup>2</sup>*Cyber Security Center, DIU, Dhaka, Bangladesh.*

*Email: maruf.swe@diu.edu.bd*

**Abstract.** Kerberos, a renowned token based authentication protocol, which is famous since mid-80's for its cryptographic process, assurance of privacy, and data security for identifying appropriate users. Due to its versatile characteristics, users of the system often need to remember complex passwords as the good practice of the method requires update of the same within a defined time-frame which becomes bit difficult for users to cope up with. At the same time, it also not provides adequate channel security to transmit the user credential between the pathway of the client and server. Therefore, researchers are trying to find out a simple solution where user does not necessitate to memorize the passwords where it could guarantee better user validation. In this paper, an enhancement of Kerberos authentication model has been proposed where biometric template and Steganography are incorporated to solve the existing weaknesses. Instead of taking username and password, the new solution will take a pair of random fingerprints from the user and convert it into a hash. It will then embed the hash in the randomized image and send it to the server for authentication. A security analysis of the proposed protocol is proven using BAN logic in this article where it ensures reliability, practicability and security of the enhanced Kerberos protocol.

**Keywords:** Cyber security, Authentication, Kerberos protocol, Image steganography.

## Paper #046

### Machine Learning Techniques for Predicting Surface EMG Activities on Upper Limb Muscle: A Systematic Review

Joy Roy<sup>1</sup>, Md. Asraf Ali<sup>1\*</sup>, Md. Razu Ahmed<sup>1</sup>, Kenneth Sundaraj<sup>2</sup>

<sup>1</sup>*Department of Software Engineering, Daffodil International University, Bangladesh*

<sup>2</sup>*Centre for Telecommunication Research & Innovation, Fakulti Kejuruteraan Elektronik & Kejuruteraan Komputer, Universiti Teknikal Malaysia Melaka, Durian Tunggal, Malaysia*

*Email: asraf.swe@diu.edu.bd*

**Abstract.** The aim of this review study is to analyze the techniques for predicting the surface EMG activities on upper limb muscles using different machine learning algorithms. In this study, we followed a systematic searching procedure to select articles from four different online databases, i.e. PubMed, Science Direct, IEEE Xplore and Biomed Central (published years between 2010 and 2018). In our searching procedure, we searched by characteristically with two keywords ("EMG" and "Machine Learning") in the above four listed databases to find the related articles in the field of machine learning techniques for predicting surface EMG activities on upper limb muscles. From the searching of this review, we selected total 25 articles for predicting surface EMG signals on upper limb muscles, where 10 articles are provided most efficient and effective classifier of surface EMG signals, 11 articles described different hand gesture recognition using machine learning algorithms, 2 articles explained that the importance of muscles selection, 1 article presented the natural pinching technique and 1 article focus on evaluation error rate of movements. This review presents not only the machine learning techniques for prediction of surface EMG activities on upper limb muscles but also it focuses on the challenge of the machine learning techniques for predicting surface EMG data. In addition, we believe that this review also provides muscle related issues that will impact the prediction of surface EMG activities on muscle.

**Keywords:** Surface Electromyography, Machine learning, Prediction, Muscle Activity, Upper Limb.



## Paper #060

### Framework for the Optimal Design of an Information System to Diagnostic the Enterprise Security Level and Management the Information Risk Based On ISO/IEC-27001

Christopher A. Kanter-Ramirez<sup>1,2</sup>, Josue A. Lopez-Leyva<sup>1</sup>, Lucia Beltran-Rocha<sup>1</sup>, Dominica Ferková<sup>3</sup>

<sup>1</sup>CETyS University, Ensenada BC 22860, Mexico

<sup>2</sup>Softtek S.A. de C.V., Ensenada BC 22760, Mexico

<sup>3</sup>University of Applied Sciences Upper Austria, 4600, Austria

Email: josue.lopez@cetys.mx

**Abstract.** This paper presents the framework for the optimized development of a digital platform based on ISO/IEC-27001 with the objective of making an initial diagnosis regarding the informatics security level in any company. In addition, the optimization process considers that the diagnostic results should be clear and direct, to making possible the fast security risk mitigation. In particular, the optimization process is based on the analysis of a conventional Management Information System framework in order to propose a novel customized framework for ISO/IEC-27001 applications. Thus, an optimized Management Information System is proposed which is the basis of the optimized digital platform. As preliminary results, the reduction of needed elements for the initial diagnosis for the informatics security promotes the simplicity of the application and thus, increases the possibility of applying the ISO/IEC-27001 to a greater amount of users, which means that it is promoted cybersecurity.

**Keywords:** Security level, ISO/IEC-27001, Optimal design

## Paper #062

### A Risk Based Analysis on Linux Hosted E-Commerce Sites in Bangladesh

Rejaul Islam Royel, Md. Hasan Sharif, Rafika Risha, Touhid Bhuiyan, Md. Maruf Hassan

Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh

Email: maruf.swe@diu.edu.bd

**Abstract.** E-commerce plays a significant role to grow its business globally by satisfying the modern consumer's expectations. Without the help of Operating System (OS), e-commerce applications cannot be operated as well as broadcasted on the web. It is evident after analyzing this study that web administrators of the business are sometimes being careless, in some cases unaware about the risk of cyber-attack due the lack of vulnerability research on their OS. Therefore, a good number of the e-commerce applications are faced different type of OS exploitations through different types of attack e.g. denial of service, bypass, DECOVF, etc. that breaches the OS's confidentiality, integrity and availability. In this paper, we analyzed 140 e-commerce sites servers' information and its related 1138 vulnerabilities information to examine the risks and risky versions of the OS in e-commerce business. The probabilities of vulnerability are calculated using Orange 3 and feature selection operation has been performed using Weka through IBM statistical tool SPSS. This study identifies few versions of Ubuntu that are found in critical status in terms of risk position.

**Keywords:** Cyber security, Operating system, OS vulnerability, Ecommerce website, Risk analysis.

## Paper #072

**An Investigation and Evaluation of N-Gram, TF-IDF and Ensemble Methods in Sentiment Classification**

**Sheikh Shah Mohammad Motiur Rahman<sup>1</sup>, Khalid Been Md. Badruzzaman Biplob<sup>1</sup>, Md. Habibur Rahman<sup>2</sup>, Kaushik Sarker<sup>1</sup>, Takia Islam<sup>1</sup>**

<sup>1</sup> Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh

<sup>2</sup> Department of Information and Communication Technology, Mawlana Bhashani Science and Technology University, Santosh, Tangail, Bangladesh

Email: motiur.swe@diu.edu.bd

**Abstract.** In the area of sentiment analysis and classification, the performance of the classification tasks can be varied based on the usage of text vectorization and feature extraction methods. This paper represents a detailed investigation and analysis of the impact on feature extraction methods to attain the highest classification accuracy of the sentiment from user reviews. Unigram, Bigram and Trigram are applied as n-gram vectorization models with TF-IDF features extraction method individually. Accuracy, misclassification rate, Receiver Operating Characteristics (ROC) and recall-precision are used in this study to evaluate which are counted as the most important performance measurement parameters in machine learning based approaches. Parameters are measured by the output obtained from Bagged Decision Tree (BDT), Random Forest (RF), Ada Boost (ADA), Gradient Boost (GB) and Extra Tree (ET). The outcomes of this study is to find out the best fitted combination of term frequency inverse document frequency (TF-IDF) and n-grams for different data size.

**Keywords:** Sentiment classification, N-gram techniques, TF-IDF, Ensemble methods.

## Paper #073

**Development of a Tangent Based Robust Speech Feature Extraction Model**

**Mohammad Tareq Hosain<sup>1</sup>, Abdullah Al Arif<sup>1</sup>, Ahmed Iqbal Pritom<sup>1</sup>, Md Rashedur Rahman<sup>2</sup>, Md. Zahidul Islam<sup>1</sup>**

<sup>1</sup> Department of CSE, Green University of Bangladesh, Dhaka, Bangladesh

<sup>2</sup> Department of CSE, Islamic University of Technology, Gazipur, Bangladesh

Email: mtareqhosain@gmail.com

**Abstract.** An accurate speech recognition system requires close observation of the selection of an error-free speech feature extraction model. This paper describes a prominent solution to obtain robust features from the sound spectrum and ensures the easy recognition of speech. The proposed architecture uses Tangent based (TB) auditory feature extraction that aims to find and process robust features from the sine wave of auditory signal data. This experiment suggests that every specific tune carries distinguishing signal patterns in the spectrum diagram and hence does the tangent of the amplitude of the same signal. To recognize the sound, a single attribute had been used rather than using multiple attributes where the slope of the sound spectrum being calculated.

**Keywords:** Tangent based (TB) feature extraction, Sound spectrum, Signal processing, Speech recognition

**Paper #081****Prevalence of Machine Learning Techniques in Software Defect Prediction**

**Md Fahimuzzman Sohan<sup>1</sup>, Md Alamgir Kabir<sup>1</sup>, Mostafijur Rahman<sup>1</sup>, Touhid Bhuiyan<sup>1</sup>, Md Ismail Jabiullah<sup>1</sup>, Ebubeogu Amarachukwu Felix<sup>2</sup>**

<sup>1</sup> *Daffodil International University, Dhaka, Bangladesh*

<sup>2</sup> *University of Malaya, Kuala Lumpur, Malaysia*

*Email: sohan35-1284@diu.edu.bd*

**Abstract.** Software Defect Prediction (SDP) is a popular research area which plays an important role for software quality. It works as an indicator of whether a software module is defect-free or defective. In this study, a review has been conducted from January 2015 to August 2019 and 165 articles are selected in the area of SDP to know the prevalence of Machine Learning (ML) techniques. These articles are collected by searching in Google Scholar, and they are published in various platforms (e.g., IEEE, Springer, Elsevier). Firstly the information has been extracted from the collected particles, and then the information has been pre-processed, categorized, visualized, and finally, the results have been reported. The result shows the most frequently used data sets, classifiers, performance metrics, and techniques in SDP. This investigation will help to find the prevalence of ML techniques in SDP and give a quick view to understand the trends of ML techniques in defect prediction research.

**Keywords:** Software defect prediction • Machine learning techniques • Software defects • Defect prediction technique

**Paper #084****A Large-Scale Investigation to Identify the Pattern of Permissions in Obfuscated Android Malwares**

**Md. Omar Faruque Khan Russel, Sheikh Shah Mohammad Motiur Rahman, Takia Islam**

*Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh*

*Email: russel35-1170@diu.edu.bd*

**Abstract.** This paper represents a simulation-based investigation of permissions in obfuscated android malware. Android malware detection has become a challenging and emerging area to research in information security because of the rapid growth of android based smartphone users. To detect malwares in android, permissions to access the functionality of android devices play an important role. Researchers now can easily detect the android malwares whose patterns have already been identified. However, recently attackers started to use obfuscation techniques to make the malwares unintelligible. For that reason, it's necessary to identify the pattern used by attackers to obfuscate the malwares. In this paper, a large-scale investigation has been performed by developing python scripts to extract the pattern of permissions from an obfuscated malwares dataset named Android PRAGuard Dataset. Finally, the patterns in a matrix form has been found and stored in a Comma Separated Values (CSV) file which will lead to the fundamental basis of detecting the obfuscated malwares.

**Keywords:** Android Malware, Obfuscated Malware, Permission Pattern, Pattern Identification.

## Paper #089

### Convolutional Neural Networks Based Bengali Hand-written Character Recognition

**Sudarshan Mondal\* and Nagib Mahfuz**

*Department of Computer Science and Engineering, North Western University, Bangladesh*

*Email: sudarshaana@gmail.com*

**Abstract.** With the increment of computation power, recognizing handwritten Character has become popular and significant improvement has been achieved for most of the major languages. But Bengali character recognition system is not well enough because of the presence of perplexing character and excessive cursive in its characters. Although several research works have been conducted for recognizing the Bengali characters, an efficient procedure is yet to discover. As the number of datasets is inadequate, most of these studies could not achieve a satisfactory level. So we propose here to train a Convolution Neural Network (CNN) and tune the parameters for better accuracy. This procedure is applied to CMATERDB 3.1.2 dataset with 15000.

**Keywords:** Handwritten Character Recognition (HCR), Image processing, Convolution Neural Network (CNN), Parameters tuning.

## Paper #091

### Retrospective Analysis of Hematological Cancer by Correlating Hematological Malignancy with Occupation, Residence, Associated Infection, Knowledge and Previous Cancer History in Relatives

**Nurbinta Sultana<sup>1</sup>, Khaled Sohel Mohammad<sup>1\*</sup>, Hassanat Touhid<sup>2</sup>**

<sup>1</sup> *Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh.*

<sup>2</sup> *Gonoshasthaya Samaj Vittik Medical College, Savar, Bangladesh*

*Email: khaledsohel@daffodilvarsity.edu.bd*

**Abstract.** Cancer incidences are increasing day by day and has become a global burden now. The incidences are frequently occurring in low-income countries like Bangladesh. A retrospective descriptive type of study had been carried out by us over 500 patients of hematological cancer in Bangladesh. The “French American British” classification of hematological cancer is used to carry out the morphological typing. We have correlated Hematological Malignancy (HM) with occupation, residence, associated infection, idea about cause of cancer and previous cancer history in relative. The analysis showed the diagnosed cancers are positively co-related with gender, occupation & idea about cause of cancer and negatively co-related with division, previously cancer history in relatives & associated disease. Our study shows the risk factor and the distribution pattern of hematological malignancy in the area of Bangladesh. It presents the distribution pattern of HM according to Age, Gender & correlation of HM with occupation, residence & other factor.

**Keywords:** Retrospective analysis of hematological malignancy, Hematological cancer in Bangladesh, Blood cancer, Cancer related to gender and occupation. Hematological malignancy. Correlation of blood cancer to gender and occupation.

## Paper #100

## Analysis of Software Defined Wireless Network with IP Mobility in Multiple Controllers Domain

Md. Habibur Rahman<sup>1,2</sup>, Nazrul Islam<sup>1</sup>, Asma Swapna<sup>3</sup>, Md. Ahsan Habib<sup>1</sup><sup>1</sup> Mawlana Bhashani Science and Technology University, Tangail, Bangladesh<sup>2</sup> Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh<sup>3</sup> Universidade Estadual de Campinas, Barão Geraldo, 13083-970, Brazil

Email: mdhabibur.r.bd@ieee.org

**Abstract.** Software Defined Networking (SDN) approach is a generalized concept that de-couples software plane from the hardware plane of a network. SDN can be an alternative to well-defined protocol stack, scalability, and full resource management capabilities. SDN for wireless environment became a popular research field for future deployment. Therefore, performance issues of Software Defined Wireless Networking (SDWN) have become important in order to study and analyze the underlying network design, scope, and capabilities. This research work represents the performance analysis of SDWN for multiple domains and inter-controller communication. Integration of IP mobility with the Mobile Nodes (MN) affects TCP throughput, bandwidth, transmission jitter and latency of underlying SDWN. This paper concludes that SDWN has both integrated performance in efficient handoff through IP mobility solution and somewhere penalties as well in terms of inter-controller communication. In the end, a comparative study with distributed mobility solutions is performed against an IP based model.

**Keywords:** SDWN, Performance Analysis, Wireless Mobility, Mininet Wi-Fi, Mobile IP.

## Paper #102

## Software Process Improvement based on Defect Prevention using Capability and Testing Model Integration in Extreme Programming

Md. Habibur Rahman<sup>1,2</sup>, Ziaur Rahman<sup>1,3</sup>, Md. Al - Mustanjid<sup>4</sup>, Muhammad Shahin Uddin<sup>1</sup>, Mehedy Hasan Rafsan Jany<sup>1</sup><sup>1</sup> Mawlana Bhashani Science and Technology University, Tangail, Bangladesh<sup>2</sup> Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh<sup>3</sup> RMIT University, GPO Box 2476, Melbourne VIC 3001 Australia<sup>4</sup> Daffodil International University, 102/1 Sukrabad, Dhanmondi, Dhaka-1207

Email: mdhabibur.r.bd@ieee.org

**Abstract.** Nowadays, Software Process Improvement popularly known as SPI has been able to receive an immense concern in the continuous process to purify software quality. Several Agile methodologies previously have worked with Extreme programming (XP). Before improving the process, defect prevention (DP) is inevitable. In addition, DP largely depends on defect detection either found earlier in the design and implementation stages or held in the testing phases. However, testing maturity model integration (TMMI) has a crucial aspect in DP as well as process improvement of the software. In particular, when software gets validated by being tested and fixed the defects up, it achieves the maximum capability maturity model integration (CMMI) aiming the process improvement. Here, the article has proposed an improved defect detection and prevention model to enhance the software process following the approach of XP. Besides, as a unique contribution, we have united the capability and testing model integration to ensure better SPI.

**Keywords:** SPI, CMMI, TMMI, Agile, Defect prevention, Extreme Programming.

## Paper #103

### A Novel Disease Diagnosis Tool from Patient's Symptoms

**Shakhawat Hossain<sup>1\*</sup>, Md. Zahid Hasan<sup>2</sup>, Aniruddha Rakshit<sup>2</sup>**

<sup>1</sup> CSE, International Islamic University Chittagong, Chittagong, Bangladesh

<sup>2</sup> CSE, Daffodil International University, Dhaka, Bangladesh

Email: shakhawat.cse@outlook.com

**Abstract.** This paper represents a novel strategy for developing a disease diagnosis gadget from a patient's statement. For that, the system solely accepts patients' statements in a natural language like English and analyzes the patients' statements to prognosis the symptoms the affected person is presently suffering from. The framework forms the patients' discourse and afterward utilizes Term Frequency (TF) to find the indications of a malady. Cosine Similarity is utilized to settle on a final decision with respect to regarding disease diagnosis task. Cosine Similarity quantifies the similitude between two non-zero vectors in a vector space model where one of the vectors is constructed with the symptoms the patient is encountering and the rest is developed during knowledge base setup. The framework is tested over 1013 patients with various ailments and its normal precision is estimated at 98.3.

**Keywords:** Disease diagnosis, Patient's statement, Cosine similarity, Term frequency, Diseases' symptoms.

## Paper #104

### Efficient Query Processing for Multidimensional Data Cubes

**Rejwana Tasnim Rimi and K. M. Azharul Hasan\***

Department of Computer Science and Engineering, Khulna University of Engineering & Technology, Khulna-9203, Bangladesh.

Email: az@cse.kuet.ac.bd

**Abstract.** Data cubes come up with a suitable paradigm for storing, accessing, processing and analysis multidimensional data. Conventional Multidimensional Arrays (CMA) are the basic data structure to process such multidimensional data. But the performance of the MDAs degrades when the number of dimension increases. In this paper, we propose a new approach for computing multidimensional data cube using conversion of dimensions of the multidimensional array. We design efficient algorithms for Multidimensional On Line Analytical Processing (MOLAP) operations using the Converted two dimensional Array (C2A). We represent the MOLAP array as a Converted two dimensional Array where n-dimension is converted into two dimension. Then we apply the operations of data cube namely slice and dice on both CMA and C2A. We calculate the time for slice and dice operations for CMA and C2A. The proposed model requires less time for index computation when number of dimension is high. The cache miss rate is also lower for C2A based implementation. Therefore, our proposed algorithm shows superior performance than the traditional scheme.

**Keywords:** Data cube MOLAP, Query processing, Cache miss, Dimension conversion, Slice, Dice.



## Paper #105

### Conic Programming Approach to Reduce Congestion Ratio in Communications Network

**Bimal Chandra Das<sup>1</sup>, Momotaz Begum<sup>2</sup>, Mohammad Monir Uddin<sup>3</sup>, Md. Mosfiqur Rahman<sup>1</sup>**

<sup>1</sup>*Department of General Educational Development, Daffodil International University, Dhaka, Bangladesh*

<sup>2</sup>*Department of CSE, Dhaka University of Engineering Technology, Dhaka, Bangladesh*

<sup>3</sup>*Department of Mathematics, North South University, Dhaka, Bangladesh*

Email: [bcdas@daffodilvarsity.edu.bd](mailto:bcdas@daffodilvarsity.edu.bd)

**Abstract.** This research introduce a robust optimization model to reduce the congestion ratio in communications network considering uncertainty in the traffic demands. The propose formulation is depended on a model called the pipe model. Network traffic demand is fixed in the pipe model and most of the previous researches consider traffic fluctuation locally. Our proposed model can deal with fluctuation in the traffic demands and considers this fluctuation all over the network. We formulate the robust optimization model in the form of second-order cone programming (SOCP) problem which is tractable by optimization software. The numerical experiments determine the efficiency of our model in terms of reducing the congestion ratio compared to the others model.

**Keywords:** Conic programming, Ellipsoid, Pipe model, Traffic demand, Robust optimization.

## Paper #106

### Diagnosis of Acute Lymphoblastic Leukemia from Microscopic Image of Peripheral Blood Smear Using Image Processing Technique

**Sadia Narjim<sup>1</sup>, Abdullah Al Mamun<sup>2\*</sup>, Diponkar Kundu<sup>1</sup>**

<sup>1</sup>*Department of Electrical and Electronic Engineering, Pabna University of Science and Technology, Pabna 6600, Bangladesh*

<sup>2</sup>*Faculty of Engineering and Technology, Multimedia University, Melaka 75450, Malaysia*

Email: [sadianarjim700@gmail.com](mailto:sadianarjim700@gmail.com)

**Abstract.** At present, cancer is a second leading cause of death which rises the global burden. Among them acute lymphoblastic leukemia is a subtype of blood cancer which is most common in child as well as adults. It occurs when the number of lymphoblast is more producing from stem cells. Over time the accumulation of this abnormal cells in bone marrow prevents to produce other healthy blood cells in our body which is very dangerous. So, early detection is one of the most important which can increase patient's survivability and treatment options. For cancer diagnosis, Ultrasound, Mammogram, MRI and microscopic images are some common methods used in medical science. Some basic detection processes of leukemia are CBC, PBS test and bone marrow test based on microscopic images. For blood cancer diagnosis, microscopic images are used manually which is time consuming and less accurate and can produce non standardized reports. So, it needs to detect leukemia automatically. Recently some computer aided methods are generated to diagnosis leukemia which are more reliable, more accurate, more precise and faster than manual diagnosis methods. In this paper a new automatic system has been proposed to detect all based on several image processing techniques from microscopic image of blood smear such as, segmentation, preprocessing, enhancement for getting better performance. To, classify blast cells and healthy cells ensemble classifier has been used with several types of feature such as, texture features, geometric features, statistic features. In this paper 99.1% accuracy, 98% Sensitivity have been achieved.

**Keywords:** Acute Lymphoblastic Leukemia (ALL), WBCs count, Segmentation, Enhancement techniques, Feature extraction, Classification, MATLAB.



## Paper #107

## An SDN Based Distributed IoT Network with NFV Implementation for Smart Cities

Bivash Kanti Mukherjee<sup>1\*</sup>, Md. Sadiqul Islam Pappu<sup>2</sup>, Md. Jahidul Islam<sup>1</sup>, Uzzal Kumar Acharjee<sup>1</sup><sup>1</sup> Jagannath University, Dhaka, Bangladesh<sup>2</sup> Daffodil International University, Dhaka, Bangladesh

Email: mshunnohridoy@gmail.com

**Abstract.** The Internet of Things (IoT) is an arrangement of connected numerous digital devices usually contained Unique Identifiers (UIDs) and have the capability to exchange data over a network without any human interaction. Another new paradigm Software-Defined Networking (SDN) comes in for the organization and control of the large amount of data produced by IoT devices. It separates the data plane from the control plane of network devices which enables easy configuration and management of those devices. Furthermore, Network Function Virtualization (NFV) is emerged to optimize and secure the SDN-IoT network. It enables network devices to be deployed as virtualized components via software. In this research, the authors have proposed an SDN based distributed IoT network with NFV implementation for smart cities. Where smart city is a residential area which utilizes Information and Communication Technology (ICT) as well as IoT network to develop the standard of living of its residents. The integration of NFV in the SDN-IoT network improves the network performance by increasing throughput, and time sequence while mitigating the round trip time as well. Moreover, the authors have used multiple distributed controllers and a clustering scheme to improve load balancing, scalability, availability, integrity, and security of the whole network.

**Keywords:** IoT, SDN, NFV, Smart city, OpenFlow, Controller, Cluster.

## Paper #112

## Smoke Detection from Different Environmental Conditions using Faster R-CNN Approach Based on Deep Neural Network

Sumayea Benta Hasan\*, Shakila Rahman, Md. Khaliluzzaman, Siddique Ahmed

<sup>1</sup>Dept. of Computer Science and Engineering, International Islamic University Chittagong (IIUC), Chittagong – 4318, Bangladesh.

Email: sumayeahasan05@gmail.com

**Abstract.** From the last few decades, smoke detection performed for noble purposes like to rescue people from fire, make wood-land or wildlife safe from fire disaster and so on. Most of those detections were sensor based where detectors detect smoke optically or by physical processes and which causes false alarm most of the time. By the passing time, the author's tries to overcome those false alarm rates by introducing hand-featured methods. From this perspective, those established systems performed better than sensor based tools. However, coming towards a significant point, in most instances, only one or two certain areas like forest were considered in addressing smoke. Now, moving on this research, we aimed to experience indeed with detecting diverse circumstances smoke by the Faster R-CNN approach based on the Inception-V2 deep neural network. We focused on the single class, i.e., smoke and training the method with images of our own combined extracted image frames. The proposed method achieves 97.31% detection accuracy and is compared to previous approaches to show higher detection accuracy over recent works.

**Keywords:** Smoke detection, Faster R-CNN, DNN, Inception-V2, Hand-featured methods.

## Paper #116

**Chemical Reaction Optimization for Solving Resource Constrained Project Scheduling Problem****Ohiduzzaman Shuvo<sup>1</sup> and Md Rafiqul Islam<sup>2</sup>**<sup>1</sup>*Green University of Bangladesh, Dhaka, Bangladesh*<sup>2</sup>*Khulna University, Khulna, Bangladesh**Email: oheduzzamanshuvo@gmail.com*

**Abstract.** In this paper, a renowned metaheuristic algorithm named chemical reaction optimization (CRO) is applied to solve the Resource Constrained Project Scheduling Problem (RCPSp). This work employed chemical reaction optimization to schedule project tasks to minimize make span concerning resource and precedence constraints. Chemical reaction optimization is a population-based metaheuristic algorithm. CRO is applied to RCPSp by redesigning its basic operators and taking solutions from the search space using priority-based selection to achieve a better result. The proposed algorithm based on CRO is then tested on large benchmark instances and compared with other metaheuristic algorithms. The experimental results have shown that our proposed method provides better results than other states of art algorithms in terms of both the qualities of result and execution time.

**Keywords:** Chemical reaction optimization, Priority based selection, Resource constrained project scheduling problem, NP-hard.

## Paper #117

**Human Age Estimation and Gender Classification using Deep Convolutional Neural Network****Md. Khairul Islam\* and Sultana Umme Habiba***Department of Computer Science and Engineering, Khulna University of Engineering & Technology, Khulna, Bangladesh**Email: mdkislam27@gmail.com*

**Abstract.** At present age estimation and gender classification task has achieved a great importance due to analyzing the category of people in social media, business, customers' choice etc. Automatic age and gender classification task from analyzing facial images has become a concern to this competitive world. In this paper, we have proposed to apply transfer learning technique on facial images of people of different ages and gender. Age and gender are special attributes which can be extracted from facial images. A deep convolutional neural network is trained using our target dataset to achieve a good classification performance. We have evaluated the classification performance on Adience benchmark for age and gender estimation using ResNet50, VGG16, VGG14 and VGG17 deep CNN models. Using an ensemble technique (majority voting) of these (VGG) classifiers, we have found approximately 90% classification accuracy on age estimation task. We have also found 94% 1-off age classification accuracy using VGG14.

**Keywords:** Deep convolutional neural network, Age estimation, Gender classification, Ensemble classifier.

## Paper #119

### Predicting Fans' FIFA World Cup Team Preference from Tweets

Md. Fazla Rabbi<sup>1\*</sup>, Md. Saddam Hossain Mukta<sup>2</sup>, Tanjima Nasreen Jenia<sup>1</sup>, A.K.M. Najmul Islam

<sup>1</sup>American International University-Bangladesh

<sup>2</sup>United International University, Bangladesh

<sup>3</sup>University of Turku, Finland

Email: fazlarabbi76@gmail.com

**Abstract.** FIFA world cup is the most prestigious football tournament and widely viewed sporting event in the world. People support different teams (countries) of FIFA world cup based on players' skills, number of winning trophies, and deliberate strategies that are applied by these teams during the tournament. These people share their opinion, criticism, love, and affection on the social media, i.e., Twitter. In this paper, we predict users' FIFA world cup supporting preference from their tweets. First, we analyze user's tweets and build two different types of classifiers by using LIWC and ELMo Word Embedding based techniques. These classifiers predict which team a user prefers from her word usage pattern in tweets. We find that Random Forest classifier performs the best for LIWC based model. We also find deep learning based word embedding technique, ELMo, achieves decent potential to predict users' team supporting preference. Later, we build a multi-level weighted ensemble model to integrate both of the independent models, i.e., LIWC and ELMo. Our ensemble model shows substantial prediction potential (average accuracy-83.5%) to predict users' FIFA world cup supporting preference from their tweets.

**Keywords:** FIFA, LIWC, Word Embedding, SMOTE, Classification.

## Paper #120

### A Hybrid Approach Towards Two Stage Bengali Question Classification Utilizing Smart Data Balancing Technique

Md. Hasibur Rahman, Chowdhury Rafeed Rahman, Ruhul Amin, Md. Habibur Rahman Sifat, Afra Anika

United International University, Dhaka, Bangladesh

Email: mrahman161260@bscse.uiu.ac.bd

**Abstract.** Question Classification (QC) system classifies the questions in particular classes so that Question Answering (QA) System can provide correct answers for the questions. We present a two stage QC system for Bengali. One dimensional convolutional neural network (CNN) based model has been constructed for classifying questions into coarse classes in the first stage which uses word2vec feature representation of each word. A smart data balancing technique has been implemented in this stage which is a plus for any training dependent classification model. For each coarse class classified in the first stage, a separate Stochastic Gradient Descent (SGD) based classifier has been used in order to differentiate among the finer classes within that coarse class in stage two. TF-IDF representation of each word has been used as feature for each SGD classifier separately. Experiments show the effectiveness of this two stage classification method for Bengali question classification.

**Keywords:** Question Classification (QC), Natural Language Processing (NLP), Stochastic Gradient Descent (SGD), Convolutional Neural Network (CNN), Word2Vec, TF-IDF

**Paper #126****Innovative Automation Algorithm in Micro-multinational Data-entry Industry****Nuruzzaman Faruqui<sup>1</sup>, Mohammad Abu Yousuf<sup>1</sup>, Partha Chakraborty<sup>2</sup>, Md. Safaet Hossain<sup>3</sup>**<sup>1</sup> *Institute of Information Technology, Jahangirnagar University, Savar, Dhaka,*<sup>2</sup> *Department of Computer Science and Engineering, Comilla University, Comilla, Bangladesh*<sup>3</sup> *Department of Computer Science and Engineering, City University, Dhaka, Bangladesh**Email: faruquizaman27@gmail.com*

**Abstract.** Data have ascended a place among capital, labor and land in production. The emerging data-driven economy has facilitated the scope of growth of data-entry industry – an industry equipped with modern computing and communication infrastructure enriched with specialized software interface allowing data-entry professionals to look into the source, collect and store target data. These data are used in business intelligence and analytics for value creation. By nature, data-entry is a tedious and repetitive task. It not only hampers creativity of the operators but also leave a possibility of wrong entry. In this paper, an innovative algorithm has been proposed which can automate the data entry industry with above 97% accuracy, more than 15 times faster than existing speed with no additional cost apart from the cost of existing infrastructure. The proposed algorithm has been tested and compared with several data-entry focused companies which demonstrate that it outperforms current manual data-entry approach and it has the potential to revolutionize the data-entry industry.

**Keywords:** Automation, String matching, Root inspection, String replacement, Mapping matrix, Local server.

**Paper #140****Ulcer Detection in Wireless Capsule Endoscopy Using Locally Computed Features****Md. Sohag Hossain<sup>1</sup>, Abdullah Al Mamun<sup>2\*</sup>, Tonmoy Ghosh<sup>3</sup>, Md. Galib Hasan<sup>1</sup>, Md. Motaher Hossain<sup>1</sup>**<sup>1</sup> *Department of Electrical and Electronic Engineering, Pabna University of Science and Technology, Pabna 6600, Bangladesh.*<sup>2</sup> *Faculty of Engineering and Technology, Multimedia University, Melaka 75450, Malaysia.*<sup>3</sup> *Department of Electrical and Computer Engineering, The University of Alabama, Tuscaloosa, Alabama 35487, United States.**Email: msh22eee@gmail.com*

**Abstract.** WCE (Wireless Capsule Endoscopy) has become one of the most significant invention to detect different types of digestive tract diseases of humans. Distinct types of abnormalities like polyps, ulcer, tumor and intestine cancer are diagnosed by the clinicians with the implement of WCE in a convenient way. In order to deduce the incubus of the physicians an automated and efficient recognition system is required. In this paper, an advanced methodology for automatically discovering ulcers in the images of the WCE video is proposed using the HSV color model. Region of interest (ROI) was identified applying a threshold on images that were extracted from the video of WCE. Local features have been extracted only from the ROI which is usually a small part of an image that offers a low computational cost. Linear discriminant analysis has been used for the classification of ulcer and non-ulcer images. The proposed algorithm was tested on a publicly available database. The performance has obtained accuracy 87.55%, sensitivity 94.70%, specificity 83.30%, precision 75.00% and F1 score 83.70%. Hence, the proposed method outperforms an efficient method that will create a great impact in this research arena.

**Keywords:** Wireless capsule endoscopy (WCE), Linear Discriminant Analysis, ulcer detection, HSV.

## Paper #150

### On the Energy Efficiency and Performance of Delay-Tolerant Routing Protocols

Md. Khalid Mahbub Khan<sup>1\*</sup>, Sujan Chandra Roy<sup>2</sup>, Muhammad Sajjadur Rahim<sup>2</sup>, Abu Zafor Md. Touhidul Islam<sup>1</sup>

<sup>1</sup> Department of Electrical and Electronic Engineering, University of Rajshahi, Bangladesh

<sup>2</sup> Department of Information and Communication Engineering, University of Rajshahi, Bangladesh

Email: khalidmahbub.khan@yahoo.com

**Abstract.** Delay-Tolerant Network (DTN) is a resource-bound networking system which consists of many intermittently connected, movable devices known as nodes. Energy can be considered as an important resource for DTN scenarios since these nodes have limited energy. In order to perfect network enforcement, it is necessary to exploit the energy of the nodes efficiently. In DTN, most of the node energy is consumed because of mobility, scanning neighbors to deliver message and message transmission. Node energy has a significant role for successful transmission of messages. Higher energy of a node means that it has a high possibility to route its message with success across the network. So, for effective message routing it is mandatory to select an energy efficient routing mechanism in DTN environment. This point makes us interested to study the consumption of node energy in DTN scenarios. Within this research, the study of energy issue is focused for DTN routing approaches: Epidemic, Resource Allocation Protocol for Intentional DTN (RAPID), MaxProp, Probabilistic Routing Protocol using History of Encounters and Transitivity (PROPHET), Spray and Wait, and Spray and Focus with their comparative performance analysis on behalf of four performance criteria: average remaining energy of node, delivery ratio, average latency, and transmission cost. Simulations are performed in ONE simulator by varying node density while keeping message Time-To-Live (TTL) fixed and further, message TTL is changed while node density is kept fixed. We have found that Spray and Wait is the most energy efficient DTN routing scheme, whereas Spray and Focus yields the best performance in terms of delivery ratio, average latency and transmission cost.

**Keywords:** Delay-tolerant network, Routing protocol, Energy efficiency, Performance evaluation, Opportunistic Network Environment (ONE) simulator.

## Paper #159

### Proposal of a Highly Birefringent Bow-Tie Photonic Crystal Fiber for Nonlinear Applications

Md. Moynul Hossain<sup>1</sup>, Md. Anowar Kabir<sup>1</sup>, Md. Mehedi Hassan<sup>1</sup>, Md. Ashikur Rahman Parag<sup>1</sup>, Md. Nadim Hossain<sup>1</sup>, Bikash Kumar Paul<sup>1,2,3</sup>, Muhammad Shahin Uddin<sup>1,3</sup>, Kawsar Ahmed<sup>1,3</sup>

<sup>1</sup> Department of Information and Communication Technology, Mawlana Bhashani Science and Technology University, Bangladesh

<sup>2</sup> Department of Software Engineering, Daffodil International University, Bangladesh.

<sup>3</sup> Group of Bio-photomatrix, Mawlana Bhashani Science and Technology University, Bangladesh

Email: moynul.ict15031@gmail.com

**Abstract.** In this letter, a bow-tie-type photonic crystal fiber (PCF) with high birefringence (Hi-Bi) has been proposed. The core of the PCF is elliptical with Chalcogenide glass (Ga8Sb32S60) material. The whole analysis of the PCF is finished by the finite element method (FEM) for wavelength ranging from 2,000 nm to 3,000 nm to obtain some optical parameters like birefringence, beat length, power fraction, numerical aperture, effective refractive area, and nonlinearity. Therefore, a perfectly matched layer (PML) is also used to throw out unwanted radiation directed as an absorbing boundary condition (ABC). It has generated high birefringence (Hi-Bi) of 0.287 at 2,975 nm wavelength, the highest power fraction of 89.39% at 2,000 nm wavelength, the higher numerical aperture of 0.86, and the better nonlinearity of  $6.10 \times 10^3 \text{ W-Km}^{-1}$ . Hence, the proposed PCF plays a significant role in PCF areas with the better polarization filter, cross talk (CT), sensing, and nonlinear applications.

**Keywords:** Photonic crystal fiber (PCF), perfectly matched layer (PML), finite element method (FEM), high birefringence (Hi-Bi), absorbing boundary condition (ABC), Birefringence, Nonlinear coefficient.



## Paper #160

## Supervised Machine Learning for Multi-Label Classification of Bangla Articles

Dip Bhakta<sup>1</sup>, Avimonnu Arnob Dash<sup>1</sup>, Md. Faisal Bari<sup>1</sup>, Swakkhar Shatabda<sup>2</sup><sup>1</sup>Department of ICT, Bangladesh University of Professionals (BUP), Dhaka, Bangladesh<sup>2</sup>Department of Computer Science and Engineering, United International University (UIU), Bangladesh

Email: swakkhar@cse.uiu.ac.bd

**Abstract.** Multi-label text classification has been a key point of research in the area of text classification latterly. But to the best of our knowledge, there have been very few research on multi-label text classification for Bangla text. There is also inadequacy of proper dataset for multi-label classification on Bangla text. Multi-label classification has many applications in the real world. One of them is automated labeling of articles of online news portals so that readers can easily look up other news articles on similar topics by clicking on hyperlinks. We applied supervised multi-label classification techniques on Bangla news articles for automated tag generation to predict related topics. We have built a new dataset from scratch and applied various problem transformation methods for multi-label classification with naive bayes classifier, logistic regression and SVM. We have analyzed the performance of these algorithms on Bangla news articles with precision, recall, f1-score and hamming loss. The dataset and the analysis of the results can be valuable for further research on multi-label text classification of Bangla text. We have open-sourced the dataset and the source code of this work (<http://bit.ly/34cSNCR>).

**Keywords:** Multi-label classification, Supervised, Bangla text, SVM, Naive Bayes, Logistic Regression, F1-score.

## Paper #163

## Machine Learning Based Recommendation Systems for the Mode of Childbirth

Md. Kowsher<sup>1</sup>, Nusrat Jahan Prottasha<sup>2</sup>, Anik Tahabilder<sup>3</sup>, Md. Babul Islam<sup>4</sup><sup>1</sup>Noakhali Science and Technology University, Noakhali-3814, Bangladesh.<sup>2</sup>Daffodil International University, Dhaka, Bangladesh.<sup>3</sup>Western Carolina University, Cullowhee, NC-28723, USA.<sup>4</sup>University of Rajshahi, Rajshahi-6205, Bangladesh

Email: ga.kowsher@gmail.com

**Abstract.** Machine learning methods give a learning technique that can be applied to extract information from data. A lot of research is being conducted that involves machine learning techniques for medical diagnosis, prediction and treatment. The goal of this study is to perform several machine learning procedures for appropriate mode of birth classification (cesarean or normal) to minimize maternal mortality rate. To generate a computer-aided decision to select between most common mode of baby birth, C-section and vaginal birth we have used supervised machine learning to train our classification model. A dataset consists of the information of 13,527 delivery patients has been collected from Tarail Upazilla Health complex, Bangladesh. We have implemented nine machine learning classifier algorithms over the whole datasets and compared the performances of all those proposed techniques. The computed mode of baby delivery suggested by the best proposed model "impact learning" showed an accuracy of 0.89089172 with the F1 value of 0.877871741.

**Keywords:** Baby delivery, Impact learning, Artificial neural network, Machine learning classifiers.

## Paper #168

### Sustainable Rice Production Analysis and Forecasting Rice Yield Based on Weather Circumstances Using Data Mining Techniques for Bangladesh

Mohammed Mahmudur Rahman\*, Tajnim Jahan, Tanjima Nasrin, Salma Akter, Zinnia Sultana

*International Islamic University Chittagong, Chittagong, Bangladesh*

*Email: provaiiuc@raudah.usim.edu.my*

**Abstract.** Rice production assumes the most noteworthy part in national economy of Bangladesh. But due to several weather circumstances, rice production is being influenced day by day. In this research work, present a sustainable rice production analysis and forecasting rice yield for Aus, Aman and Boro rice based on weather circumstances. This paper aims to forecast rice production on the basis of weather parameters (Temperature, Rainfall, Humidity) and then predict future rice production based on previous data analysis. This research work has considered here Multiple Linear Regression, Support Vector Machine and Random Forest methods of data mining for selected region of Bangladesh. On the basis of the final calculating result, the analysis will help the farmers to understand which types of rice will be planted in which weather and it will help to achieve greater profit in the economy of Bangladesh.

**Keywords:** Multiple Linear Regression, Data Mining, Support Vector Machine, Weather Parameters, Random Forest, Rice Production.

## Paper #178

### Performance Optimization of Layered Signature Based Intrusion Detection System Using SNORT

Noor Farjana Firoz, Md. Taslim Arefin, Md Raihan Uddin

*Department of ETE, Daffodil International University, Dhaka, Bangladesh*

*Email: arefin@diu.edu.bd*

**Abstract.** This paper analyzes the ways of Intrusion Detection System (IDS) which stands for Intrusion Detection System works. The basic aim of an IDS is to protect a computer network or system from unauthorized access of attacks. Different types of IDS are also compared and criticized in this paper which explores the vulnerability of the system. Different detection techniques have been discussed on network based IDS. The study has been done on the operational procedures of Network based open source IDS tool Snort. It is a lightweight network based intrusion detection system, which read every incoming/outgoing packet through a network and alert the admin accordingly. To check every packet, Snort uses a central database system of signature. In this paper a layered database system has been proposed to upgrade the system performance. An analytical operation has been conveyed on the proposed solution and compared with the existing standard system.

**Keywords:** SNORT, IDS, Signature Based IDS



## Paper #185

## Examining Usability Issues in Blockchain-Based Cryptocurrency Wallets

Md Moniruzzaman\*, Farida Chowdhury, Md Sadek Ferdous

Shahjalal University of Science ,Technology, Sylhet, Bangladesh

Email: monirulhasann@gmail.com

**Abstract.** Blockchain has emerged as a revolutionary technology that has been envisioned to disrupt several industries, including financial domains with its decentralised and highly-secure design. However, since the beginning of its evolution, it has been highly criticised for the difficulties in dealing with it properly. As cryptocurrency is the most successful application of blockchain, we aim to identify the potential obstacles and usability issues, which might hinder its wide-scale adoption, of five applications (i.e., wallets) that are used to manage cryptocurrencies. Applying the analytical cognitive walk-through usability inspection method, we investigate common usability issues with desktop and mobile-based wallets. Our results reveal that both wallets lack good usability in performing the the fundamental tasks which can be improved significantly. We summarise our findings and point out the aspects where the issues exists so that improving those areas can result in better user experience and adoption.

**Keywords:** Usability, Human Computer Interaction, Cryptocurrency, Block-chain, Cognitive walk-through, User-interface, User-experience

## Paper #192

## A New Approach to Solve Quadratic Equation Using Genetic Algorithm

Bibhas Roy Chowdhury<sup>1</sup>, Md. Sabir Hossain<sup>1\*</sup>, Alve Ahmad<sup>1</sup>, Mohammad Hasan<sup>2</sup>, Md. Al-Hasan<sup>2</sup><sup>1</sup>Chittagong University of Engineering & Technology, Chattogram, Bangladesh.<sup>2</sup>Bangladesh Army University of Science & Technology, Saidpur, Bangladesh

Email: sabir.cse@cuet.ac.bd

**Abstract.** Solving quadratic equation efficiently is a real-world challenge nowadays, due to its wide applications in the task of determining a product's profit, calculating areas or formulating the speed of an object. The general approach of finding the roots of a quadratic equation is not enough efficient due to the requirement of high computation time. Because of the Genetic Algorithm's stochastic characteristics and efficiency in solving problems it can be used to find roots of quadratic equation precisely. In modern athletics reducing the computation time of solving the quadratic equation has been so inevitable where using a genetic algorithm can find a quick solution that doesn't violate any of the constraints and with high precision also. Optimization has been done in the Crossover and Mutation process which has reduced the number of iterations for solving the equation. It reduces the time complexity of the existing approach of solving the quadratic equation and reaches towards the goal efficiently.

**Keywords:** Genetic algorithms, Crossover, Mutation, Chromosomal fitness, Population, Quadratic equation.

## Paper #203

## Classification of Succulent Plant using Convolutional Neural Network

Ashik Kumar Das\*, Md. Asif Iqbal, Bidhan Paul, Aniruddha Rakshit, Md. Zahid Hasan

*Department of Computer Science and Engineering, Daffodil International University, Bangladesh**Email: kumar15-7210@diu.edu.bd*

**Abstract.** Machine learning methods such as deep neural networks have remarkably improved plant species classification in recent years. It is very challenging task to classify plant species based on their categories. In this work, deep learning approach is explained to identify and classify succulent plant species using VGG19, three layers CNN and five layers CNN network on our dataset. The proposed model achieved a significant result from VGG19 and three layers CNN model. In succulent plant image dataset, there are 10 different classes of succulent and non-succulent plants. The dataset consists of 3632 succulent plant images and 200 non-succulent plant images. The model achieved 99.77% accuracy which performs better than VGG19 and three layers CNN model.

**Keywords:** Succulent plant, Convolutional neural network, Augmentation, Adam optimizer

## Paper #215

## RP-DMAC: Receiver Pivotal Directional MAC with Multichannel for IoT Based WSN

Arpita Howlader<sup>1\*</sup> and Samrat Kumar Dey<sup>2</sup><sup>1</sup>*Dhaka University of Engineering and Technology, Gazipur-1700, Bangladesh*<sup>2</sup>*Dhaka International University, 66 Green Road, Dhaka-1205, Bangladesh**Email: arpita.toma@gmail.com*

**Abstract.** In the construction of the wireless sensor network; MAC protocols are considered as a foremost element of IoT based devices that are used for data transmission and greater scalability with simple executions. Furthermore, most of the researches on WSN conduct directional antenna to provide substantial progresses in communication. However, numerous types of problems such as deafness, deadlock, and head of line blocking problems irrespective of a number of channels are introducing inherently in directional MAC protocols. Some proposed asynchronous multichannel MAC protocol is based on RIT or RI mechanisms that escape those prevalent problems. Using a multichannel directional MAC with RP is proposed in this article that referred to as Receiver Pivotal DMAC (RP-DMAC). We propose RP-DMAC as a state-of-the-art protocol for IoT based WSN to separate deafness and other problem by using directional RTR (Ready to Receive) packet, data channel, and guard band. As like most of the DMAC protocols, in default mode, our RP-DMAC is sender-initiated. When deafness problem is recognized then as our RP protocol manner; nodes will initiate with DRTR negotiation in its unused sector expending through guard band to received data from desire sender. To solve the deadlock and packet loss, our proposed RP protocol performs better results than DA-MAC and circular RTR MAC in terms of packet drop ratio, overhead, and throughput.

**Keywords:** Ad hoc networks, Receiver-initiated, Throughput, Directional antenna, Deafness.

## Paper #220

### Bangladeshi Stock Price Prediction and Analysis with Potent Machine Learning Approaches

**Sajib Das, Md. Shohel Arman \*, Syeda Sumbul Hossain, Md. Sanzidul Islam, Farhan Anan Himu, Asif khan Shakir**

*Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh*

*Email: sshuvo27@gmail.com*

**Abstract.** Stock price forecasting, is one of the most significant financial complexities, since data are not reliable and noisy, impacting many factors. This article offers a machine learning model for the stock price prediction using Support Vector Machine-Regression (SVR) with two different kernels which are Radial Basis Function (RBF) and linear kernel. This study shows the Prediction and accuracy comparison between Support Vector Regression (SVR) and Linear Regression (LR) and also the accuracy comparison for different kernels of Support vector Regression (SVR). The model has used sum squared error (SSE) to determine the accuracy of each algorithm; which has shown significant improvement than the other studies. This analysis is conducted on the price data of about five years of Grameenphone listed on Dhaka Stock Exchange (DSE). The highest accuracy was found with Linear Regression model in every case with the highest accuracy of about 97.07% followed by SVR (Linear) model and SVR (radial basis function) model with the highest accuracy rate of about 97.06% and 96.82 percent. In some cases the accuracy of SVR (radial basis function) was higher than SVR (linear). But it was the Linear Regression which had the highest accuracy of all in every case.

**Keywords:** Machine Learning, Stock price prediction, Support vector regression, Linear regression.

## Paper #223

### Detection and Classification of Road Damage Using RCNN and Faster R-CNN: A Deep Learning Approach

**Md. Shohel Arman\*, Md Mahbub Hasan, Ms. Farzana Sadia, Asif khan Shakir, Kaushik Sarker, Farhan Anan Himu**

*Department of Software Engineering Daffodil International University, Dhaka, Bangladesh*

*Email: sshuvo27@gmail.com*

**Abstract.** Road surface monitoring is mostly done manually in cities which is an intensive process of time consuming and labor work. The intention of this paper is to research on road damage detection and classification from road surface images using object detection method. This paper applied multiple convolutional neural network (CNN) algorithm to classify road damage and discovered which algorithm performs better in road damage detection and classification. The damages are classified in three categories pothole, crack and revealing. For this research data was collected from street of Dhaka city using smartphone camera and preprocessed the data like image resize, white balance, contrast transformation, labeling. This study applies R-CNN and faster R-CNN for object detection of road damages and apply Support Vector Machine (SVM) for classification and gets a better result from previous studies. Then losses are calculated using different loss functions. The results demonstrate the highest 98.88 % accuracy and the lowest loss is 0.01.

**Keywords:** Road Damage identification, Road Damage Classification, R-CNN, Faster R-CNN

## Paper # 227

### A Bioinformatics Analysis to Identify Hub Genes from Protein-Protein Interaction Network for Cancer and Stress

**Md. Liton Ahmed<sup>1</sup>, Md. Rakibul Islam<sup>1</sup>, Bikash Kumar Paul<sup>1,2,3\*</sup>, Kawsar Ahmed<sup>2</sup>, Touhid Bhuyian<sup>1</sup>**

<sup>1</sup>Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh

<sup>2</sup>Department of Information and Communication Technology (ICT), Mawlana Bhashani Science and Technology University (MBSTU), Santosh, Tangail, Bangladesh

<sup>3</sup>Group of Bio-photomatrix, Mawlana Bhashani Science and Technology University (MBSTU), Santosh, Tangail, Bangladesh  
Email: bikash.swe@diu.edu.bd

**Abstract.** Cancer is a disease involving the uncontrollable growth of cells with potential strafe to other organs of the body. Stress is a state of the body a non-specific response to any demand for change. Cancer had a deep relation with stress. Activation of the stress response and exposure to the associated hormones could promote the growth and spread of tumors. The immune system can be important for finding and eliminating cancer cells. This study is based on Cancer and Stress. In this study, we collect responsible genes from NCBI's Gene database individually for stress and cancer. After that, common responsible genes were collected by using Venny online tools. From the common genes, we had constructed a protein-protein interaction network using the STRING database. Afterward, the top 10 hub genes were identified by using CytoHubba. Hub genes were identified based on their degree value where degree value more than or equal 72 are considered as hub gene. These hub genes may use to design a potential drug for cancer and stress combine. We have collected 3264 and 9433 human genes for Cancer and Stress respectively. 2477 common genes are found through Venny. We have been identified the UBC, TP53, RPS3, RPL5, RPL11, RPS27A, RPL19, RPL3, RPS7, and CTNNB1 as targeted hub genes by using the CytoHubba plugin of Cytoscape.

**Keywords:** PPI network Gene regulatory network, Cancer, Stress, Computational biology.

## Paper #233

### A Modified Particle Swarm Optimization for Autonomous UAV Path Planning in 3D Environment

**Golam Moktader Nayeem<sup>1</sup>, Mingyu Fan<sup>1\*</sup>, Shanjun Li<sup>2</sup>, Khalil Ahammad<sup>3</sup>**

<sup>1</sup>School of Computer Science and Engineering, University of Electronic Science and Technology of China, Chengdu, P. R. China

<sup>2</sup>Key Laboratory of Information Network Security, Ministry of Public Security, Shanghai, P. R. China

<sup>3</sup>Department of Computer Science and Engineering, Comilla University, Cumilla, Bangladesh  
Email: ff98@163.com

**Abstract.** Path planning is an important aspect of an autonomous Unmanned Ariel Vehicle (UAV). As finding the best path is a nondeterministic problem, meta-heuristic algorithms proved to be a better choice in recent years. Particle Swarm Optimization (PSO) is one of the widely applied meta-heuristic algorithms for non-deterministic problem due to simplicity and ease of implementation. However, the lack of diversity in the particles in PSO algorithm generates a low-quality path for UAV. In this paper, we presented a modified PSO algorithm called n-PSO. In the algorithm, a dynamic neighborhood approach is proposed to improve the diversity of the particles. The n-PSO algorithm is applied to UAV path planning and simulated in a 3D environment. We compared the algorithm with two widely used versions of PSO for UAV path planning. The proposed algorithm showed significant improvement in particles diversity that plays an important role to produce better UAV path. At the end, we presented a time cost analysis of the algorithm for UAV path planning.

**Keywords:** PSO, UAV, Path planning, 3D Environment

**Paper #242****An Empirical Framework to Identify Authorship from Bengali Literary Works****Sumnoon Ibn Ahmad\*, Lamia Alam, Mohammed Moshui Hoque**

*Department of Computer Science and Engineering (CSE), Chittagong University of Engineering & Technology (CUET) Chattogram-4349, Bangladesh*  
*Email: sumnoon52@gmail.com*

**Abstract.** Authorship attribution is the process of identifying the probable author of an unknown document. This paper proposes a neural network based framework, which identifies the authorship from Bengali literary documents. For this purpose, a corpus consisting of 12,142 text documents of 23 writers/bloggers is built. A static dictionary is used to count vectorization and important features are selected using information gain. The proposed system is trained with 9099 documents and tested with 3043 documents. The experimental result shows that neural network with n-gram and parts of speech (PoS) features achieved 94% accuracy on developed corpus.

**Keywords:** Bangla language processing, Authorship attribution, Feature extraction, Machine learning.

**Paper #244****Semantic Sentence Modeling for Learning Textual Similarity Exploiting LSTM****Md Shajalal<sup>1</sup>\*, Masaki Aono<sup>2</sup>**

*<sup>1</sup>Department of Computer Science and Engineering, Hajee Mohammad Danesh Science and Technology University, Bangladesh.*

*<sup>2</sup>Toyohashi University of Technology, Toyohashi, Aichi, Japan*  
*Email: hajalal@hstu.ac.bd*

**Abstract.** Finding the semantic similarity between texts is not trivial and is an indispensable task in many NLP and information retrieval tasks. In this paper, we introduced a semantic sentence modeling approach for learning the similarity between sentences using long-short-term-memory (LSTM) networks. First, sentences are represented with high dimensional vectors based on the wordembedding model that encodes the semantic meaning of the sentences. Then the encoded sentences are used to train the siamese LSTM model. The trained model builds a structured high dimensional space and can predict the semantic similarity between sentences. We applied our proposed method on two benchmark datasets on semantic textual similarity. The experimental results exhibited the efficiency of our method in measuring semantic similarity between sentences.

**Keywords:** Sentence modeling, Word semantics, Semantic modeling, Semantics

## Paper #246

## Training Data Selection Using Ensemble Dataset Approach for Software Defect Prediction

**Md Fahimuzzman Sohan, Md Alamgir Kabir, Mostafijur Rahman, S. M. Hasan Mahmud, Touhid Bhuiyan***Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh**Email: sohan35-1284@diu.edu.bd*

**Abstract.** Cross-project defect prediction (CPDP) is using due to the limitation of within project defect prediction (WPDP) in Software Defect Prediction (SDP) research. CPDP aims to train one project data to predict another project using the machine learning technique. The source and target projects are different in the CPDP setting, because of various structured source-target projects, sometimes it may not be a perfect combination. This study represents a categorical data set ensemble technique, where multiple data sets have been aggregated for source data instead of using a single data set. The method has been evaluated on nine data sets, taken from the publicly accessible repository with two performance indicators. The results of this data set ensemble approach show the improvement of the prediction performance over 65% combinations compared with traditional CPDP models. The results also show that same categories (homogeneous) train-test data set pairs give high performance; otherwise, the prediction performances of different category data sets are mostly collapsed. Therefore, the proposed scheme is recommended as an alternative to predict defects that can improve the prediction of most of the cases compared with traditional cross-project SDP models.

**Keywords:** Software defect prediction • Cross-project defect prediction • Training data selection • Data set ensemble.

## Paper #248

## Aspect Based Sentiment Analysis in Bangla Dataset Based on Aspect Term Extraction

**Sabrina Haque, Tasnim Rahman, Asif khan Shakir\*, Md. Shohel Arman, Khalid Been Badruzzaman Biplob, Farhan Anan Himu, Dipta Das***<sup>1</sup>Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh**Email: asif.swe@diu.edu.bd*

**Abstract.** Recent years have seen rapid growth of research on sentiment analysis. In aspect-based sentiment analysis, the idea is to take sentiment analysis a step further and find out what exactly someone is talking about, and then measuring the sentiment if she or he likes or dislikes it. Sentiment analysis in Bengali language is progressing and is considered as an important research interest. Due to scarcity of resources like proper annotated dataset, corpora, lexicon such as part of speech tagger etc. aspect-based sentiment analysis hardly has been done in Bengali language. In this paper, we have conducted our experiments based on a recent work from 2018 using conventional supervised machine learning algorithms (RF, SVM, KNN) to perform one of the ABSA's tasks - aspect category extraction. The work is done on two datasets named – Cricket and Restaurant. We then compared our results with the existing work. We used two traditional steps to clean data and found that less preprocessing leads to better F1 Score. For Cricket dataset, SVM and KNN performed better, resulting F1 score of 37% and 27%. For Restaurant dataset, RF and SVM achieved improved score of 35% and 39% respectively. Additionally, we selected two more algorithms LR and NB, LR achieved best F1 score (43%) for Restaurant dataset among all.

**Keywords:** ABSA dataset, ABSA in Bangla, aspect extraction, aspect category extraction



## Paper #257

**EMG-based Classification of Forearm Muscles in Prehension Movements: Performance Comparison of Machine Learning Algorithms****SAM Matiur Rahman<sup>1\*</sup>, Omar Altwijri<sup>2</sup>, Md. Asraf Ali<sup>1</sup>, Mahdi Alqahtani<sup>2</sup>**<sup>1</sup> *Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh*<sup>2</sup> *Biomedical Technology Department, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia**Email: sammatiurrahman@gmx.com*

**Abstract.** This paper aimed to classify two forearm muscles known as Flexor Carpi Ulnaris (FCU) and Extensor Carpi Radialis Longus (ECRL) using surface Electromyography (sEMG) signal during different hand prehension tasks, such as cylindrical, tip, spherical, palmar, lateral and hook while grasping any object. Thirteen Machine Learning (ML) algorithms were analyzed to compare their performance using a single EMG time domain feature called integrated EMG (IEMG). The tree-based methods have the top performance to classify the forearm muscles than other ML methods among all those 13 ML algorithms. Results show that 4 out of 5 tree-based classifiers achieved more than 75% accuracies, where the random forest method showed maximum classification accuracy (85.07%). Additionally, these tree-based ML methods computed the variable importance in classification margin. The results show that the lateral grasping was the most important moving variable for all those algorithms except AdaBoost where tipping was the most significant movement variable for this method. We hope, this ML- and EMG-based classification results presented in the paper may alleviate some of the problems in implementing advanced forearm prosthetics, rehabilitation devices and assistive biomedical robots.

**Keywords:** EMG signal, Machine learning, Forearm muscle, Rehabilitation.

## Paper #261

**Advanced Artistic Style Transfer Using Deep Neural Network****Kabid Hassan Shibly\*, Sazia Rahman, Samrat Kumar Dey, Shahadat Hossain Shamim***Dhaka International University, Dhaka, Bangladesh**Email: khshibly00@gmail.com*

**Abstract.** At present, neural style transfer technique is gaining more and more popularity in different fields like sports and entertainment. During the artistic style transfer of an image, style loss and content loss occurs. Several research works are being performed in present with a view to reduce the rate of both style and content loss, but some of these processes require much time for style transfer. In this paper, we propose a style transfer method using convolutional neural network that minimizes the rate of style and content loss in a minimal time compared to some other works. The proposed method is applied on different images and artworks. The results are compared with some recent research works related to this method and the proposed method is found to be 5-7% more efficient and faster than those related works.

**Keywords:** Neural network, Deep Neural Network (DNN), Convolutional Neural Network (CNN), Visual Geometry Group (VGG), Neural Style Transfer (NST)

## Paper #262

## IoT Based Smart Health Monitoring System for Diabetes Patients using Neural Network

Md. Iftekharul Alam Efata<sup>1\*</sup>, Shoaib Rahman<sup>2</sup>, Tasnim Rahman<sup>2</sup><sup>1</sup>*Institute of Information Technology, Noakhali Science & Technology University, Bangladesh*<sup>2</sup>*Department of Software Engineering, Daffodil International University, Bangladesh**Email: iftekhar.efat@gmail.com*

**Abstract.** In improvement of the quality of health care services, Internet of Things (IoT) has evolved rapidly for monitoring patient from distance. However, notifying health status based on continuous change of health condition for immediate healing to patient, existing systems has some limitations. In this paper, we demonstrate a smart health monitoring technology for diabetic patients which follows up their health condition depending on sugar level, heart pulse, food intake, sleep time and exercise. To illustrate, this technology takes the variables (data) as input through sensors continuously and process with neural network to evaluate the data, resulting four modes of health risk status: low, medium, high and extreme. The range of the risk status can differ based on patient's type and previous histories of their health. In addition, an automatic phone call and/or SMS notification is being sent to patient's relative along with patient's location if his/her health condition is at high or extreme risk. Besides, it also calls patients nearest hospital in case of extreme risk. However, the system provides allied instruction as voice command to patient's mobile in both cases. This technology has been experimented on 25 diabetic patients successfully and achieved 84.29% accuracy to identify the proper risk level, which is a highly acceptable level of identifying health risk status.

**Keywords:** Internet of Things (IoT), Diabetes Management, mHealth, Patient Monitoring, Neural Network

## Paper #265

## Prediction Model for Self-Assessed Health Status in Flood-Prone Area of Bangladesh

Md Kamrul Hossain

*Department of General Educational Development, Daffodil International University, Dhaka – 1207, Bangladesh**Email: kamrul.ged@diu.edu.bd*

**Abstract.** Bangladesh is a frequently affected by river flood and flash flood because of its geographical location. Along with the number of vulnerabilities, flood is cause severe health related problems. Thus objective of this study was to develop a prediction model for self-assessed health for the people of flood-prone area of Bangladesh. A CHAID technique is applied to predict the self-assessed health status. Data was collected from 883 individuals who were selected applying multistage random from four selected flood affected districts - Sunamgonj, Chattogram, Jamalpur and Gaiandha of Bangladesh. It is observed that more than 54% people of the flood affected area had reported that they were in poor health condition. In addition, food scarcity, worried about future, health awareness, use of hygienic toilet and education level were found the influential factors for self-assessed health status. However, food scarcity was the most influential factors for the prediction model. Accuracy, Precision, Recall and F1 Score for the training model were found 75.1%, 82.01%, 74.5% and 78.1% respectively whereas for test model were 74.1%, 85.5%, 71.0% and 77.6% respectively. The prediction model would assist to identify people who might be under risk in the flood affected area and also can mitigate health related disaster in the area.

**Keywords:** CHAID Technique, Self-Assessed Health, Flood-prone Area.

## Paper #266

### Android Malware Detection by Machine Learning Apprehension and Static Feature Characterization

**Md Rashedul Hasan, Afsana Begum\*, Fahad Bin Zamal, Lamisha Rawshan, Touhid Bhuiyan**

*Department of Software Engineering, Daffodil International University, Dhaka – 1207, Bangladesh*

*Email: afsana.swe@diu.edu.bd*

**Abstract.** The increased usage and popularity of Android devices encourage malware developers to generate newer ways to launch malware in different packaged forms in different applications. These malware causes various information leakage and money lost. For example, only in Canada, McAfee, which surveyed 1,000 Canadians and found 65 per cent of them, had lost more than \$100 and almost a third had lost more than \$500 to various cyber scams so far this year. Moreover, after identifying software as malware, unethical developer repackages the detected one and again launches the software. Unfortunately, repackaged software remains undetected mostly. In this research three different tasks were done. Comparing to the existing work we have used source code based analysis using bag-of words algorithm in machine learning. By modifying Bag-of-word procedure and adding some additional preprocessing of dataset the evaluation results represent 0.55% better than the existing work in this field. In that case re-packaging was included and this is a new edition in this field of research. Moreover in this research, a vocabulary was also created to identify the malicious code. Here with existing 69 malicious patterns more 12 malicious patterns were added. In addition to these two contributions, we have also implemented our model in a web application to test. This paper represents such a model, which will help the developers or antivirus launcher to detect malware if it is repackaged. This vocabulary will also help to do so.

**Keywords:** Malware Analysis, Android Malware, Source code, text processing, repackaging, Bag-of-words

## Paper #267

### Parking Recommender System using Q-Learning and Cloud Computing

**Md Omar Hasan<sup>1</sup>, Khandakar Razoan Ahmed<sup>1</sup>, Md. Motaharul Islam<sup>2</sup>**

*<sup>1</sup>,<sup>2</sup>Department of Computer Science and Engineering, BRAC University, Dhaka, Bangladesh*

*<sup>2</sup> Department of Computer Science and Engineering, United International University, Dhaka, Bangladesh*

**Abstract.** Artificial Intelligence (AI) based recommender systems help to make our life easy and comfortable. From simple chatbot to YouTube recommendation, AI is used to recommend news, videos, etc. which provide us more information and saves our time. In big cities, parking seems to be a major problem where commuters need to find a suitable parking space among many parking areas which cause wastage of time and fuel. Our paper proposes a parking recommender system where commuters will be suggested a parking area to a nearby place for helping them to save time, parking cost and ensure high security. To collect data of parking spaces, we propose a Cloud architecture where we use the concept of Edge and Cloud computing to collect and process data smoothly and reduce latency. To deal with bigger amounts of data we use Data Streaming Pipelining to process and analyze those data. We use Amazon Web Services (AWS) to implement our proposed Cloud architecture. For creating the AI based recommender system, we propose the Q-learning algorithm with  $\epsilon$ -soft policy to suggest nearby parking areas. Our novel approach will be helpful for both local and global citizens to find an ideal parking area close to their working place, home, etc. Our proposed Cloud architecture is able to reduce latency and make data transferring system faster. Also the Q-learning algorithm can outperform in terms of both certain and uncertain situations.

**Keywords:** Parking Recommender System • Edge Computing • Data Streaming Pipelining • Q-Learning • Cloud • AWS

## Paper #270

### Designing A New Hybrid Cryptographic Model

**Burhan Selçuk and Ayşe Nur A. Tankül**

<sup>1</sup> *Karabük University, Karabük 78050, Turkey*

*Email: bsalcuk@karabuk.edu.tr*

**Abstract.** With the rapid development of technology, one of the most important requirements in today's systems is the reliable transfer of information and confidentiality. Thus, military, electronics, banking systems and many other places have become the fields of use of cryptography science. Cryptology methods are used to solve these problems and need of secure information transfer resulted in the development of reliable encryption techniques. In this study, a new poly-alphabetic substitution cipher is designed using the coordinate axes. The proposed method of a hybrid encryption method is a mix of the Polybius square cipher and the Vigenère cipher, reinforced with the RSA cryptography algorithm. For each letter in the alphabet, there is more than one point on Cartesian coordinate system and in the calculation of these points random chosen values are used. Values used to calculate alphabet and start index of alphabet are send to receiver using RSA algorithm with cipher text. So, with multiple security stages the proposed method is a strong encryption method that is difficult to decode.

**Keywords:** Poly-alphabetic substitution cipher, Vigenère cipher, Polybius square cipher, RSA, Coordinate axis.

## Paper #273

### Link Prediction on Networks Created from UEFA European Competitions

**Oğuz FINDIK and Emrah ÖZKAYNAK<sup>2</sup>**

*Karabük University, Karabük, Turkey*

*Email: oguzfindik@karabuk.edu.tr*

**Abstract.** Link prediction is widely used in network analysis to identify future links between nodes. Link prediction has an important place in terms of being applicable to many real-world networks with dynamic structure. Networks with dynamic structure, such as social networks, scientific collaboration networks and metabolic networks, are networks in which link prediction studies are performed. In addition, it is seen that there are few studies showing the feasibility of link prediction by creating networks from different areas. In this study, in order to show the applicability of link prediction processes in different fields link prediction was made by applying traditional link prediction methods in the networks formed from the data of football competitions played after the groups between the years 2004-2017 in the Uefa European League. The AUC metric was used to measure the success of forecasting. The results show that link prediction methods can be used in sports networks.

**Keywords:** Link Prediction, Data Mining, Complex Network.

## Paper #274

## Non-Invasive Diabetes Level Monitoring System using Artificial Intelligence and UWB

Minarul Islam<sup>1</sup>, Sabira Khatun<sup>1\*</sup>, Nusrat Jahan Shoumy<sup>2</sup>, Md Shawkat Ali<sup>3</sup>, Mohamad Shaiful Abdul Karim<sup>1</sup>, Bifta Sama Bari<sup>1</sup>

<sup>1</sup> Faculty of Electrical and Electronics Engineering Technology, Universiti Malaysia Pahang, Malaysia

<sup>2</sup> School of Computing and Mathematics, Charles Sturt University, Wagga Wagga, NSW, Australia

<sup>3</sup> BMTF, Dhaka Cantonment, Dhaka, Bangladesh

Email: sabirakhatun@ump.edu.my

**Abstract.** Diabetes is a silent-killer disease throughout the world. It is not curable, therefore, regular blood glucose concentration levels (BGCL) monitoring is necessary to be healthy in a long run. The traditional way of BGCL measurement is invasive by pricking and collecting blood sample from human arm (or finger-tip), then measuring the level either using a glucometer or sending to laboratory. This blood collecting process produces significant discomfort to the patients, especially to the children with type-A diabetes, resulting increased undetected-cases and health-complications. To overcome this drawbacks, a non-invasive ultra-wide-band (UWB) BGCL measurement system is proposed here with enhanced software module. The hardware can be controlled through the graphical user interface (GUI) of software and can execute signal processing, feature extraction, and feature classification using artificial intelligence (AI). As AI, cascade forward neural network (CFNN) and naïve bayes (NB) algorithms are investigated, then CFNN with four independent features (skewness, kurtosis, variance, mean-absolute-deviation) are found to be best-suited for BGCL estimation. A transmit (Tx) antenna was placed at one side of left-earlobe to Tx UWB signals, and a receive (Rx) antenna at opposite side to Rx transmitted signals with BGCL marker. These signals are saved and used for AI training, validation and testing. The system with CFNN shows approximately 86.62% accuracy for BGCL measurement, which is 5.62% improved compared to other methods by showing its superiority. This enhanced system is affordable, effective and easy-to-use for all users (home and hospital), to reduce undetected diabetes cases and related mortality rate in near future.

**Keywords:** UWB, Non-invasive Measurement, Blood Glucose Concentration Level, cascade forward neural network.

## Paper #275

## Performance Comparison of Early Breast Cancer Detection Precision Using AI and Ultra-wideband (UWB) Bio-Antennas

Bifta Sama Bari<sup>1</sup>, Sabira Khatun<sup>1\*</sup>, Kamarul Hawari Ghazali<sup>1</sup>, Mamunur Rashid<sup>1</sup>, Minarul Islam<sup>1</sup>, Mostafijur Rahman<sup>2</sup>

<sup>1</sup> Faculty of Electrical and Electronics Engineering Technology, Universiti Malaysia Pahang, Malaysia

<sup>2</sup> Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh

Email: sabirakhatun@ump.edu.my

**Abstract.** Breast cancer is the most common cancer among women and a major cause of death globally. A high percentage of the cancer death can be reduced if it is detected earlier (Stage 1 or 2). Early and non-invasive (health-friendly) diagnosis is the most essential key to detect breast cancer that ensures a fast and effective treatment for reducing women mortality. Ultra-wide band (UWB) technology is considered as an effective technique for breast cancer detection due to its health friendly (non-ionizing) nature to human tissue. The UWB technology uses the scattering or reflected wave/signal from breast tissue for diagnosis. A high-performance bio-antenna plays an important role in transmitting and receiving the UWB signal for this case. In this paper, breast cancer detection performance comparison of two types of UWB bio-antennas (pyramidal shaped UWB patch and the proposed modified T shaped UWB patch) has been investigated depending on accuracy. A system has been developed using a pair of UWB transceivers with bio-antennas and artificial neural network (ANN). The signals are transmitted and received through breast phantom for different arbitrary tumor size and location for considered antennas. The obtained tumor/cancer location and size detection accuracy are approximately 90.27% and 89.91 % for pyramidal shaped antenna, whereas, those for the proposed (modified T shaped) antenna are nearly 91.03% and 91.09% respectively. The proposed (modified T shaped) antenna is comparatively better to detect early breast cancer than pyramidal shaped antenna, by showing its suitability for practical use in near future.

**Keywords:** Breast Cancer Early Detection, Bio-antenna, Ultra-Wideband (UWB), Artificial Neural Network (ANN).



## Paper #280

## An E-Commerce Supply Chain Traceability System using Blockchain Technology

Md. Takasur Rahman Chowdhury Nayan<sup>1</sup>, Md. Mustafa Kamal<sup>2</sup>, Abu Zahid Md Jalal Uddin Joy<sup>1</sup>, Delwar Alam<sup>3\*</sup>, Tanjila Farah<sup>4</sup>

<sup>1</sup>Dept. of Software Engineering, Daffodil International University, Bangladesh

<sup>2</sup>Bangladesh Telecommunication, Regulatory Commission, Bangladesh

<sup>3</sup>BugsBD Limited, Bangladesh

<sup>4</sup>Department of ECE, North South University, Bangladesh

Email: delwaralam@gmail.com

**Abstract.** A record-keeping mechanism with a decentralized and distributed database, blockchain technology makes it more accessible and safer for businesses to work together with the internet. It measures some characteristics, activities, and resources that involve several phases where data flows from supplier to customer. The supply chain has become complicated in recent years. The e-commerce supply chain in Bangladesh is running with computerized supply chain management software. From connected manufacturing equipment to digital shipping notices, products are traced with a computerized system. Traceability and transparency are the essential foundation of logistics in the supply chain, but it is challenging to know the value of products for customers because there is a significant lack of transparency in e-commerce's current system. It is challenging to investigate supply chains when there is mismanagement with illegal or unethical follows. Using blockchain technology, each stage of production can be recorded without being tempered. It allows to record the transfer of assets, track orders, contracts, and shipment documents, verifies the source and link them with the information and labels, and share them between suppliers and dealers. Therefore, the research aim is to propose a model of the e-commerce product traceability from the supply chain system in Bangladesh with Blockchain technology.

**Keywords:** Blockchain, Supply chain, e-commerce, smart contract

## Paper #281

## Automated Border Control System Using Blockchain Technology

Shanjita Akter Prome<sup>1</sup>, Farzana Sadia<sup>1</sup>, Umme Jannath Tamanna<sup>1</sup>, Moniruz Zaman<sup>2</sup>, Md. Asrafuzzaman<sup>1</sup>

<sup>1</sup>Daffodil International University, Bangladesh

<sup>2</sup>Department. of CSE, Bangladesh University of Business and Technology, Bangladesh

Email: sanjitaprome@gmail.com

**Abstract.** Currently, in this digital world, the passport is still a physical entity. Each passport contains various security and identity attributes that are conducted to prescribe the owner of the passport and also circumvent attempts at tampering with the passports. Diversely fake passports are the copies of genuine passports that are illegally modified by an unauthorized person. Subsequently, criminal activities have grown for instance trafficking, smuggling, identity theft and so on. Currently, no mechanism accessible to immediately blacklist or revoke a suspected passport. It is a big challenge, especially for Bangladesh, to diagnose blacklisted passports and forge border control systems more securely. By using Blockchain Technology, the research will fling to reduce the following problems. The proposed system attempt to mitigate privacy and legal disquiet over data stored on the blockchain. It is producing a wide scope of changes and potential outcomes in current travel document verification services. Blockchain is an unbribeable peer-to-peer network that permits multiple validators/verified agencies to transfer value through a secure and transparent way. This paper is composed of the perception of digitizing Passport, VISA and Immigration records. The aim is to propose a decentralized application and all validators have to connect through the distributed ledger. To verify a passport each validator bet on the blocks and added to the chain. The validators mining the blocks continuously unless found any anomalies. If one validator gets any suspicious issue, then the passport included in the blacklisted list and that will be detectable by globally. Also, it makes services more elegant and increasing efficiency.

**Keywords:** Blockchain, Smart contract, Proof of stake, Proof of work, Ethereum blockchain.



## VOLUNTEER LIST

### Department of Software Engineering, DIU

Md. Abu Saleh	Amina Benta Nurnabi
Subroto Karmokar	Tawhidur Noor Badhan
MD Mostafa Munna	Shantanu Dey Anik
Nagma Islam	Md. Naziur Rahaman Monzu
Nasim Rana	Nur Mohammad Rayhan
Abu Sufian shibli	Nusrat jahan mim
Sadman Fahim Arpan	DM Shahriyer Bashar
Sohel Rana Tibro	Mahmudul Hasan
Md. Abu Sayeed	MD.MAINUL HASAN
Rasel Ahmed	Md. Hasibul Islam
Shah Fahad Hossain	Rakhi Moni Saha
Sabiqun Nahar	Lameya Islam
Mahedi Hasan	Md. Asibur Rahman
Biraj Saha	Shakib Mahmud
Akib Al-Amin	Jannatul Ferdous Shova
Ibne Sayad	Omar Faruk Shourov
Md. Rezuhan Hossain	Md.Rafidul Awal
Md Asik	Md. Mesbaul Islam
Raju Talukder	Subir Kundu
Mim Rahman	Fahadul Islam
Sabina YesminAnika	Ashraful Alim
Shouman Barua Shuvo	

### Department of Multimedia And Creative Technology, DIU

Monoway Kayser  
Eshrakur Rahman  
Md Shakhawat Hossain



Organized by:  
Department of Software Engineering, Daffodil International University, Dhaka, Bangladesh.

E-mail: [iconcs2020@diu.edu.bd](mailto:iconcs2020@diu.edu.bd) +8801783529558, 8801847140142 Conference Link: <http://iconcs.daffodilvarsity.edu.bd/>