

NEWSLETTER

Issue 2019-20

DEPARTMENT OF COMPUTER SCIENCE FORMAN CHRISTIAN COLLEGE (A CHARTERED UNIVERSITY), LAHORE



Welcome Message

Welcome to the second edition of DCS newsletter.

We are happy to bring you an update of the activities of the department through this newsletter. Over the past year, our students have been acknowledged at international forums, presenting papers at prestigious conferences, getting admissions at top-notch universities abroad, and doing internships and jobs at the best organizations in the country. We were also honored to see our first batch of graduating MS students at the PG commencement ceremony as they received their degrees. Our faculty members have also continued to further strengthen themselves professionally by pursuing PhD and Post-Doc programs, consequently enriching the department with their contemporary knowledge and experience. We have also developed linkage with the industry and are consolidating it by means of formal MOU's.

While the COVID-19 pandemic has had a disruptive effect on many fields, we have continued to provide our academic services through remote teaching. Over the past few months our faculty has worked tirelessly to provide an excellent educational environment to our students. I have full confidence in the resilience of our UG/PG programs because of the dedication of our faculty, our hard-working students, and a supportive environment at FCC.

In the next year we will continue to maintain quality in our areas of strength and produce industry-ready graduates with strong leadership skills. We will give increased professional exposure to our students by offering relevant events from our student society platforms like IEEE and ACM student branches which are part of internationally esteemed professional bodies. We will also reinforce our industrial linkages through projects in our key areas including Artificial Intelligence, Human Computer Interaction, Internet of Things, Networking, and Software Engineering.

We hope you enjoy going through this newsletter. We would love to have your feedback to make it better.

Warm Regards,

Dr. Aasia Khanum
Professor and Chair
Department of Computer Science



About the Department

The Department of Computer Science is part of the Faculty of Computer and Mathematical Sciences. With more than 600 students currently enrolled in CS, it is one of the largest departments of FCC. Both undergraduate BS(CS) and postgraduate MS(CS) programs in Computer Science are offered by the department. Our 4-year BS(CS) degree program at FCC is accredited by NCEAC (National Computing Education Accreditation Council) of HEC with the highest ranking of 'W'. Our MS program was started in 2017 and has evolved much since then. Our MS students are successfully publishing and presenting their research in national and international conferences.

We have a family of brilliant faculty members with outstanding academic record and active research output. Our faculty delivers both the state-of-the-art and crucial skills of concepts understanding, problem solving and programming to the students. We revise our curriculum frequently to offer a meticulous curriculum to prepare our students for their competitive field. Our students are encouraged to show active participation in technical and professional seminars, workshops and events and we have received great response from our student community in this regard.

INSIDE THIS ISSUE

About the Department ---	2
Students Achievements	
Honors & Awards---	3
Conference Publications---	5
Alumni Achievements	
Placements---	7
Alumni/Student Spotlight ---	7
Faculty & Staff Achievements	
Academic Progression---	8
Conference /Publications ---	8
Professional/Community Services---	9
Events ---	10
Societies & Chapter Activities	
Forman Computing Society---	13
ACM Chapter---	14

Students Achievements

Honors and Awards

The project titled, "Automated Binocular" by our students Ali Iftikhar and Abdullah Butt, supervised by Mr. Muhammad Salman Chaudhry was presented in Role of S & T Education for Industrial Development - PCSIR Expo at PCSIR on 23rd and 24th September 2019. It was well appreciated by the visitors.



Two MS students namely Mr. Nabeel Francis and Syeda Bushra Kazmi participated in 'DICE COVID 19 Global Innovation Challenge'. It is an international competition. Participants are not only from various universities of Pakistan, but also from USA, UK, Indonesia etc. It is commendable that these two students have reached the final round. We wish them very best in the final round. Their submissions are as under:

- COVID-19 Health Care Solution for Pakistan: Automated diagnostic system in hospitals during COVID 19, Smart Hospital framework for post COVID 19 era (Syeda Bushra Kazmi)
- Kisan DOST: Agriculture Training Application for Pakistan, In current and post COVID 19 Era (Mr. Nabeel Francis)

Our UG students Amroz John, Usman Riaz and Abdul Haseeb participated in the Falling Walls Lab Event held at FCCU on 3rd October 2020 and presented the idea of their FYP "Headspace" supervised by Dr. Nosheen Sabahat and Dr. Aasia Khanum, representing the CS department.

Honors at Senior Project Exhibition January 2020



All the 3 awards (Best Research Project, Best Poster and Best Report) were given to the project “Domain Adaptation for Lane Marking: An Unsupervised Approach”, supervised by Dr. Amara Tariq and Dr. Nazim Ashraf. The students were Ammar Saqib, Sarah Sajid and Sheikh Mahad Arif.



In the category of Application Based Projects, the best project award was given to the project “Virtual Fitting Room in Augmented Reality”, supervised by Mr. Rauf Butt and Dr. Amara Tariq. The students were Ubaiq Ur Rehman, Saad Saqib and Hania Javed.

Conference Publications

Our senior students Syeda Airas Burhan, Mohammad Nabeel and Osama Zahid successfully completed their Senior Project in Spring 2020 under supervision of Dr. Sidra Minhas and Dr. Amara Tariq. Their project titled “Disease and Pest Detection in Rice Crop Using Deep Learning” aimed at developing a stable, automatic system which successfully identifies critical issues faced by Rice crop in Pakistan.

They extracted a research paper titled “Comparative Study of Deep Learning Algorithms for Disease and Pest Detection in Rice Crop” from their project which was accepted for publication in 12th IEEE International Conference on Electronics, Computers and Artificial Intelligence (ECAI), June 2020. The students presented their work virtually in the conference and were applauded upon for the nature of their project and for being the youngest researchers amongst the presenters.

MINISTERUL EDUCAȚIEI NAȚIONALE

**ECAI 2020
INTERNATIONAL CONFERENCE
12th Edition**

Electronics, Computers and Artificial Intelligence

25 June-27 June 2020

Bucharest, ROMANIA

Comparative Study Of Deep Learning Algorithms For Disease And Pest Detection In Rice Crops

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Abstract— Accurate and timely detection of rice crop diseases like Leaf Blast and Brown Spot, as well as pests like Hispa, can help minimize crop losses and increase the yield obtained. Since Pakistan is an agricultural country, such researches are imperative to its economic growth. This research is focused on a comparative study between the performances of five different Deep Learning Models i.e. Vgg16, Vgg19, ResNet50, ResNet50V2, and ResNet101V2 on both artificial data as well as on images collected from the rice fields in Gujranwala, Pakistan. The artificial dataset has been classified into four classes Hispa, Healthy, Brown Spot, and Leaf Blast, whereas binary classification of Healthy Vs. Unhealthy has been performed on the dataset collected from the fields. All images have been pre-processed by removing backgrounds and shadows before being passed through the models. On the artificial dataset, the ResNet50 model performed the best with an accuracy of 75.0%, and in case of the real dataset, the ResNet101V2 was the best performing model with an accuracy of 86.799%.

Keywords—rice disease, pest detection, deep learning, comparative study, leaf segmentation, deep learning models, digital image processing

INTRODUCTION

yield was observed [4]. This is mainly due to the two most common fungal diseases i.e. Leaf Blast and Brown Spot, and the pest Hispa that attacks rice crops and causes immense damage.

Fig 1 display the types of rice crop issues under discussion. Fig 1(a) depicts the leaf appearance due to Leaf Blast while Fig 1 (b) and (c) show leaf situation due to Brown Spot and pest Hispa attack, respectively. Leaf Blast is a fungal disease that affects all parts of the rice plant like the node, neck, leaf sheath and parts of the panicle. It can attack the plant through all growth stages. It appears as whitish grey or greenish spots which then develop a necrotic border and a reddish-brown center. Similarly, Brown Spot is another fungal disease that attacks the leaf sheath, panicles, glumes and the coleoptile. This disease can impact the furrow crops as well through infected seeds. Although it can occur at all stages of growth, the rice plants are most vulnerable during the tillering and ripening phase. It appears as small yellow-brown lesions on the leaf and can evolve into a red bordered spot with a grey or light brown core. In contrast, Hispa is not a disease but a pest. Adult Hispa is a beetle that is around 5mm in length. It feeds by scraping the surface of the leaf as a result of which white

One of our research-based senior project titled, “Domain Adaptation for Lane Marking: An Unsupervised Approach” by Ammar Saqib, Sarah Sajid, and Sheikh Mahad Arif under the supervision of Dr. Amara Tariq and Dr. Nazim Ashraf was accepted at the 27th IEEE International Conference on Image Processing (ICIP 2020), which is a one of the top venues for Computer Vision research.



Plenary Speakers



Prof. Lina Karam
Lebanese American University

Towards Resilient Deep Learning



Prof. Katherine Bouman
California Institute of Technology

Capturing the First Picture of a Black Hole & Beyond



Prof. Wolfgang Heidrich
King Abdullah University of Science and Technology

Learned Optics — Improving Computational Imaging Systems through Deep Learning and Optimization



Alumni Achievements

Placements

Our alumni are working at renowned software houses and many are pursuing higher studies. Outlined below are a few noteworthy ones.

- Bareerah Qureshi, Muhammad Abubakar, Usman Manzoor, Farah Arif, Muhammad Bilal, Arsalan, Taha Azhar are working at Systems Limited.
- Khozema Lodhi is working at EWORX International.
- Ubaid-ur-Rehman is working at i2c
- Muhammad Anzar is in China and Vikram Jan is in Germany for higher studies.

Alumni/Student Spotlight

In this section of the newsletter in every issue, we highlight one of our brilliant alumni or students. This time it is Ubaid Ur Rehman from our batch of 19-series students. He is currently working at i2c Inc. which is a top-tier multinational software company, as a Software Engineer in the Security and Performance Testing department.

I, Ubaid Ur Rehman, graduated from Forman Christian College (A Chartered University) with Bachelor of Computer Sciences (Hons) in Class of 2019. I have had the pleasure of being a part of this prestigious institute for almost 6 years: 2 years as Intermediate and 4 years and undergraduate. Throughout my degree, I came across instructors who were not only sound enough in their relevant area but also were adept to the practical implementation of theoretical knowledge. Apart from my academics, I have been actively involved in co-curricular activities and event management on campus. The skills I learnt from these activities acted as a cherry on top when I witnessed a strong demand of these soft skills in my profession. Forman Christian College does not only give you an undergraduate degree; it gives you a package of tools needed to stand out in the practical world.



I have had experience of working in two of the biggest software companies in Pakistan in just one year, and the credit entirely goes to my Alma Mater for providing me with a platform to perform and tools to flourish. It was through the campus recruitment drive during my final year that I was hired in Systems Limited, which is one of the largest Software Company of Pakistan when it comes to manpower, as an Associate Software Engineer. I worked there in Software Quality Assurance Competency for 8 months and was able to bag the Performance Excellence Award. I was offered a job by i2c Inc. afterwards, which is another reputed software company of Pakistan, having some of the brilliant minds of the IT industry, as Software Engineer in the Security and Performance Testing department. Since then I have been working in i2c Inc. and productively implementing what was taught to me by the outstanding faculty of Forman Christian College University.

Faculty & Staff Achievements

Academic Progression

- Dr. Amara Tariq (Assistant Professor) left for Postdoc at Biomedical Informatics, Emory University, Atlanta, GA, USA. Working at Emory University, USA would strengthen the faculty's research and ultimately will benefit FCC when she will rejoin with more experience in research.
- Dr. Nazim Ashraf (Associate Professor) has successfully completed his Postdoc at the University College Cork, Ireland. He is rejoining us in Fall 2020.
- Ms. Umer Nisar started her PhD in Computer Science from FAST-NUCES, Lahore.
- Ms. Maria Taimoor (Assistant Professor) is pursuing her PhD in CS from FAST Lahore. She has already successfully completed her course work and is in the final stages of her research.
- Mr. Adil Mukhtar was also offered PhD abroad. The department said farewell to him Spring 2020.
- Our BS graduate Mr. Gadhaun Aslam has joined us as a faculty member. It was an honor for us and a very warm welcome to him from our side.
- Lab S-219 has been upgraded on cloud computing, offering a tremendous increase in hardware and software resources available to the students.

Conferences/Publications (Selected List)

- Nabeel A. Riza, Nazim Ashraf, Mohsin A. Mazhar, "Robust Testing of Displays using the Extreme Linear Dynamic Range CAOS Camera", IEEE 2nd British and Irish Conference on Optics and Photonics (BICOP), 2019, London, United Kingdom.
- Nabeel A. Riza and Nazim Ashraf, "Calibration Empowered Minimalistic Multi-Exposure Image Processing Technique for Camera Linear Dynamic Range Extension", IS & T Electronic Imaging Conference Proceedings, 2020.
- Farwa Bahir, Nosheen Sabahat, "Size Estimation of Puzzle Games", Proc. of the 2nd International Conference on Electrical, Communication and Computer Engineering (ICECCE) 12-13 June 2020, Istanbul, Turkey.
- Moazzama Nadeem Ahmad Chaudhary, Nosheen Sabahat, Saba Khalil Toor, "RES-TOOL To Overcome Requirements Elicitation Barriers In Pakistan Software Industry", Proc. of the 2nd International Conference on Electrical, Communication and Computer Engineering (ICECCE) 12-13 June 2020, Istanbul, Turkey.
- Haseeb Haider, Saad Bin Saleem, Johnson Rafaqat, Nosheen Sabahat, "Threat Modeling of Wireless Attacks on Advanced Metering Infrastructure", 2019 13th International Conference on Mathematics, Actuarial Science, Computer Science and Statistics (MACS), December 2019.
- Adil Peter, Nosheen Sabahat, Saad Bin Saleem, "An Enhanced Framework for Rescue Service in Pakistan", 3rd International Conference on Innovative Computing (IC)2, UMT Lahore, November 2019.
- Zarsha Nazim, Nosheen Sabahat, Sunbal Allauddin, "Amendments in E-Learning Services Provided at School Level in Pakistan", 3rd International Conference on Innovative Computing (IC)2, UMT Lahore, November 2019.
- Ayesha Ajmal, Seemal Irfan, Nosheen Sabahat, Saad Bin Saleem, "Analysis of Flood Risk Management in the Context of Mathematical Models", 3rd International Conference on Innovative Computing (IC)2, UMT Lahore November 2019.
- Bismal Majeed, Hamza Ahmed Khan Niazi and Nosheen Sabahat, "E-Government in Developed and Developing Countries: A Systematic Literature Review," 2019 International Conference on Computing, Electronics & Communications Engineering (iCCECE), London, United Kingdom, 2019, pp. 112-117.

- Adeem Akhtar, Taha Ahmad, Nosheen Sabahat and Sidra Minhas, "IoT Based Home Automation System Using ThingSpeak," 2019 International Conference on Computing, Electronics & Communications Engineering (iCCECE), London, United Kingdom, 2019, pp. 163-168.

Professional/Community Service

Dr. Aasia Khanum served as Program Evaluator for National Computing Education Accreditation Agency (NCEAC). She also served as a reviewer for WIML Workshop (USA), Pakistan Science Journal. PCSIR exhibition participation was also done.

Dr. Nosheen Sabahat chaired a session virtually at the 2nd International Conference on Electrical, Communication and Computer Engineering (ICECCE) 12-13 June 2020, Istanbul, Turkey.

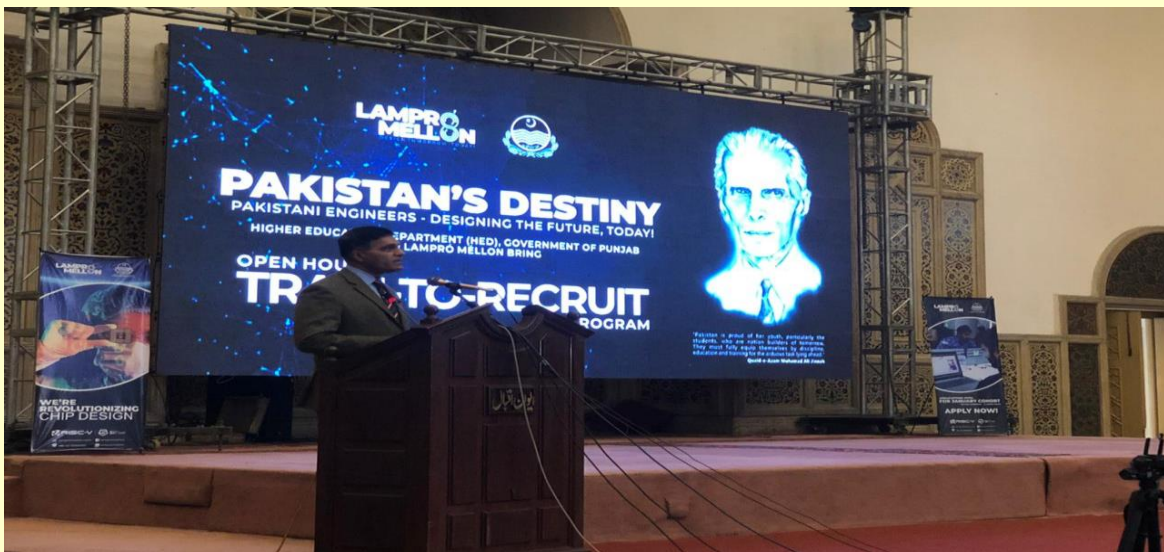
Dr. Saba Khalil Toor chaired a session at a conference at LGU.



A 2-day Basic Excel Workshop for FCC staff was conducted by Dr. Aasia Khanum and Dr. Mubashar Mushtaq. It covered concepts ranging from using Excel sheets and basic operations to basic macros.

Recruitment Drive was organized jointly by HED Government of the Punjab and Lamprò Mellon on Friday, 6th December 2019, at Aiwan-e-Iqbal Complex, Egerton Road, Lahore. The Honorable Minister for Higher Education Punjab, Raja Yassir Humayun Sarfraz (Chief Guest) and Chairman Punjab Higher Education Commission (PHEC), Prof. Dr. Fazal Ahmad Khalid (Guest of Honour) attended the event. Our senior students also attended it along with the Dean, Faculty of Computer and Mathematical Sciences, Dr Ahmad Mahmood Qureshi and the faculty members Dr. Saad Bin Saleem, Dr. Nosheen Sabahat and Mr. Zeeshan Haider Malik of the Computer Science department.

LAMPRO MELLON



Events

MOU signing ceremony between DICE Analytics and DCS/FCC. This will help in professional skill development, internship opportunities, and employability of our students (March 2020)



Recruitment Drive and Introduction Session was conducted by Tkel a leading software development company located in Reston, Virginia who are committed to develop innovative software solutions for leading enterprises in the world by using the latest technology solutions (Feb 2020)



SENIOR PROJECT EXHIBITION JANUARY 2020

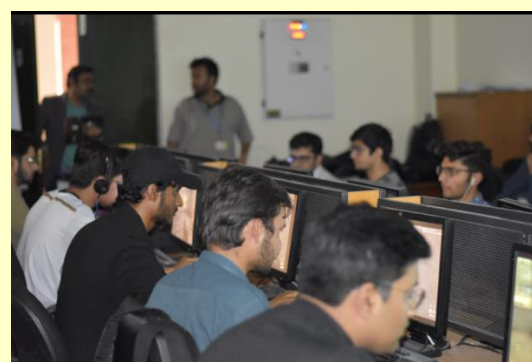


Societies & Chapter Activities

Forman Computing Society (FCS)

Some noteworthy events of the year were:

- Freshmen Experience Stall was held both in Fall 2019 and Spring 2020 for introducing freshmen to the university.
- Freshmen Console and Mobile Gaming event was held during Winter 2019 and again in Spring 2020.
- Mr. Kamran Shafi hosted a seminar to introduce students to freelancing.
- A workshop was held on WordPress to enable students to create personal blogs and webpages.
- Mini Mindsweeper was held to provide university students a chance for free entry in our flagship event called Mindsweeper which was to be held in April 2020. Mini Mindsweeper is a rehearsal event for Mindsweeper hosting team.



ACM Student Chapter

Association for Computing Machinery (ACM)'s Professional and Student chapters worldwide serve as pivots of activities for ACM members and the computing community in general. They provide seminars, lectures, learning forums and networking opportunities with peers and experts across the computing spectrum. The purpose of organization of technical talks, workshops, field trips and programming contests by the ACM Student Chapter is to facilitate communication and collaboration within a university's computer science group as well as with the worldwide computing body. The following events were conducted by ACM's FCC student chapter during 2019-2020 tenure.

Project Management Seminar

Seminar on Project Management - A seminar was held for Computer Science students in E-001. The guest speaker hailed from NETSOL. This seminar was aimed at providing students insights into the aspect of project management and helping them understand the importance of it. As project management is an important part of any software development cycle, this session was extremely beneficial to graduating students who not only were about to graduate but were also working on their final year projects.

Firestore Workshop

Workshop on Cloud Firestore - As part of our series to introduce students to newer technologies, FCC ACM Chapter organized a hands-on experience workshop on Cloud Firestore; Google Firebase's real time database management system. Students were taught how to create a project in firebase, how to manage it, how to set it up with their application, how to fetch data, how to store data and how to edit stored data. They were also taught how Cloud Firestore works and how its file system works.

Freshmen Gaming Competition:

Gaming Competition - A gaming competition for Call of Duty 4 was held for Freshmen during Forman Experience 2019. A large number of new students participated in this event. The students really enjoyed this event and actively participated in it. The event was held in the computer labs in the Sciences Building.





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