







_	 Message of Head of the Department
_	 Department Achievements
_	 Department news room
_	 Interview with Alumni
_	 Research of the department
_	 Senior project of the issue
_	 Field article of the issue
_	 CSE Social news

Message of the Head of Department

Somaya Al-maadeed, Head of Computer Science and Engineering Department

Welcome to the sixth issue of the Department of Computer Science Connect newsletter. It is always a pleasure to be part of Computer Science and Engineering Department (CSE) team. The department offers BSc in Computer Science, BSc in Computer Engineering, MSc in computing (with two tracks in CS and CE), PhD in Computer Science, PhD in Computer Engineering. The opportunity of computer science and engineering is endless. CSE students are highly demanded by the recruiters of many companies and organizations in Qatar.

We are delighted that, with generous help from a variety of supporters including IEEE, Qatar National Fund, the Supreme Committee for Delivery & Legacy (SC), Qatar Tourism Authority (QTA), Dell, Hamad Bin Khalifa University (HBKU), and Texas A&M University at Qatar (TAMU) we will be organizing IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT'20), our largest conference this year. IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT'20) would feature the following Awards to highlight and acknowledge the most prominent researchers from all around the world. We're excited to let you know about our latest competitions in ICIoT for best Posters and best Demos with two tracks; one for usual submissions and the other specifically for the undergraduate students work. Such an assortment is expected to encourage the participation of undergraduate students through their projects and other scientific findings, thus highlighting young researchers' work amidst high profile and world-renowned researchers. Deadline for submitting your poster/demo is 1st of January.

Qatar University continues to be recognized in Times Higher Education (THE) rankings, placing 201–250 in the Computer Science subject for the second year and 176–200 in the Engineering & Technology subject for the 2020 year.

In this issue, we will cover the workshop we organized with the support of Google to course for the professional development of computer teachers at the Ministry of Education and Higher Education. Beside that the department organized or co-organized other events with many entities in Qatar. Furthermore, we will highlight students and faculties achievments and news.

We always appreciate your feedback and input for the next issue

Sincerely

Dr. Somaya Al-maadeed, Ph.D, SMIEE	.د. سمية علي المعاضيد
Head Computer Science and Engineering	رئيس قسم علوم وهندسة الحاسب
College of Engineering, Qatar University	كلية الهندسة ، جامعة قطر
Tel: +974 4403 4262	تليفون: 974 44034262+
E-mail: s_alali@qu.edu.qa	البريد الالكتروني: <u>s_alali@qu.edu.qa</u>
P.O. Box : 2713 Doha-Qatar	صندوق بريد 2713 الدوحة قطر
Website: www.qu.edu.qa	الموقع الالكتروني: www.qu.edu.qa



Department's Achivements

Winning best project in 2019 IEEE GCC SYP



5

The second 2019 IEEE GCC SYP congress and exhibition. was held at Kuwait Regency Hotel on the 19th and 20th of April 2019 under the theme of "Technology Innovation Driven by GCC Young Professional" "TID by GCC YP". SYP's main goal is to motivate the new youth generation to drive the economic growth of GCC by their innovative solutions. Many competitions were held under the umbrella of the congress. One of them called "Project competition". The Undergraduate Project Competition is for course projects conducted by undergraduate students during their undergraduate courses at any of their year of study. The submission could be a course projects in the shape of a poster, co-op/internship findings, research projects, software/hardware, or a robot done at the academic institution. CSE undergraduate students Mariam Al-Muhandi and Wedyan Al-Enazi participated in this competition, and won the first place for their project titled "Portable Braille Display" under the supervision of Dr. Mohsen Mokhtar and Dr. Tarek El-Fouly.





CSE collects first and Runner up places in Startup LaunchPad competition

On April 2019, Qatar university QU lancaued the QU forum for digital annovations. The two-day forum aimed to bring technology and industry leaders together to share ideas and insights on new technology trends and their impact on education. The forum also provided the university community a platform to explore the latest technological developments related to education.Startup LaunchPad competition, sponsored by Microsoft was a part of QU Digital Innovation Forum. Startup Launchpad event was organized by Information Technology Services Department, and Center for Entrepreneurship in the College of Business and Economics. Students, faculty and staff members of Qatar University were allowed to participate in this event.



The aim of the contest was to let the participations try to commercialize their business idea, innovation, or graduate project. Some of CSE students and faculty member participated in this competition. Mr. Zeyad Ali and Dr. Qutaibah Malluhi pariticpated in the competation with their project titled "InstaPreter". The project is used in the medical filed where it can make the communication between the doctor and the partient much easir by interpreting the conversation between the, and deleting of the language barrier. The project won with the first place in the competation.



The winners in this competation were not only faculty memebers from CSE department, but also the CSE department senior students Menatalla Abdelfattah Issa. Roudha Mohammed Al-Ahbabi, and Shimaa Amer Taha under the supervison of their supervisor Dr. Uvais Qidwai participated with the idea of their senior project titled "Robotic Physiotherapy System for Arm Rehabilitation using Visual Impulsive Stimuli". The group won the 1st Runner up place in the competation. Menatalla said to express her happense :" It was a thrilling experience as we had the chance to challenge ourselves by joining a competition that was joined by experts in both business and technology fields. It was also a great opportunity to try presenting in front of big crowd of technology experts. We are also so grateful for our supervisor and Dr Ajimsha from Hamad Hospital for believing in us and providing us with a great support throughout the competition"

Furthermore, Other senior students from CSE department presented their ideas in the competation such as the group of Mohamed Abdou, Hussein Aly and Abdelmonem Mohamed, who presented their idea about "Ustad " the online private lessons website they pitched on. Ustad is a web platform to make focused curriculum private tutoring much cheaper, more time convenient, and informative. In addition to that, Sara AL-Housani, Eshraq Alhazbi, and Raghd Al-Qershi other CSE senior students participated with their project titled "Kidlinker". Kidlinker is a smart watch for the autistic kid to keep them safe and the parents can watch them all the time. Sara mentioned that their smart watch could offer the following a smart lock that opens and close with a pin code(the parents set the pin), GPS tracker & safe zone detection, an alarm that alerting the surrounding if the kid lost or etc, and a smart etextile to be printed on the kid shirt (optional).









Department's Achivements

New Patents Granted to CSE faculties



Patent title: Method For Generating A Secret Key For Encrypted Wireless Communications

The method for generating a secret key for encrypted wireless communications is a physical layer technique that exploits channel randomness between two nodes , the channel being characterized by reciprocity between the two nodes . Reference signals exchanged by the two nodes are used to faun a channel estimate , including gain location and phase location . The gain and phase locations are compared to threshold values , and locations exceeding the respective thresholds are stored in vectors . The moving differences between gain and phase locations at adjacent sampling times define secondary random processes . The moving difference values are quantized and converted to bit streams , which are concatenated to generate the secret key . Measures are provided to reduce parity errors , thereby reducing the bit mismatch rate (BMR) .

Inventors: Dr. Tarek Elfouly, Dr. Amr Mohamed, and Dr. Tamer Khattab

Date of Patent : Sep 2019

Patent title: Non - Coherent Ultra – Wideband Receiver

This patent aims to design a non - coherent ultra - wideband receiver that receives an ultra wideband (UWB) signal, consisting of pulses (or "symbols") and uses on - off keying (OOK) modulation so that when a binary "0" is transmitted, the receiver collects noise - only samples. The receiver collects samples during the symbol (pulse) duration and sorts the samples by magnitude of voltage or energy. The receiver uses the known transmission rate and the estimated signal - to - noise ratio to retrieve a sample index from a look - up table. The receiver then compares the signal sample at the index value with a predetermined threshold voltage (or energy). If the selected sample exceeds the threshold, then it is assumed that all succeeding samples also exceed the threshold (assuming the sort is in ascending magnitude) and the pulse is present and binary "1". Otherwise, the pulse is absent in the sampling period, and binary "O". The process is repeated for the signal duration

Inventors: Dr. Tarek Elfouly



Date of Patent : Aug 2019

Patent title: Method And Apparatus For Simple Angle Of Arrival Estimation

The method and apparatus for angle of arrival estimation are used for estimating the angle of arrival of a received signal by a switched beam antenna array and a single receiver. The switched beam antenna array first collects an omnidirectional signal to be used as a reference signal. A main beam thereof is then switched to scan an angular region of interest. The collected signals from the switched beams are cross correlated with the reference signal. The cross – correlation coefficient is the highest at the true angle of arrival and relatively negligible otherwise. The collected signal from each beam angle is cross - correlated with the omnidirectional reference signal to determine the angle of arrival of the received signal.

Inventors : Dr. Tarek Elfouly, and Dr. Amr Mohamed

Date of Patent : Aug . 20 , 2019



Six Awards for CSE department in QU annual research forum 2019

Qatar University Annual Research Forum and Exhibition has been always the meeting point for students, researchers and academics from the University's nine colleges, centers and institutes; including partners and stakeholders, to assess and review the institution's research enterprise. This year's high profile event will be extended to two days and will feature theory grounded discussions, and original research presentations. It is an occasion to demonstrate new tools, or report on the implementation of new programs, collaborations, innovations and other relevant projects that take bearing from the QU Research Roadmap 2018-

2022, Qatar National Research Strategy and Qatar National Vision 2030.

The forum this year (April 2019) highlighted the important and awarded winning research being conducted at Qatar University that promotes the vision of the University and supports the research priorities of Qatar in the areas of Water Security, Energy Security, Cyber Security, Social Priorities and Health; and the goals of the Qatar National Vision 2030.

Luckly Computer Science and Engineering department collected six different awards under the umberalla of the QU annual resrach forum which are:

Poster Award - ICT – Under



Award title

Graduate Students

Project name

Intelligent UVA Detection: A

Machine Learning Approach

Winners

Students: Iten Soliman, Rawan Abulibdeh

Supervisors: Dr. Tarek El-Fouly, and Dr. Amr Mohamed





Award title	Project name	
-------------	--------------	--

Poster Award - ICT - Graduate Students

 Neuropathy Classification of Corneal Nerve Images using Artificial Intelligence Student: Tooba Salahuddin

Winners

Supervisors: Dr. Uvais Qidwai and Dr. Sumaya AlMaadeed



Award title	Project name	Winners
Barzan Award- Under Graduate Students	Real Time Detecting and Counting of Moving Objects using mmWave Radar and Computer Vision	Students: Aisha Alqitari, AlDana AlSalem, Alanoud Al- Thani Supervisor: Dr. Sumaya AlMaadeed



Award title

Project name

Winners

Barzan Award- faculty member and PostDoc

Intelligent Video Surveillance Platform Dr. Noor AlMaadeed (lead), Dr. Sumaya AlMaadeed, Dr. Omar Elharrouss



Award ti	tle		Project na	ime		Winners
Barzan member ar	Award- nd PostDoc	faculty	Oriented Coverage and Tracking of dimensional Targets	Dr. Amr Mohammed (lead), Dr. Khalid Harras , Dr. Aiman Irbid, and Dr. Mohsen		
			100		IUM	



Award title		Project name	Winners		
The visualization	challenge	CamNav	Dr. AbdelGhani Karkar, Eng. Jayakanth Kunhoth, an		

The visualization challenge Car (interactive section).

Dr. AbdelGhani Karkar, Eng. Jayakanth Kunhoth, and Prof. Somaya AlMaadeed (Lead)







Cogratultation to all of the winners, hoping all of them the best!

Department's Achivements

Publication of an article in the Communications of the ACM:



Dr. Malluhi has published an article titled "The Limit of Blockchains: Infeasibility of a Smart Obama-Trump Contract". In this article Dr Malluhi



formulated an Obama-Trump contract and showed that such a contract wouldn't be able to be implemented using blockchain smart-contract techniques. Some of these techniques include the use of Cleve's result on the limit of coin flips when half the participants are faulty, then try to enforce the contract on a block chain, from which they have established that such a contract is infeasible.





Department's Achivements

CSE winners of college of Engineering senior design contest 2019

CENG graduating students presented their senior projects during the college's annual Senior Design Contest **on May 2019**. All senior project teams in the college of engineering presented their senior projects to many judges representing some of Qatar's top institutions and industrial companies. The projects were evaluated on innovation, commercial potential, sustainability, and presentation quality.

The results were announced in the winners' announcement, and the winners from CSE department for this year 2018-2019 are:





CSE CONNECT



Project Name Students' Name

- Fire fighting VR training and assistant system 1. Fatemah Ahmad Al-Atom
- 2. Allaa Adel Al-Khalaf
- 3. Safa Nashat Ibrahim



.

Dr. Mohammad Saleh (Supervisor) , Dr. Osama Halabi (CoSupervisor)







S

Place

Second Place Computer Engineering

Project Robotic Physiotherapy System for Arm Rehabilitation using Visual Impulsive Stimuli Name Students' 1. Menatalla Abdelfattah Issa

- 2. Roudha Mohammed Al-Ahbabi
 - 3. Shimaa Amer Taha
- Supervisor

Name





Second Place Computer Engineering

Project Name Students' Name

1. Abdallah Khalel Miqdad

LIDAR based motion detection system

- 2. Abdulrahman Ziad Naasani
- 3. Ali Abdelhakam Osman
- Dr. Noor AlMaadeed Supervisor



Second Place Computer Science

Project MOALEM: An Assistive Platform for Children with Arabic Reading and Writing Skills. Name Students' 1. Fatema Ahmad M A Al-Musleh Name 2. Khadlja Asim Elamir

3. Sara Jamal Abdelazi

Dr. Jihad Al-Ja'am Supervisor



Third Place Com[uter Engineering

Project **Real-time Detecting and Counting Of Moving Objects** Name Students' Aisha Abdulla Al-Qitairi 1.

Name

- 2. Alanood Ahmed Al-Thani 3. Aldana Yousef AL-salem
- Dr. Somaya Al-Maadeed Supervisor

Third Place Computer Engineering

Project An IoT Reconfigurable SoC based Robotic Platform for Sensing and Computer Vision Application Name Major Computer Engineering Students' 1. Marouane Ferjani Name 2. Mazen Nashat Mohamed Abdelfattah 3. Naheel Faisal Kamal Supervisor Dr. Abbes Amira



Third Place Computer Scinece

Project Name Students' Name

- 1. Abdullatif Naim Mnawar
- 2. Alaaeldin Mohamed Abdalla Said
- 3. Islam Mohamed Abdallah Ali Ibrahi
- 4. Saeed Ahmad Alrashidi

Supervisor Dr. Ali Al-Jaoua

Qu community



9

Department's Achivements

15th international wireless communications and mobile computing confrence



In June 2019, Dr. Lamiaa Basyoni, Dr. Aiman Erbad, Dr. Noora Fetais and Dr. Moshen Guizanithe represented Qatar University in the International Wireless Communications & Mobile Computing confrence in Tangier, Morocco. The theme of this conference was "Connecting to the IoT". In this conference, this team won a best paper award for their paper "Empirical Performance Evaluation of QUIC Protocol for Tor Anonymity Network". In this paper, the team purposed "QuicTor" to help eliminate problems affecting the performance of the Tor network as the current design of its transport layer was lacking. "QuicTor" would replace the current use of TCP to Googles protocol "QUIC".







💪 HUAWEI

QU, Huawei partnership to empower next generation of ICT leaders



On 28 May 2019, Qatar University College of Engineering signed an Memorandum of Undrstanding (MoU) with Huawei Technologies Investment Co Ltd – Qatar. The MoU was signed by QU-CENG Dean Prof Abdelmagid Hammuda and CEO of Huawei Technologies LLC Frank Fan, in the presence of QU President Dr. Hassan Al Derham, Vice President of Huawei Technologies LLC Farhan Khan, Huawei representatives, as well as QU leadership, faculty and staff.

The MoU states that Huawei will deliver some training and certification programs to QU through Huawei Authorised Information and Network Academy (HAINA), the academy will be newly launched in Qatar. Huawei will promote QU as a training organization to its students and customers base for HAINA-based programs and selected professional programs according to QU's capability and capacity. Additionally, Huawei will provide Huawei Certification Academy Instructor (HCAI) training for professional instructors for each course direction.

QU will provide classroom and other teaching facilities to accommodate Huawei ICT equipment for the HAINA programme, as well as professional instructors to become Huawei Certified Academy Instructors. The university will also add the HAINA certification course as an extension course for the QU curriculums, liaise with local networking industry – in particular government entities and institutions – to promote and deliver HAINA Network training across a wider outreach of population in the ICT realm within Doha, Qatar, and work with Huawei to develop a training schedule that meets students' needs.

In his remarks, Prof Abdelmagid Hammuda said: "Through this MoU, Qatar University CENG showcases its commitment to providing students with opportunities to heighten their skills and competencies and to enhance their knowledge in the field of information and communications technology. Additionally, this opportunity will help students stay in close touch with technological advancements and innovations in China, and to interact with experts easily. In coordination with our partners, Qatar University will continue to deliver on its mission and vision to fulfill the needs of the industrial sector by graduating highly qualified professionals, and by providing its students with training and internship opportunities that enable them to make a difference in various areas at the workplace."

Frank Fan said: "We are proud to roll out our flagship global CSR program in Qatar in partnership with a leading educational institution such as Qatar University, and in collaboration with the Ministry of Education and Higher Education in Qatar. The Huawei academy will equip Qatari youth with the necessary skills and know-how to lead the country's journey to become a knowledge-based society and support digital transformation in Qatar."

CSE senior studetns's Internership program in Huawei



On June 27, 2019 Huawei company launched their Internship Program. Thr ceremony was presenced by Dr. Sumaya Al-Maadeed, Head of Computer Science & Engineering Dept of Qatar University and Dr. Jens Schneider, Assistant Professor of Hamad Bin Khalifa University, the interns from QU computer science and engineering students, and HNK students.

CEO of Huawei Technologies LLC shared an encouraging speech to the students, guests and mentors. He expressed his support and he wanted the current batch of Interns to be inspired and create more value as he shared his experiences in the company. He highlighted the importance of Huawei vision, team collaboration, and that Huawei is a customer centric company.

The Huawei culture training started at that day where the first phase is focused on Huawei's Company Culture and Introduction/Overview. The next part shows the Training Plan overview of Huawei's Internship Program. The first week of the program will provide the Interns some trainings/workshops, group discussions, etc. Then the Mentors will manage to present and discuss their platform as to what work or task they will assigned to the Interns. The last week will be the judgment day where the Intern have to prepare his/her presentation for what he/she have learned and on a certain topic he/she is assigned to. The Interns will be evaluated by the chosen panel of Managers and might have a chance to be awarded as the "Best Intern for year 2019".

A course to qualify computer teachers in Qatar schools offered by CSE.

By support of Google company



On March 2019, Within the framework of community contribution and cooperation with government institutions, and with the support of Google, the Department of Computer Science and Engineering at the college of Engineering at Qatar University organized a course for the professional development of computer teachers at the Ministry of Education and Higher Education. The course

lasted for four days (every Saturday) and was attended by about 70 teachers from different schools in the country. The course included the training of teachers on the skills of computer thinking and how to teach students through the teaching of programming, which became an important part of the new curriculum of the computer where students begin to learn at the primary stage using simple environments to consolidate the concepts of programming up to the preparatory and secondary stage where students learn to analyze problems and write algorithms and converted To computer programs. The course was given mainly by Dr. Saleh Al-Hazbi who won the grant from Google company eariler in May 2018. In addition to that, Eng. Farah El-Qawasma and Eng.



Heba Dawoud teaching assistants from the CSE department helped Dr. Saleh in preparing the material of the course and delivering the material to the teachers.

Dr. Sumaya Al-Maadeed, Head of the Department of Computer Science and Engineering pointed out that this course is part of the community outreach carried out by the Department and within the efforts of the Department with the Ministry of Education and Higher Education to support and develop computer education in schools within the framework of the changes being made by the Ministry to develop curricula in schools. The qualification of teachers represents the cornerstone in the activation of new curricula to achieve its objectives, especially with the initiative taken by the Ministry of Education and Higher Education in Qatar to open a new path in secondary education, which is a technology-based and computer-focused. Dr. Sumaya noted that many countries around the world began to modify the curricula of computers in schools and focus on the development of computational thinking skills as one of the skills required for one century so that students have skills more than just how to use the computer, which has become familiar to the new generation.



For his part, Dr. Saleh Al-Hazbi, in charge of the course, thanked Google for providing support for this course in the framework of supporting computer education in schools worldwide.He pointed out that Qatar University was one of thirty universities and non-profit institutions in Europe and the Middle East that received this support in 2018. On the projects submitted where projects are selected that contribute significantly to the development of computer teaching in schools. He also thanked the brothers in the Ministry of Education and Higher Education for their interaction and keenness to qualify the teaching staff as one of the most important pillars of the educational process.





Participation of CSE Department in Autism Spectrum Disorder (ASD) awareness forum



Prof. Jihad Al Ja'am, Dr. Saleh Alhazbi, and the Ph.D student Ms. Amal AlMohamad from the dept. of Computer Science and Engineering have presented their research outcomes as part of QNRF participation in the Autism Spectrum Disorder (ASD) awareness forum organized by the Ministry of Public Health on Friday April 26th, 2019..

Dr. Saleh presented his UREP project outcome, Faheem, a tablet-based application to help improve the Arab autistic children receptive language. Dr. Jihad presented the outcome of his UREP project on communication through images for nonverbal children with autism. He also presented with his student Amal AlMohamad the outcome of his NPRP project on learning through multimedia for children with disabilities, and





introduced to the audience his new NPRP project entitled MOALEM on converting Arabic text to the best representative images using different techniques including deep learning. The instructors can then generate contents dynamically to teach the children with learning difficulties. The workshop was attended by a large number of professionals from different entities in Qatar and families of autistic children. The workshop was delivered in interactive manner between the audience and the presenters noting that The forum was the number of participants in the conference exceeded 500 attendees Dr. Enas Mohamed, the QNRF Program Manager in Biomedical Sciences & Health coordinated the workshop and promised to provide more funding for projects dealing with children with special needs.In addition, she thanked CSE faculty members

saying "Thanks for your wonderful contribution to QNRF Research Outcome Seminar (ROS). The event was both informative and enjoyable; a rare combination in solemn scientific events of this nature, which is a testament to your competence and devotion ".



Participation of CSE in Engineering forum 2019 in Oman

On April 2019, Sultan Qaboos University organized the ninth edition of the Engineering Engineering Forum under the support of His Excellency Eng. Mohsen bin Mohammed AI Sheikh, Mayor of Muscat Municipality. The Forum reflected the efforts of the students of the Engineering Community and the support of the University College of Engineering, with the participation of 48 projects from inside and outside the Sultanate; 27 projects prepared by students of the university, 21 from outside the university, in addition to 11 projects from the GCC countries, Palestine, Iraq and the Philippines. The forum aimed to provide opportunities for students to expand their knowledge, exchange experiences, and develop their abilities.

CSE graduated student Fahad Bakri went to the forum to present his senior project is titled "Tactile Footwear Interface To Simulate The Illusion of Walking on Different Surfaces". knowing that Mohammad Majed and Khaled Mohamed Rizk were his senior project team, and Dr. Osama Halabi was their supervisor. The project team won the first place earlier in Engineering senior design contest 2018.



Continuous collaboration between CSE dept. and Ministry of Education

On May 2019, the computing subject standards specialists in the Ministry of Education and Higher Education visited CSE dept. to get an idea about the educational plans for the programs offered by the department, and to see the labs and equipment. The aim of the visit came as part of the ministry's efforts to develop new national computing curriculum in public schools. The meeting was attended by Dr. Sumaya Almaadeed Head of the CSE Department, Dr. Tarek El-Fouly Computer Engineering program coordinator, and Dr. Saleh Alhazbi a faculty member in the CSE department. After presenting the offered programs in CSE department, the attendees discussed the possible ways of integration between the computing subject to be offered in the schools and the CSE programs.





CSE 2018-2019 Senior Projects Day

The senior project is the capstone project that synthesizes the knowledge and skills that the student developed during the entire academic program at the department. Thus, every year, the department asks the senior students to work for two semesters in teams of 2 to 3 students. These teams then work on development or applied research project requiring significant effort for planning and completion.

At the end of the senior project, the students are required to demonstrate a complete design of their project in the senior project day where they show a working hardware and/or software prototype of their project. The following are some of the senior projects that were presented by the computer science (CS) and computer engineering(CE) students last year and the winner project among them.

RaQeeb: Public Security Surveillance System Using Blockchain Technology and Advanced Image Processing Techniques. The students who worked on the project are Fatima Al-Jabiri - CE, Lina Al-Sahan – CE, Nora Abdelsalam –CE. The project was supervised by Dr. Amr Mohamad. This project leveraged the public security on a national level by eliminating the blind spots of the government visual surveillance systems, with full respect of the private facilities' regulations. The proposed solution assists the specialist authorities in tracking and monitoring criminals and wanted offenders by utilizing the most recent technologies such as Blockchain and Facial recognition. Using these technologies, the students built an integrated system by leveraging intelligent techniques to help the government surveillance requirements. Image processing was applied on surveillance cameras' live footage to recognize the facial features of the pedestrians to detect the target existence. Upon successful detection, the system will then start the tracking and monitoring phase. The target's suspect coordinates and current location data are sent to a monitoring station (governmental system) in a real-time manner. Also, summarized tracking information and events are shared amongst multiple stakeholders using blockchain technology.







The second project is titled Robotic Physiotherapy System for Arm Rehabilitation using Visual Impulsive Stimuli. The students who worked on the project are Menatalla Issa-CE, Roudha Al-Ahbabi-CE, Shimaa Taha (201103366 - CE). The project is supervised by : Dr. Uvais Qidwai



In this project, the students developed an interactive gaming environment and a custom-built low-cost robotic arm system to control the patient's arm movements for rehabilitation purpose. They designed a game module in four phases, and during each phase, the hardware was controlled differently to increase the efficiency of the treatment method. The students measured the improvement by sensors attached to the person's arm. Then the system they designed sent the sensor values to a software application which the patients and his physician could access to monitor the progress. When the students were asked about their achievements, they said, "by the end of this year, we were able to fulfill all our objective by creating a portable, light-weighted, and affordable device that could be used for the rehabilitation of monoplegia. In addition, our device supports both aquatic and non-aquatic treatments, which is not supported by the currently available market solutions. To connect all parts of the system, a secure and user-friendly web application was developed."





Another presented project for year 2018-2019 it titled Intelligent UAV Detection: A Machine Learning Approach. The students who worked on it are : Fatema Ahmad M A Al-Musleh-CS , Khadlja Asim Elamir –CS, Sara Jamal Abdelaziz – CS, and the project was supervised by Dr. Jihad Al-Ja'am.

In this project, an anti-drone system is proposed that can detect drones based on camera-feed, narrowing down potential regions of interest, and further identifying the existence and location of the drone. Multiple machine learning techniques combined with image processing methods, are examined to address the problem of malicious drone activity that may directly threaten national security. The system proposed by the students was composed of a Raspberry Pi that continuously captures the image then passes it to the detection techniques. Two solutions were investigated to tackle object and drone detection: Haar cascades, and background subtraction with pre-trained convolutional neural networks (CNN). Figure 1 shows an overview on how the different methods are related.



Another great presented project is QU Community Application that was done by the students : Abdullatif Mnawar-CS, Alaaeldin Said -CS, Islam Ibrahim-CS, Saeed Alrashidi-CS, the project was under the supervision of Dr. Ali AL-Jaoua. This project proposed a mobile app called QU Community app which provides the students and faculty with several functionalities/services. Some of these functionalities are Instructors ratings, bookshelves for donations, course bank, events, part-time work, lost and found items. In addition, the app provides entertainment section which includes chatting, and feed of timeline posts similar to Facebook. The Application is currently in android based and is only for QU members including professors and staff. However, in the future, the students will like to expand it to the Qatar community in general.





When asked about their project achievements during the presentation, the students said, "The project turned out better than we expected, the discussed objectives and goals were met in a high degree. We achieved a huge success that showed in our testing phase when we had mostly positive feedback from our users and huge adoption by the student's community. Even those who didn't attend the testing due helped in spreading positive things through word of mouth to the community. The Application has a huge novelty, by being created for the sole purpose of improving the quality of life for the future generations of the massive community of Qatar University."



The last project to talk about is Real-Time Text Detection and Reader for visually impaired. That was developed by Abdullah Gamal -CE, Abdelrahman Abujahel-CE, and supervised by : Dr. Somaya Al-Madeed.

.



In this project, the students created a portable device that converts written text into voices. The main object of the project was to help the visually impaired community inside the university. The created device focused on detecting and recognizing text written in the doors or beside the doors, such as the doctor's information or the number of the classrooms. The software was on a laptop, which has a higher speed than the raspberry pi. When the student were asked about their achievements in the project, they said, "we have created the major components such as the VI READER. This component consists of raspberry pi, which is the main device that we used to connect all the different parts of the detection system. However, the project contains some gaps; sometimes, the device cannot recognize the text very well, so it may give a wrong speech to the user. This project can be improved to add more features such as adding flash to the camera, and it can be designed as glasses to make it easy to carry. In the future, the voice could be with different languages, especially Arabic languages, as it could be preferred locally."







Google Cloud Study-Jam Workshop

As part of the department initiative to help the CSE students, on 4th of September 2019, a second google cloud study jams workshop was held at QU CSE department. The workshop was organized by the Department of Computer Science and engineering staff Eng. Abdulahi Hassen, Eng. Farah El-Qawasma, and Mr. Sachin Kumar who is the head of Google Developers Group in Doha. The workshop was open to all the department students.



In the workshop, Mr. Sachin presented two topics that focused on google cloud services for the students. The first talk focused on the current trends in technology and the importance of using cloud services. Then Mr. Sachin discussed the state of the art algorithms, cloud, IoT, and big data. Finally, he presented one technical study jam for the attendees. The study jam focused on an introductory-level quest. Participants got hands-on practice with the Google Cloud Platform's fundamental tools and services. The attendees learned how to create virtual machine instances of various machine types using the Google Cloud Platform (GCP)

Console and using the gcloud command line. They also learned how to connect an NGINX web server to their virtual machine. The workshop gave the participants the skills they can use for personal development or career advancement. The participants also received access to google online labs(worth 55\$+) for free. The participants were very excited about what they have learned during at the workshop, and they were all willing to retake similar workshops if held in the future.



Workshop on Mobile Crowdsourcing for Qatar Smart City: Techniques, Applications and Challenges



On 9th September, Dr. AbdelKarim Erradi held a workshop titled "Mobile Crowdsourcing for Qatar Smart City: Techniques, Applications and Challenges". The ubiquity of mobile devices has elicited the emergence of mobile crowdsourcing where people create new on-demand services through sharing or exchanging resources. Mobile crowdsourcing leverages smartphones and IoT devices with sensing capabilities to collect data from the world around us and share the data across the Internet where it can be processed and utilized for various purposes. This enables the development and deployment of innovative services such as supporting the mobility of the citizens in urban environment, improving traffic safety, efficient traffic routing, and up-to-date view of city's transportation system. Integrating crowdsourcing, IoT and other emerging technologies like big data analytics can help in building smarter infrastructure and provide better public services to achieve the vision of smarter city and smarter living.

The workshop provided the opportunity to gather researchers and practitioners to discuss the aspect of mobile crowdsourcing in Qatar smart city and how this paradigm can contribute in smarter and more efficient transportation ecosystem. Additionally, key contributions of NPRP 9-224-1-049 project "Spatio-Temporal Composition of Sensor Cloud Services" were discussed.



Information and Communications Technologies Competition



The Ministry of Education and Higher Education, in cooperation with Huawei, launched the third edition of its Information and Communications Technologies Competition in Qatar on Wednesday.

The annual Huawei Middle East ICT Competition is also supported by Qatar University, Hamad Bin Khalifa University, Carnegie Mellon University and Community College of Qatar.

The competition promotes innovation and creativity and acts as a bridge between the classroom and the workforce to nurture ICT university students' talents in Middle-East region, increase national ICT competitiveness and develop a generation of ICT leaders ready to drive digital transformation forward.

Huawei team visited Qatar University students on 11th September to introduce the contest. Informing the students that contestants are tested on their knowledge of cloud computing, switching, routing and network security. In addition, the competition gets participants up-to-date with the latest technologies such as IoT, AI, Big Data and most importantly 5G, the future technology which Huawei is leading globally and set to disrupt the way business is carried out. The competition is a unique opportunity for students to test their abilities in ICT's most cutting-edge fields, and helps colleges and universities better understand enterprises' talent requirements and optimize talent development modes accordingly. The competition comprises three stages: preliminary, national final and international final. The top teams will advance to the national final stage, which will take place on October 31. The national winners of the competition will not only receive certificates, trophies, and prizes, but will also have a once-in-a-lifetime opportunity to travel to China and gain insider access to a top global ICT company.



Dear Students,

Warmest of Greetings from the Huawei Qatar Office & Welcome to the Huawei ICT Competition Middle East 2019!

We are very proud and excited to be making arrangements for the hosting of this exquisite competition, yet again this year in Qatar!

As before the ICT Skills Competition is a globally coordinated event which gives you the opportunity to participate and compete for a number of prizes, including travel overseas to China. It is a great opportunity for interaction across skills development, learning and cooperation amongst the lovely and unique academic institutions of Qatar.

The schedule and program is for there to be, firstly, a preliminary on-line ICT Skills Questions competition exam, after which a top selection of National Finalists will go through to take part in the Qatar National Final, where-after the top 3 Winners will be sponsored and invited to China in order to participate in the International Middle East Final!

Please don't waste any more time and do go ahead to sign-up immediately via the URL link below, as can be found within the attached competition flyer!

http://tiny.cc/ICTRegistration2019

Furthermore you will be able to access to the learning materials immediately and thus be in a more comfortable position when it comes to the competition.

Time is limited, so please create your user-account immediately and start your preparation straightaway! We wish you all the best and look forward to meeting you soon!

Last Year's Competition Highlightsl: https://www.youtube.com/watch?v=mBSk8HJwAe0

Kind Regards & Best of Luck!



ICT Registration QR Code

IEEE International Symposium on Information Theory conference

Dr. Malluhi and his collaborators were able to break a cryptographic algorithm that was proposed as a candidate to become a NIST Post Quantum Cryptographic standard. It is known that many of the cryptographic algorithms that are widely used today in our day-today online interactions will no longer be secure as quantum computers are moving closer and closer to becoming a reality. This is creating a big concern in the community as it implies that most of online services that we heavily rely on today would collapse. Therefore, the National Institute of Standards and Technology (NIST), a major standards organization, has recently initiated a process to establish a post-quantum resistant standard for public-key cryptography. After process round 1, a cryptographic algorithm

called HK17 was one of the standard candidates. Dr. Malluhi and his collaborators were able to identify weaknesses in this standard candidate and showed a method for breaking it. This significant result has been presented in France in the renowned 2019 IEEE International Symposium on Information Theory (ISIT 2019), which is the top international

conference in the area information theory.

Visit to Oman

Prof. Malluhi also participated in the Workshop on the Future of Computing Programs at Sultan Qaboos University (SQU), Oman. The workshop was held on Oct 1, 2019. Dr. Malluhi was invited by SQU to this event in order to offer expert opinion and recommendations regarding possible future directions for structuring the different computing programs at SQU. Dr. Malluhi has delivered an invited talk and participated in round-table and panel discussions regarding recent trends in computing education and the future of computing programs.

CSE CONNECT





Preparation for CSE computing 2019_2020!



In September 2019: Computer Science and Engineering department launched the CSE Computing Contest 2019-2020. The contest will be organized for the thirteenth time. Last years contests have been a great success; participation level was great, and the department was surprised to see the talent and abilities demonstrated by most participants. The Department of Computer Science and Engineering would like to encourage school students to contribute to this computing contest. The theme of this year is related to Hamad port. Where students will be asked to transfer container from the Port of Doha to the port using their robot.

This computing contest is designed to offer students the opportunity to interact with each other and demonstrate their creativity and teamwork skills. The contest also provides a platform for the Department of Computer Science and Engineering at QU and schools to focus on the growing market demand for computing professionals (such as software engineers, system administrators, system developers, network designers, security consultants, teachers, etc.). There will be two contests this year; the first one is Microcontroller contest that will be on the concept of "Smart Shade" – under the umbrella of smart cities concept. Furthermore, the other contest will be on robotics-based challenges. The winning teams will be awarded valuable prizes at an awards ceremony that will immediately follow the competition. In preparation for the contest, the department set a workshop for the participants about the two contest on October 2019. In addition, a help session is given in November 2019. And the contest will take place at 24th November 2019. Be stunned to now more about the winners in the coming issue of the magazine!





Game Design Workshop for CSE students



As part of the department initiative to help the CSE students, on November 2019, An introduction to game design workshop was held at QU CSE department and was organized by Eng. Farah El-Qawasma teaching assistant in CSE department. The workshop was presented by Mr. Amir Suliman and Mr. Moahmmad Banikir who are game development educators at Qatar game development community. The workshop was open to all the department students. A lot of students showed interest in attending this workshop. And many of them attended the session. The meaning of game development, and its general steps were introduced in the workshop. Then Finally the students had small hand on session were they could move there first object in a small game design. Finally some of the students discussed their game design projects with the presenters to take their feedback. The CSE department looking forward to organize more workshops like this one where students can have the chance to work on new stuff.



The Second Meeting of the Standing Committee for Scientific Research and Innovation in the Arab Countries

Dr. Somaya Al-Maadeed is a member of the Standing Committee for Scientific Research and Innovation in the Arab Countries. She participated at the committee meeting on 25 and 26 September 2019, at FAO Headquarters, Republic of Tunisia. The committee is part of The Arab League Educational, Cultural and Scientific Organization (ALECSO) which is an Arab League institution based in Tunis, established in accordance with article 3 of the Arab Cultural Unity Charter on 1970. ALECSO works to coordinate educational and cultural activities in the Arab countries.

Among its various activities, the Standing Committee for Scientific Research and Innovation in the Arab Countries discussed the the Arab strategy for scientific research in the social and economic fields, scientific forums, perceptions and visuals, classification of Arab universities, and the needs for science, technology and innovation in the Arab world.





Interview with alumni Reasearch of the issue Senior project of the issue Field article of the issue



Interview with Alumni

Salem Ghanim AL-Ghanim Backend Server Developer in Ooredoo Company Bachelor Degree in Computer Science



Tell me a little bit about yourself (i.e. name, year of graduation, age, specialty, place of empowerment...etc.) My name is Salem Ghanim AL-Ghanim, I graduated from Qatar University, Computer Science and Engineering Department in 2018 as computer scientest. I am specialized now in Backend development.

Tell us more about your job

I work at Ooredoo Qatar as a backend server development for Ooredoo's Website and Mobile Application.

Why did you select this specialization?

I went with backend Specialty because I am more interested in how the APIs work and how do they get developed and what kind of logic happens behind each and every click the user makes when he uses the products.

Did this specialization help you in finding a job easy?

Yes, as there was a hunger for Qatari Developers in the market.

Do you think the Qatari work market needs more CSE graduates?

Yes, as each and every company need some kind of Developer, whether it's an application developer or a backend server developer, or even a combination of both. Where the developer is handling both the application or frontend development and the backend development.

Did you find what you studied helpful when you went to work? Give us some examples

To some extent yes it was helpful but it didn't make me ready for the market , I had to take some online courses or do some personal development to grow my skills and discover the new things that are being offered in the world of technology and code development.

Tell us about your most exciting experience you had during your studies

Developing and learning the core of Android development, plus the work me and my team did during the senior project course.

Tell us more about the achievements you had while you were a student.

Writing a new algorithm for Redirected walking in VR during my senior project with Dr.Osama Halabi and getting the paper recognized in IEEE.



Do you have any advice or a message to tell newly enrolled students in CSE?

Classes are not meant to teach you everything you need, they just give you enough information to start up your journey of learning, it's up to you then to go ahead to hone your skills even more and learn new things out side of the class. On the other side, don't skip lectures ©



Reasrach article of the issue

Light-Weight and Effective Security Schemes for Wireless Medical Devices (NPRP No.: 8-408-2-172)

By Prof. Mohsen Guizani



Wireless medical devices have been widely used to treat various diseases and to help patients overcome difficulties. There are many different types of these wireless medical devices, such as wireless insulin pumps, pacemakers, cardiac defibrillators, neuro stimulators and various drug delivery systems. The US FDA reported that about 375,000 adults used insulin pumps in 2007. The market is expected to grow exponentially. The use of such devices can have many benefits and some risks. Using these devices should increase the patient mobility by eliminating wires that bind a patient to a medical bed, provide health care professionals the ability to remotely program devices, and give physicians remote access and monitoring of patient's data regardless of the physical location. They can also access patients' real-time

data without being physically in the hospital and allowing device adjustment and patient treatment. Remote monitoring can detect problems with senior citizens and/or chronic disease patients before more serious consequences occur. Since this technology continues to evolve, it is important to keep in mind its potential for interference with pacemakers, implantable cardioverter defibrillators (ICDs), and implantable medical devices (MDs). Therefore, health care facilities should pay attention to the selection of the wireless technology used, quality of service (QoS), electromagnetic compatibility (EMC), coexistence, and security.



Unfortunately, most existing wireless medical devices lack sufficient security mechanisms to protect patients from malicious attacks. With the rise of using such devices, security becomes so critical due to the fact that such attacks may hurt or even kill patients. An attacker may launch several different kinds of attacks on wireless medical devices. For instance, an adversary may activate a magnetic switch within a pacemaker or implantable cardioverter defibrillator (ICDs) by using a sufficiently strong magnetic field. The current access is based on a magnetic switch but it does not require any authentication, which is a serious security concern. The medical device vulnerabilities provide opportunities for an adversary to monitor or even change the parameters/function of a medical device remotely. Without sufficient security protection on medical devices, the consequences could be fatal.

Therefore, it is essential to find solutions to fully secure these devices. First, securing such tiny devices can pose many challenges due to their very limited resources. These limitations include, but are not limited to energy supply, processing power, and storage space. For example, an implantable medical device (IMD) with a small battery is expected to operate for several weeks, months or even years. A PRIZM 2 ICD typically lasts 4 to 6 years. Furthermore, because an IMD is embedded in the human body, it may need surgery to change the battery (not practical in many cases). In addition, most medical devices have very limited storage. For example, a medical device manufactured in 2002 (which is still being used today) contains only 8 KB of RAM/ROMError!



Reference source not found. Many medical devices have much less resources than wireless sensor nodes. Hence, security schemes designed for sensors are not suitable for most of these medical devices.

Second, existing pre-shared-key-based security schemes do not work well for medical devices. A pre-shared-key-based security scheme let two devices pre-share a secret key, thus the communication between the two devices can be secured. This kind of security schemes have been widely used for security in wireless sensor networks as well as other wireless networks. However, this approach does not work well for implantable medical devices, even though some may have the resource to run crypto algorithms. For a medical device, if it has a pre-shared key with a reader/controller, the key may be used to run security operations. However, a pre-shared key will bond a medical device to a particular reader. This means that if the patient is out of town and goes to see a different doctor who does not have the key, there is no way to authenticate and communicate. Storing the key in an online server will have some problems: (1) a reader may not have Internet access at all times, and (2) it is expensive to run and keep up a global online server. Hence, this approach does not work well for tiny medical devices.

Third, security schemes for medical devices should be able to handle patients' emergency situations. During an emergency (a

coma for instance), a patient may be unconscious and cannot provide the required credentials (such as a security key or a token) to the medical personnel, nor can the patient tell the doctor about his/her medical condition. In addition, neither device-based schemes nor family-based schemes can be used if the patient has an emergency outside his home city/country. In this case, the patient's safety outweighs the security concerns of medical devices. A good security scheme should satisfy security. privacy and safety requirements.

To mitigate some of the above challenges, we got an NPRP project to study this situation and come up with potential solutions. After which we embarked on developing (1) a general data analytic approaches and models of medical data as well as proof-of-concept security



schemes for medical devices. We collaborated with medical hospitals that provided us with real medical device data. Using this data allowed us to develop proof-of-concept security schemes for these devices; (2) we designed effective security schemes for patients in emergency situations. For the above two cases, we used the system shown in the Figure referring to an Insulin Pump System. Finally and in order to generalize our findings, we developed effective security schemes for the general purpose wireless medical devices.

This project was a great success in terms of publications and the developed prototypes. A total of 11 journal publications and 13 conference papers were accomplished. Members of the team from our department are: Prof. Amr Mohamed, Dr. Abdulla Al-Ali and Prof. Mohsen Guizani. The outside collaborator was at Temple University in the USA represented by Prof. James Du as the PI. For more information on the research details and the achievements of this project, readers are referred to the publications available online.

IoT Data Management and Applied Research in Qatar By Aliya Tabassum

Internet of Things (IoT) is a network of interconnected devices which carry potentially data to serve multiple users. Internet of Things (IoT) has changed the perception of life in every sector of human operation. The number of connected devices is being increased every day making the traditional objects into smart, intelligent and coordinating in decision making. In 2010, the number of IoT connected devices has surpassed the human population and have a significant home and market applications which make these devices highly important. The term Internet of things (IoT) was first introduced by Kevin Ashton in 1999 [1] and it is predicted that by 2020 there will be more than 50 billion smart objects and each person would be owning approximately 7 physical smart devices [2]. Due to the use of modern technologies like Smart Home & Agriculture automation and Education, Energy & Building management, IoTs are rapidly being adopted worldwide. At the same time, the risks and challenges in data management are worth concerning that create obstacles to the services. Figure 1 below gives an overview of risks with data management are shown. This article provides an overview on current risks and challenges in IoT data management and latest research works in IoTs in Qatar.

The major challenges for IoT data management are Data Storage, Integrity, Privacy and Confidentiality [3].



Figure 1 IoT Data Management Challenges

Data Integrity, Privacy and Confidentiality: IoT devices exchanges enormous data every day. The number of attacks against these devices has made it difficult to maintain the integrity, privacy and confidentiality of data in motion and data at rest [4]. Robust authentication, access control and other defense mechanisms can ensure overcoming the following challenges of IoT data management.

Data Storage: Due to increase in the number of IoT devices, the huge amount of data is being generated. The concern for data storage and management is rising every year. It requires efficient mechanisms to collect, store and manage data. In addition, better data analysis tools are needed to extract and save useful data [5].

Other areas of concern are Data Heterogeneity & Mobility Management, Interoperability, Data Access Management, Knowledge Management, Data Aggregation tools and Data Analysis tools.



Popular research projects on IoT devices in Qatar are illustrated below.

1) An Intelligent Car Monitoring system is developed by Jabbar et.al [6] in collaboration with Qatar Foundation and Qatar University, for road safety and traffic control in Qatar. The model is based on the naturalistic driver behavior using existing traffic

Figure 3 Hierarchical structure of

attributes.

monitoring systems. The authors have used Deep Learning and Neural Networks to collect and analyze provide data to dynamic information about road conditions, high and low risk locations.



Figure 2 Intelligent Car Monitoring system

2) Context aware

name discovery for block chain based services in IoTs was proposed by Roberto Di et. al [7] from HBKU, to easily identify services in IoT devices using universal multi-layer blockchains. The model is based on the existing protocols and uses publicly available information from one block chain to gather meaningful knowledge from the environment.

3) A Survey on IoTs, Protocols and Applications by M. Guizani et. al, Qatar University [8]. This work summarizes the technologies, most relevant protocols, and security issues of Internet of Things (IoT). The fundamental concepts of architecture and building blocks are made clear in the beginning to comprehend further deep understanding of protocols. The working of the

protocols at each layer is mentioned with graphs and clear illustration. Higher technical terms are used in simple English for the reader to gain insight into terminologies used in IoTs. The paper has covered large details on the standard protocols proposed by IETF, IEEE and EPCglobal. This article helps student and researchers to understand key IoT characteristics and elements without much effort to quick start new research in emerging areas like big data analytics, cloud fog computing.

4) A comprehensive survey on application of Deep Learning methods for IoT Security: by Amr Mohamed et. al., Qatar University [9]. The work explores the issues and challenges in implementing the security measures, such as encryption, authentication, access control, network security and application security for the IoT devices. It highlights how intelligent techniques can be used to enhance the security. The research suggests that intelligent monitoring provides a significant



Figure 4 Horizontal and Vertical market integration of IoTs

solution to new or zero-day attacks. ML/DL are the robust methods for data exploration, management and for learning 'normal' and 'abnormal' behavior of the network. The authors have enlisted all the recent work done in IoT security using ML/ DL, providinglimitations and advantages of each method to trigger new direction of research and implementation of IOT security.



Figure 5 Role of ML/ DL in IoT security.

IoT devices and networks are growing rapidly worldwide and some of the researchers predict that the revenue generated due to smart IoT devices will reach 4 to 11 trillion dollars in 2025 [10]. The huge data traffic management and its security has become biggest concern worldwide. Although, a lot of research has been done in these areas, further research and validation is necessary to manage the ever-growing data traffic and emerging zero-day attacks. To meet this demand, intelligent techniques, resources, investment and research scientists are required in Qatar and every technologically advancing country.

References:

[1] Miorandi, Daniele, et al. "Internet of things: Vision, applications and research challenges." Ad hoc networks 10.7 (2012): 1497-1516. [2] Chase, J. (2013). The evolution of the internet of things. Texas Instruments, 1.

[3] Asad, Mohammad & Memon, Zulfiqar & Syed, Tahir & Memon, Jamshed & Alshboul, Rabah. (2017). Addressing Future Data Management Challenges in IoT: A Proposed Framework. International Journal of Advanced Computer Science and Applications. 8. 10.14569/IJACSA.2017.080525.

[4] J. Fu, Y. Liu, H. Chao, B. K. Bhargava and Z. Zhang, "Secure Data Storage and Searching for Industrial IoT by Integrating Fog Computing and Cloud Computing," in IEEE Transactions on Industrial Informatics, vol. 14, no. 10, pp. 4519-4528, Oct. 2018.

[5] Dobre C, Xhafa F. Intelligent services for big data science. Future Generation Computer Systems. 2014 Jul 1;37:267-81.

[6] Jabbar, Rateb, et al. "Applied Internet of Things IoT: Car monitoring system for Modeling of Road Safety and Traffic System in the State of Qatar." Qatar Foundation Annual Research Conference Proceedings. Vol. 2018. No. 3. Qatar: HBKU Press, 2018.

[7] Daza, Vanesa & Pietro, Roberto & Klimek, Ivan & Signorini, Matteo. (2017). CONNECT: CONtextual NamE disCovery for blockchain-based services in the IoT. 1-6. 10.1109/ICC.2017.7996641.

[8] Al-Fuqaha, A., Guizani, M., Mohammadi, M., Aledhari, M., & Ayyash, M. (2015). Internet of things: A survey on enabling technologies, protocols, and applications. IEEE communications surveys & tutorials, 17(4), 2347-2376.

[9] Al-Garadi, Mohammed Ali, Amr Mohamed, Abdulla Al-Ali, Xiaojiang Du, and Mohsen Guizani. "A survey of machine and deep learning methods for internet of things (IoT) security." arXiv preprint arXiv:1807.11023 (2018).

[10] IoT Revenue Projected to Reach \$3 Trillion by 2025, https://www.ariasystems.com/blog/internet-things-3-trillion-market-2020/s



Senior Project of the issue

Firefighting VR training and assistant system

Every year, after students presented their senior projects to the faculty and examined, they are then asked to showcase their work to the general public through posters. Prominent people from the industry are invited as judges and requested to decide on the best senior project award by examining a variety of criteria.



This year the judging committee chose the project titled "Firefighting VR training and assistant system" as one of the best senior project. This project was implemented by students Allaa Adel Al-Khalaf – CS, Fatemah Ahmad Al-Atom, Safa Nashat Ibrahim – CS and was supervised by Dr. Mohammed Saleh.



The Fire fighting VR training and assistant system was a CS-CE students joint project. The students used Virtual Reality to simulate real-life firefighting scenarios. The VR system, acted as a training and evaluation system for basic firefighting training scenarios. This training included, dealing with different fire types, and using the appropriate fire extinguishers accordingly.



The students said they were inspired by the imminent danger beginner firefighters face during early training. For instance, the students mentioned in their literature study that, between 2015 and 2017, there have been on average 15% deaths during training in the US alone. So, the students wanted to solve this problem by using VR technology for the training sessions without affecting the firefighters training quality. They achieved this by creating real-life scenarios and evaluations that are based on international firefighter stadards and training.

They used Unity to set up the scenes of the basic firefighters' training. They also used a Virtual Reality headset and real firefighters gears such as the jacket and three different fire extinguisher to accomplish the tasks in their scenes. They also used Bluetooth trackers, sensors, and motors to make it more realistic for the trainee. This seniors and motors helped them in emulating the heat and smell produced by a real fire.



Finally, they evaluated their system with 26 subjects. During the test, they evaluated if the person extinguishes the fire completely, if the person chooses the correct extinguisher based on the fire type, and whether the person maintains the optimal distance from the fire. They tested their project on real firefighter trainees in Doha and got a very positive result for their prototype.

Field article of the issue

The Application of Deep Learning for Helping Visually Impaired People Navigating QU

By. Ms. Hanadi Hassen Mohammed



Introduction

In the last few years, signal processing had witnessed significant scope widening with machine learning technical area [1], especially with the great development that emerged in 2006 for deep learning [2] which is a new area of machine learning. Unlike traditional machine learning techniques which exploit shallow architectures that have a single layer feature transformation, deep learning exploits deep architectures that cope with complex features in problems like human vision and speech processing [3]. One application of deep learning is computer vision which aims to give computers the ability to extract high-level understanding from digital images and videos. Some tasks of computer vision include image classification, object detection, object segmentation and many others. One of the applications that can benefit from computer vision are applications that help people with visual disabilities for navigation from one place to another.

There are about 285 million visually impaired people in the world. They struggle to walk; they struggle to identify. There is much research done in computer vision to make those people struggle less. Computer vision is an analogue system that converts optical information into demonstrative signals. It allows visually impaired to have less of struggle in life. Take walking, for example, they will usually have a stick or an adult that lead the way for them. Computer vision guides them by a camera that captures the information of the environment the one blind persons in and that information is processed by the computer that in return vocally informs the person using the device of what is around them. Computer science researchers at Qatar University have been trying to develop a new mobile device which could potentially allow the blind people to see the world around them. Led by Dr. Somaya Al-Maadeed, head of the

Department of Computer Science and Engineering and a team of researchers, the first prototype of the system is completed.

General Overview of the system

CamNav is a computer-vision based system, which utilizes a trained deep learning model and SVM model to perform indoor scene recognition. The architecture of the system shown in Figure 1 is a client-server architecture. The server part is responsible for performing complex processing computations. The use of image processing as well as deep learning techniques on a mobile device consumes a considerable amount of processing resources resulting in a significant loss in the battery life that's why these parts are placed in the server side. In the other hand, the client side is the mobile application that provides the services of indoor positioning and navigation. The mobile application is configured to send in real-time captured images to the server and wait for their recognition. Figure 1 shows the complete architecture of the system.

The Testing Environment

In order to show the effectiveness and efficiency of the proposed system, another two systems which utilize QR code markers (QRNav) and BLE beacons are developed to guide the people with visual impairments using the system. The performance of CamNav, QRNav and BLE beacons based navigation system are evaluated in real-world



Figure 6: System Overview

Environment. The evaluation experiments were carried out on the ground floor of the 'B09' building of Qatar University.

Figure 2 illustrates the floor plan of the building 'B09' (ground floor). Ten people were involved in the testing including 8 females and 2 males to evaluate the navigation systems in real-time. The blindfolded participants were asked to walk from the entrance door of the B09 building to two specific points of interest in the B09 building. Each participant has to walk from point A to B (Red line in the floor plan, distance = 30 meters) and A to C (Blue line in the floor plan, distance = 47 meters) using the three navigation systems separately.

A service to perform scene recognition in the real-time environment has been created to analyze the performance of the trained deep learning model. The service is responsible for receiving query images sent by users and classifying them to predict their location. The deep learning model achieved 96.9 % success rate.

References

- L. Deng, "Expanding the scope of signal processing," IEEE Signal Processing Mag., vol. 25, no. 3, pp. 2–4, May 2008.
- G. Hinton, S. Osindero, and Y. Teh, "A fast learning algorithm for deep belief nets," Neural Comput., vol. 18, pp. 1527–1554, 2006.
- Yu, Dong, and Li Deng. "Deep learning and its applications to signal and information processing [exploratory dsp]." IEEE Signal Processing Magazine 28, no. 1 (2010): 145-154.s



Figure 2: Floor Plan for



CSE social news

More great news about CSE students and faculty members!



Dr. Amr Mohammed is promoted to the rank of Professor



Dr. Aiman Erbad is promoted to the rank of Associate Professor



Dr. Abdelkarim Erradi is promoted to the rank of Associate Professor



Dr. Abdulaziz Al-Ali hired as Assistant Dean of the Faculty of Engineering for Student Affairs



Eng. Naveed Nawaz got a new baby.



CSE Social News





Dr. Khaled Khan was awarded in the college of engineering end of year event 2018-2019 for his Excellence in Services

Dr. Saleh AlHazbi was awarded in the college of engineering end of year event 2018- 2019 for his Excellence in Teaching



Dr. Amr Mohammed was awarded in the college of engineering end of year event 2018-2019 for his Excellence in Research

CSE Social News





IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT'20)

III Submission deadline: November 1st, 2019 III

Qatar University, Doha, Qatar, February 2–5, 2020 https://ICIoT20.com/

ICIoT 2020 aims to report high-quality research on recent advances in various aspects of Informatics, artificial intelligence, IoT applications, smart services, computer vision and use of enabling technologies to make future connectivity and its applications available, affordable, scalable and efficient. You are cordially invited to submit your research contributions to ICIoT 2020. Authors are solicited to submit complete, previously unpublished contributions to the following six sessions: AI, computer vision, Informatics, IoT, enabling technologies and e-Health. Topics of interest include but are not limited to the following topics:

- Artificial intelligence
- Informatics, IoT devices and smart systems
- 5G communications
- Mobile computing
- Machine/deep learning and neural networks applications
- Signal processing algorithms for smart systems
- Information retrieval
- Human computer interface
- Computer vision and pattern recognition
- Robotics for IoT and smart systems
- Smart technologies for health systems
- e-Health, m-Health, Telehealth, and Telemedicine smart applications
- IoT for Healthcare information systems
- Virtual reality (VR) for e-Health applications
- Medical and wellness applications
- Smart system for e-Health and intelligent ubiquitous technologies
- E-learning, training and practices for the health sector
- Smart diagnosis and predictive evaluation for mobile-enabled connected healthcare
- Mobile-enabled services, systems, infrastructure and techniques for connected healthcare based on sensors and smart objects
- Smart patient condition screening, visualization and monitoring
- Instrumentation, haptic and smart devices for health applications

Submission and publication

Papers must be up to 8 pages and follow IEEE doublecolumn format. Submissions will be peer-reviewed. Papers will be evaluated based on relevance, significance, impact, originality, technical soundness, and quality of presentation. At least one author should attend the conference to present an accepted paper. All papers accepted for presentation at the main tracks and workshops will be included in the conference proceedings, which will be published by IEEE Computer Society and referenced in IEEE Xplore Digital Library, DBLP and major indexes. Extended version of selected accepted papers will be considered for publication in special issues of major journals. All papers must be submitted electronically, in PDF format and uploaded on EDAS. The direct link for paper submission is https://edas.info/newPaper.php?c=26418

Poster and Demo Sessions

Students and young researchers are also invited to submit extended abstracts to Poster and Demo Sessions. The main purpose of these sessions is to recognize researchers and give them the opportunity to practice their visual, written and oral communication skills in a professional conference environment.

Keynotes

The Technical Program of ICIoT'20 will include the following keynote speakers: Dr. Hessa Al-Jaber, Prof. Amin Bermak, Prof. Mohammed Sawan, Prof. Ahmed Bouridane as well as others.

Exhibition and Competitions

The ICIoT'20 Conference and Exhibition will be hosting several competitions for students, researchers, and academics including best demo competitions.

Important dates

Full Paper SubmissionNovember 1, 2019Notification of AcceptanceDecember 15, 2019Final Paper SubmissionJanuary 01, 2020

Contact Information

Email: iciot@qu.edu.qa Phone: (+974)44034240

Conference venue

Ibn Khaldoon Hall, Qatar University, Doha, Qatar







دعوة للمشاركة بأوراق بحثية في المؤتمر الدولي IEEE حول المعلوماتية وإنترنت الأشياء. وتقنية التمكين (IcioT)(20)

يسرُّنا دعوتكم لحضور المؤتمر الدولي IEEE حول المعلوماتية وإنترنت الأشياء وتقنيات التمكين ا (ُDoloT)، وسيعقد مُؤتمر ICloT أ20 الفترة من 2 إلى 5 فبراير 2020 في جامعة قطر، إنَّ هدف مؤتمر (ICloT) هـو الـمشاركة بأبحاث عالّية الجودة حول التطورات الحديثة في جوانب مختلفة. من المعلوماتية، والذكاء الاصطناعي، وتطبيقات إنترنت الأشياء، والخدمات الذَّكية، ورؤية الكهيدوتر واستخدام التقنيات التمكينية؛ لجعل الاتصال في المستقيل وتطييقاته متاحة، وبأسعار معقولة، وقابلة للتطوير وفعالة، يُطلب من الباحثين المشاركين تقديم مساهمات كاملة وغير. منشورة مسبقًا، وذلك ضمن الجلسات الست التالية، الذكاء الاصطناعي، الرؤية بالكمبيوتر، المعلوماتية، إنترنت الأشياء، التقنيات التمكينية والصحة الإلكترونية، وسّيتم مراجعة الأوراق المقدمة وسيتم نشر الأوراق المقبولة من قبل IEEE المفهرسة بواسطة Scopus، علاوة على ذلك نسعاى لنشر أوراق مختارة في عدد خاص من المجلات الدولية المرموقة وذلك بعد مراجعتها.

موقع المؤتمر: com.https://iciot20

المواعيد النهائية الهامة للمؤتمر،

آخر موعد لتقديم ورقة العمل، 29 نوفمبر 2019 فوعد إشعار القبول، 15 ديسمبر 2019 آخر موعد لإرسال الأوراق الكاملة، 1 يناير 2020. تاريخ انعقاد المؤتمر؛ 2-5 فيراير 2020

> Editing team: Eng Farah El-Qawasma Mr. Abdulahi Hassen Mr. Mohamed Seoud









+974-4403-4240



 \bowtie

Ğ

CSE at Qatar University

Smart Computing for Smart Living



Senior students project presentattion Day, Spring 2019



cs@qu.edu.qa +974-4403-4240 CSE@QU

CSE at Qatar University

Editing Team:

CSE student: Mohamed Seoud

Mr. Abdulahi Hassen

Eng. Farah El-Qawasma





