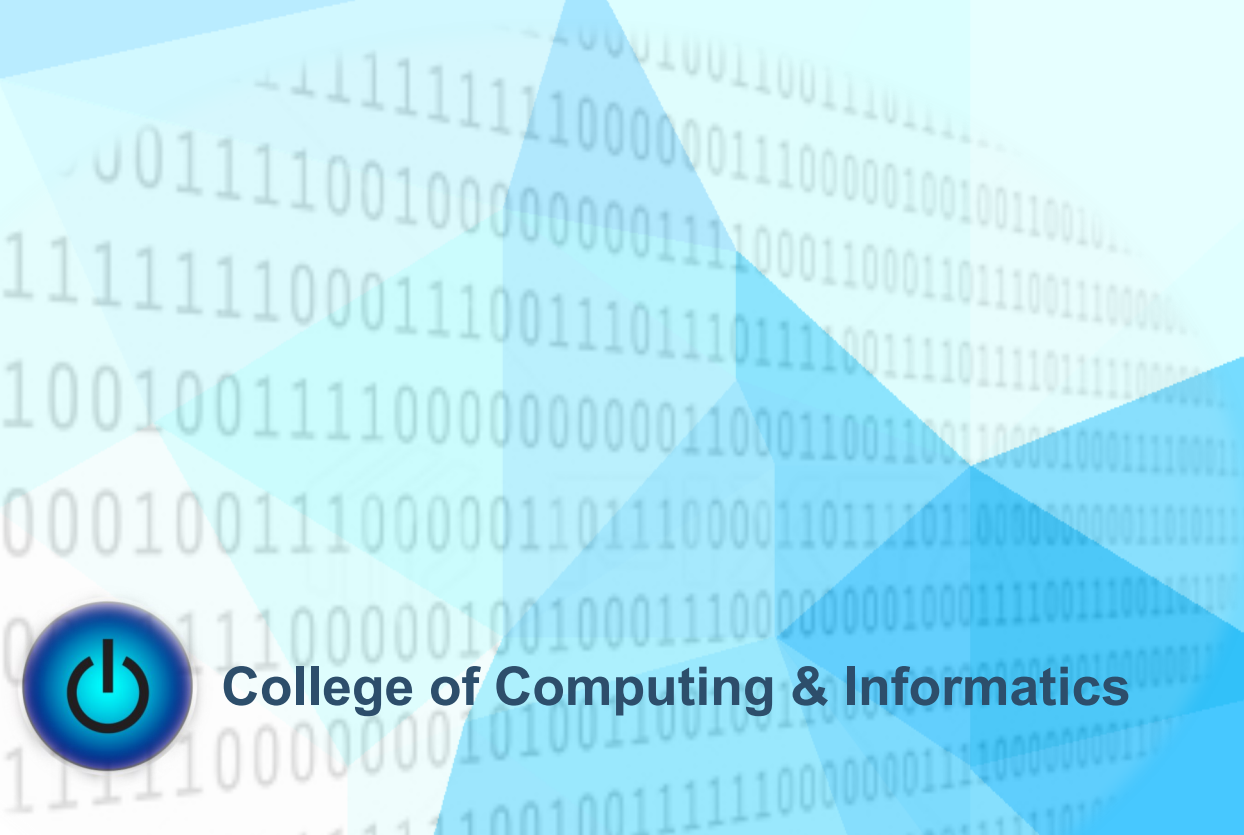




جامعة الشارقة
UNIVERSITY OF SHARJAH



CONNECT



College of Computing & Informatics



Contents Page

- Dean Word
- The College in their Eye
- College Highlights
- Story from College Faculty
- Story from College Students
- Interview with Alumni
- Emerging Technology around the UAE

Dean Word

Welcome to the first issue of CONNECT, a digital publication from the College of Computing and Informatics (CCI) where we highlight and focus on our impact activities. This is the second publication we have in addition to our CASCADE magazine where we disseminate our faculty and students' success stories. In this issue, we have compiled great articles from across CCI communities on a wide range of topics including: CCI interactions with the College advisory board, stakeholders and international partners, stories from CCI faculty members about their impactful research and assessment methods that inform our teaching and help us with the assessment of our programs performance and course delivery, interviews with our alumni students and how



Prof. Abbas Amira

they are connecting and contributing to the community and some highlights about new courses, pending approval, the College is planning to offer in the future in the areas of data analytics and cyber security.

Plus, we have a section dedicated to different emerging technologies around the UAE, including: 3D printing technologies, Artificial Intelligence at EXPO 2020, Dubai Metro distributed acoustic technology and laser robotics.

And as always, we welcome articles and success stories from faculty members and our students to disseminate our impact and interdisciplinary activities.

My thanks to all of you who contributed to this issue and we look forward to celebrating major achievements in 2022. The efforts you made, and the results to be hopefully achieved in this academic year, will reshape how the community sees us.

The College in their Eye

The College of Computing and Informatics Advisory Board first meeting of the academic year 2021-2022 was held on Sunday, November 28 in hybrid mode. The Chairman commended on the overall performance of the college during the past academic year and went through the agenda items that included reporting from the Dean of the college who reported on the key performance indicators of the college as well as its strategic directions and the way forward, students employability, priorities for the new academic year, future events, Students' internship and faculty secondment, and the formation of 2 important subcommittees: Students Affairs and Private Sector and Research and development.



College Highlights

“On December 14th, 2021, representatives from University Malaysia Sabah (UMS) led by Vice-Chancellor Professor Datuk Dr. Taufiq Yap Yun, and his team Dr. Jidon Adrian Director of Innovation and Communication Management, Ms. Molly Donna, Deputy Registrar, and Professor Abdullah Gani Dean of the Faculty of Computing and Informatics met with Professor Abbes Amira the Dean of College of Computing and Informatics, University of Sharjah, the Vice Dean Professor Ashraf Elnagar, and Dr. Ibrahim Abaker Hashem to discuss possible collaboration in various fields including Artificial Intelligence and Data Science. The meeting was held at the College of Computing and Informatics. Great emphasis was placed between the two colleges on exploring opportunities in research through matching grants, Innovations, joint events, online workshops, student exchange, and joint supervision. This collaboration would result in strong relationships between the two universities.”



College Highlights

Sponsoring Students to Attend International Conferences

The College of Computing & Informatics in collaboration with Research Outreach Department secured sponsorships for more than 35 students to attend two international conferences:

1) IEEE ICECS 2021 28th IEEE International Conference on Electronics Circuits and Systems Security of Microelectronic Circuits and Systems 28th Nov – 1st Dec 2021.



College Highlights

Sponsoring Students to Attend International Conferences

2) Women in tech Summit, December 15th 2021 (Part of IEEE/IoT Conference).



College Highlights

The College of Computing & Informatics in collaboration with College of Graduate Studies are forming external strategic partnerships for each graduate program. The partnership should provide support in any of the following aspects:

- Co-supervision of PhD and Master Theses.
- Co-teaching graduate courses.
- Co-authorship in publications.
- Exchange university/industrial resources (i.e. lab, equipment, and datasets).
- Thesis as part of industrial/ governmental projects.

Master/PhD scholarships.



Story from College Faculty

Prof. Ahmed M. Khedr was awarded the State Prize of distinction in advanced technology (Egypt), Sharjah Islamic Bank prize of distinction in research and the University of Sharjah prize of distinction in research (two times), in June 2009, May 2013, April 2014, and 2021, respectively. His research interests include Intelligent Computing, Wireless Networks, and Internet of Things. He is working with a number of research groups in UAE, Egypt, and KSA. He coordinated the initiation and accreditation of the new Bachelor of Science in Biomedical Informatics. He employs Intelligent Computing Techniques for Community Applications such as (his projects):



Prof. Ahmed M. Khedr

1. Road Safety and Traffic Management System in the Internet of Vehicles Paradigm,
2. New Methodology and Algorithms for Improving the Performance of Distributed Big Business Data Analytics and Financial Disaster Prediction.
3. An Energy Proficient Data Gathering Scheme for IoT-enabled Smart Spaces and Environments, and
4. Decision Making of Emerging Applications, and Exploiting Internet of Things Capacities using Artificial Intelligence methods for Secure Data Delivery and Processing in Smart Cities.

Story from College Faculty

Dr. Thar Shamsa has conducted UAE case study on Developing a Humanoid Robot-support Automated Framework to Advance the Quality of Education in Multicultural Education Systems. The United Arab Emirates (UAE) remains one of the fastest-growing countries on the planet in all domains including education. It attracts millions of expatriates to work, reside, invest, and permanently relocate with great incentives. To accommodate different education systems for the incoming expats' kids, there are many educational curriculums and systems (American, UK, Indian, to name but a few) that are currently running in the UAE. In fact, in Abu Dhabi only, there are 14 different education systems, 191 private schools, and approximately 250,000 students from 170 different nationalities.

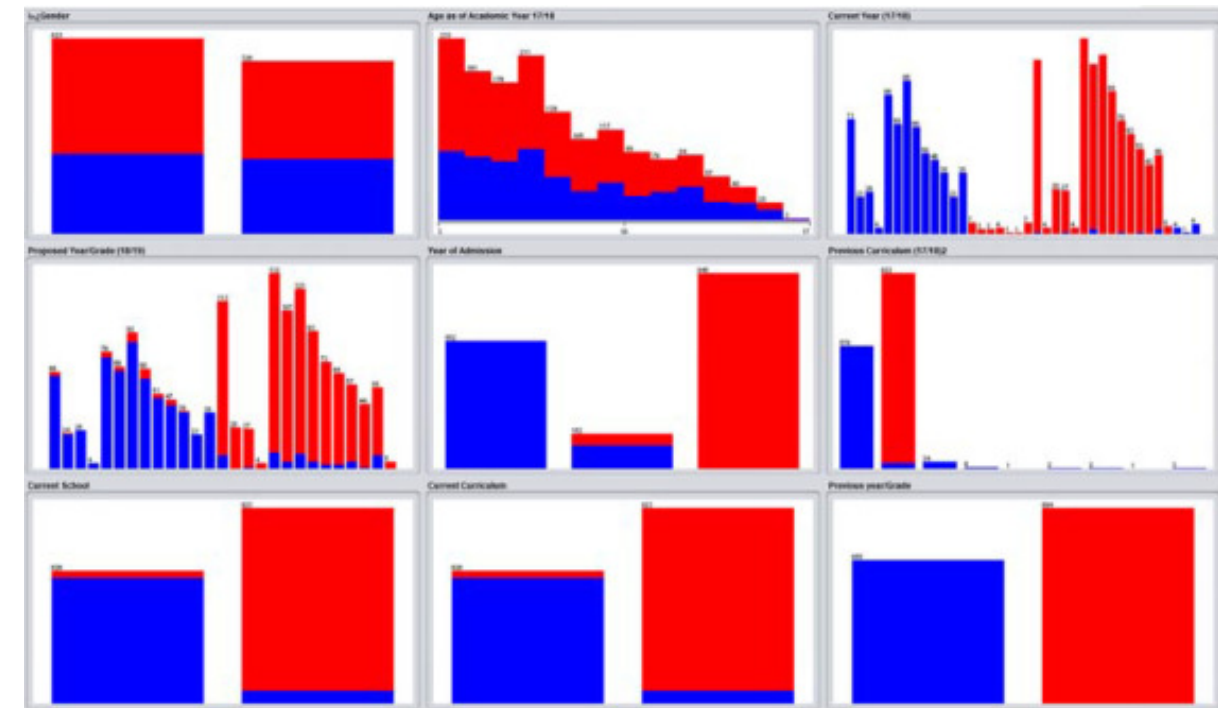


Dr. Thar Shamsa

These systems and schools have different requirements for registration, levelling, and graduation. In other words, there are different ages for starting education in each system, different number of years of education, assessment techniques and forms. For example, UK primary schools start from 5 years old, whilst USA schools start from 6 years old. Notwithstanding, children can still switch from one system to another, according to the children parents' preferences (i.e., distance from workplace and home). However, the move from one system to another is not a straightforward process due to many reasons: (i) at the admission stage, (ii) levelling stage, and (iii) inside the class stage, where there is not currently a way to differentiate and compare the new student's actual performance and level, who joined from a different educational curriculum to his/her peers in the class.

Story from College Faculty

Research Team Solution: To this end, the team has been working on developing an automated framework, with all associated tools, including an advanced humanoid robot, that performs the levelling and differentiation stages within a classroom automatically. The ultimate goal is to aid in a smooth transition “levelling” of students who relocate from a particular education curriculum to another; and minimize the impact of switching on the students’ educational performance.



The project outcomes will benefit both the scientific and commercial communities in the UAE and will establish the UAE as an innovator in the field of Artificial Intelligence (AI). Partners: This project involves researchers from the University of Sharjah in the UAE, University of Reading in the UK, Liverpool JM University in the UK, Kazan Federal University in Russia, Belvedere British School in Abu Dhabi, and Abu Dhabi Department of Education and Knowledge (ADEK) formerly known as Abu Dhabi Education Council (ADEC).

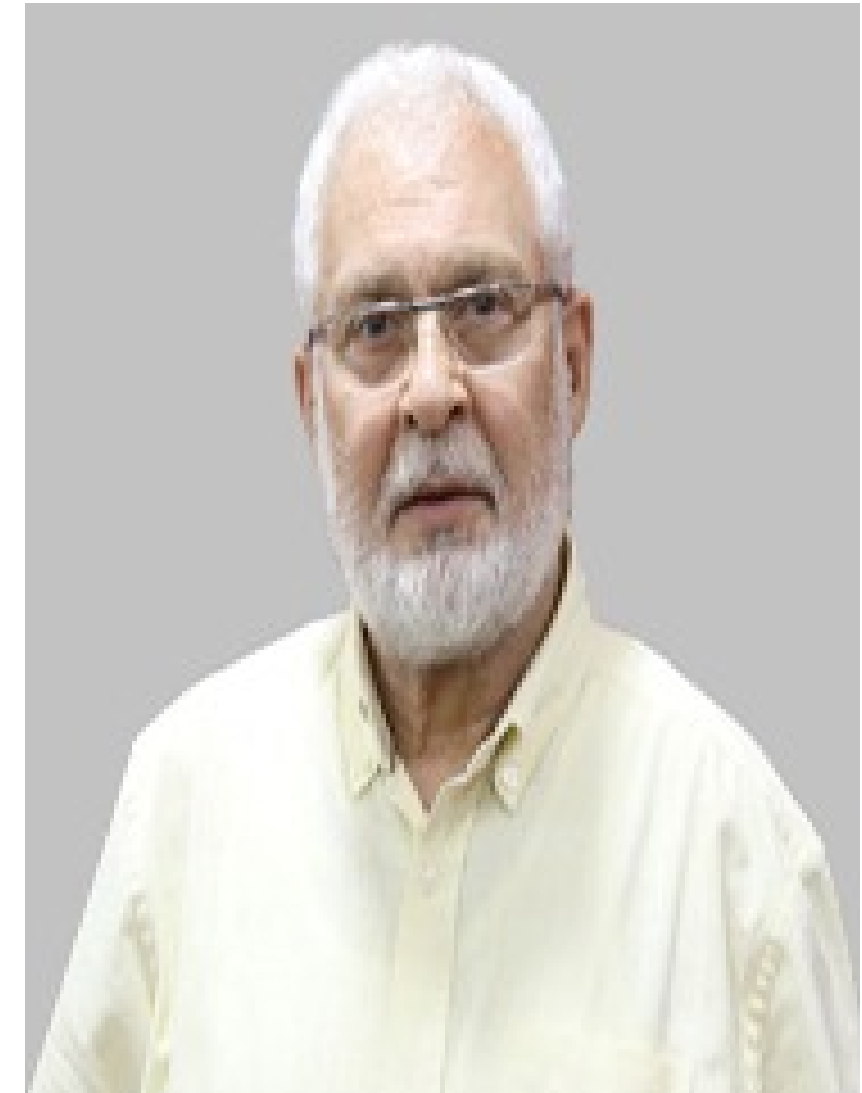
Further Readings:

1. For the first time, an open access dataset has been collected and built from two international schools, a British curriculum, and an American Curriculum based in Abu Dhabi, UAE. The dataset is now accessible online @ <https://data.mendeley.com/datasets/3g8dtwbjy/2>.
2. A journal paper, titled “Dataset of student level prediction in UAE”, has been published in Data in Brief journal of Elsevier, DOI: <https://doi.org/10.1016/j.dib.2021.106908>
3. A short conference paper, titled “Robotics to Enhance the Teaching and Learning Process”, has been published in the 2021 International Conference on Artificial Intelligence and Data Analytics (CAIDA) in Riyadh, Saudi Arabia. Link: <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9425061>

Story from College Faculty

Program Assessment Methods

Academic programs are evaluated and assessed to control the quality and improvement of a program offering. The evaluation process involves assessing a set of Program Learning Outcomes (PLOs) indicating what the graduate can and is able to do after graduation. A wide range of tools exists to assess the extent to which the PLOs are met, such as employer surveys, student ratings, test scores and student self-reports. Each of these assessment tools suffer from a set of drawbacks, which limits its applicability. For example, surveys have the drawback of low response rate, appropriate person to fill the survey, and time of conducting the survey. A robust assessment method that focuses on the actual achievements of a program graduates is needed. Information posted by the graduates on their social media accounts, such as LinkedIn can be used for the PLOs assessment, this approach of assessment is continuous and not restricted to any period of time.



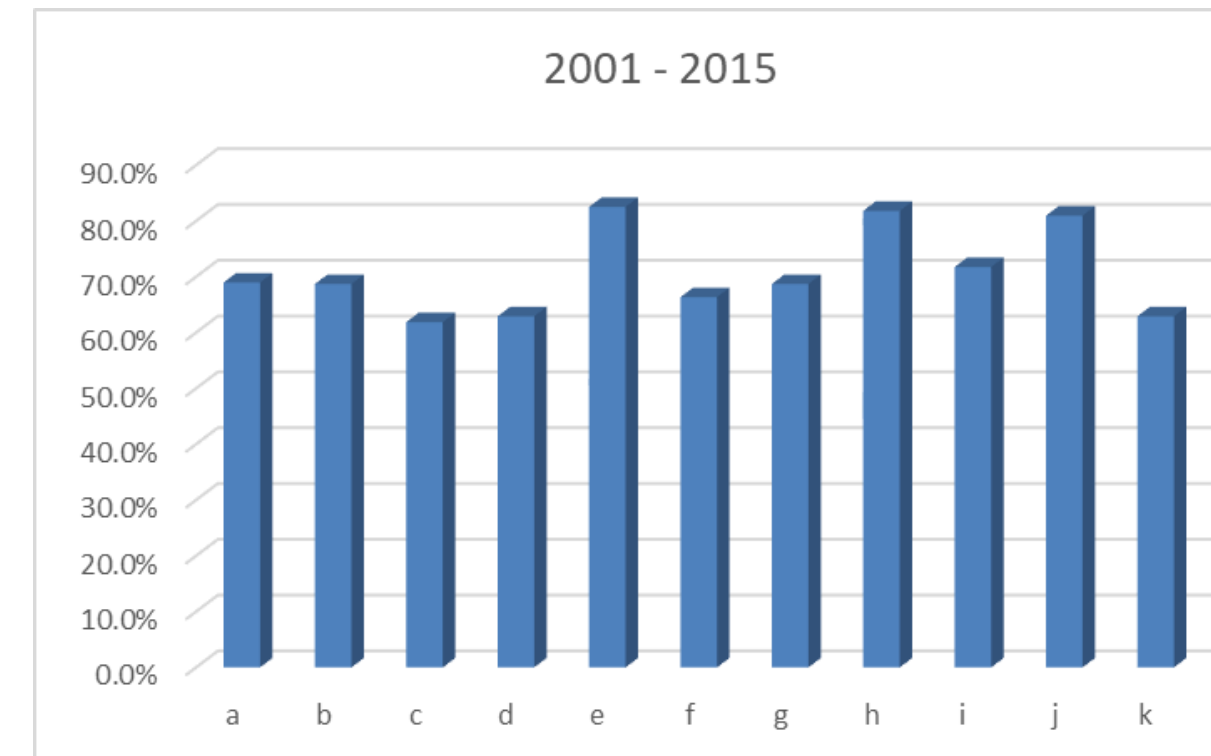
Dr. Abdullah Hussein

Professional social networks can be used to capture data about the graduates' real performance in the work environment, and based on what they did and achieved. As graduates tend to post a wealth of information about their career on LinkedIn, the site is an excellent choice to capture the required data. Such information includes the six categories: Experience, Education, Skills, Accomplishments, Interests, and Endorsements. The collection of such data from enough alumni profiles on LinkedIn allows to build the required dataset for PLOs evaluation.

Story from College Faculty

Program Assessment Methods

As LinkedIn and other professional social networks are becoming a tool for recruitment and a venue for professional connections, graduates are increasingly interested in creating and maintaining profiles at one or more professional social networks, such as LinkedIn. Further, many graduates ensure that their professional social network profiles are populated with their attained experience, education and other accomplishments to impress recruiters.



The proposed method of assessment has the following stages:

Stage 1. Selection of PLOs to be assessed.

Stage 2. Selection of LinkedIn data categories and mapping of PLOs to categories. This stage also involves assigning weights for each data item.

Stage 3. Extraction of alumni data from their LinkedIn profiles.

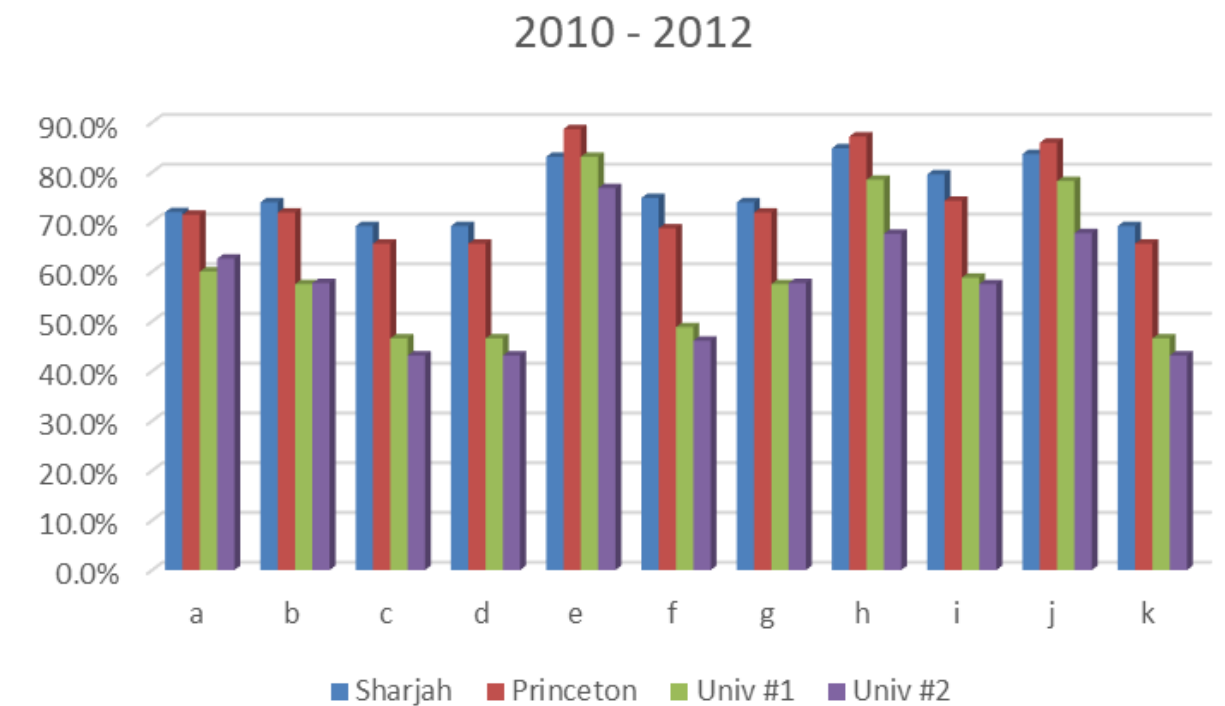
Stage 4. Calculation of the PLOs based on the extracted data.

To assess the efficacy of the proposed method, we used it to measure the performance of 103 graduates of the department of computer science who posted information on LinkedIn over a period of time [2001, 2015]. The following figure shows result of the assessment of the a – k set of ABET Computer Science program outcomes.

Story from College Faculty

Program Assessment Methods

One advantage of the proposed method of assessment using social data other than assessing the achievement of a program graduates, is to compare the achievement of a program graduates with the graduates of similar programs from different institutions. This comparison usually cannot be done because the data of the graduates of other institutions are not made public.

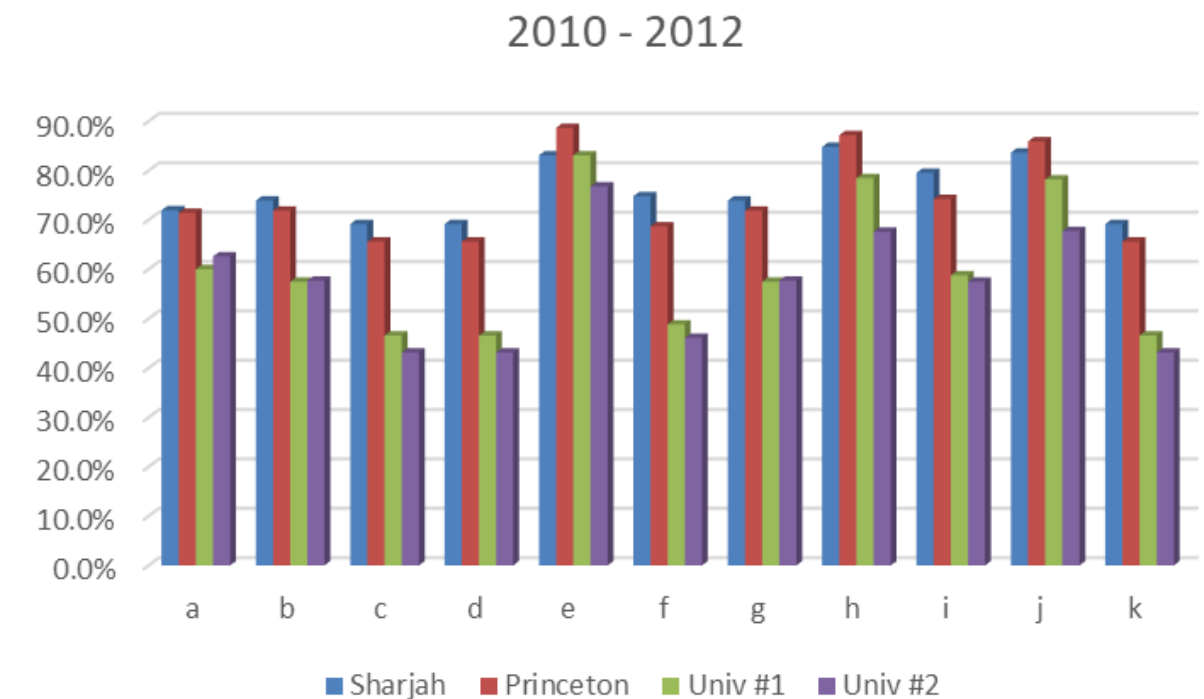


Achievements of 11 graduates from the Department of Computer Science – University of Sharjah were compared with the achievements of 11 graduates from Princeton University (at the time this work was done, Princeton university was ranked the 6th in computer science in USA, and the 10th in the world) and two other UAE universities over a period of the time [2010, 2012]. The following figure shows the result of the assessment. Comparing the achievement of 11 graduates does not provide a conclusive result, it only shows that the proposed method can distinguish between different levels of achievements.

Story from College Faculty

Program Assessment Methods

The proposed method of assessment using social data resolves the problems accompanying other methods, since the performance of large number of graduates can be assessed. Accreditation agencies can easily check the results and be assured that the results are genuine, the assessment are done over the entire time interval and not for a small discrete period. The assessment is done without the need



to involve employers or graduates. The proposed method of assessment should be of interest to institution administrators, and college deans, because it permits the comparison of the achievement of the institution graduates with other graduates.

More information of the proposed approach can be seen in the reference, ²A. Hussain, M. Hussain. Social-media based assessment of academic programs, Studies in Educational Evaluation Journal, 2019, Vol. 62, pp 149 – 157².

Story from College Faculty

With the rise of connected world and new era of digital transformation in which everything in the world is connected to the cyber, a concept known technically as Internet of Things, the security turns to be one of the highest demanded jobs in the market for Engineers. The market is in a pressing need for experts in cybersecurity. Computer Engineering department is actively in the process to open new program in Cybersecurity Engineering. This will provide to the market equipped engineers in both hardware and software backgrounds to facilitate more

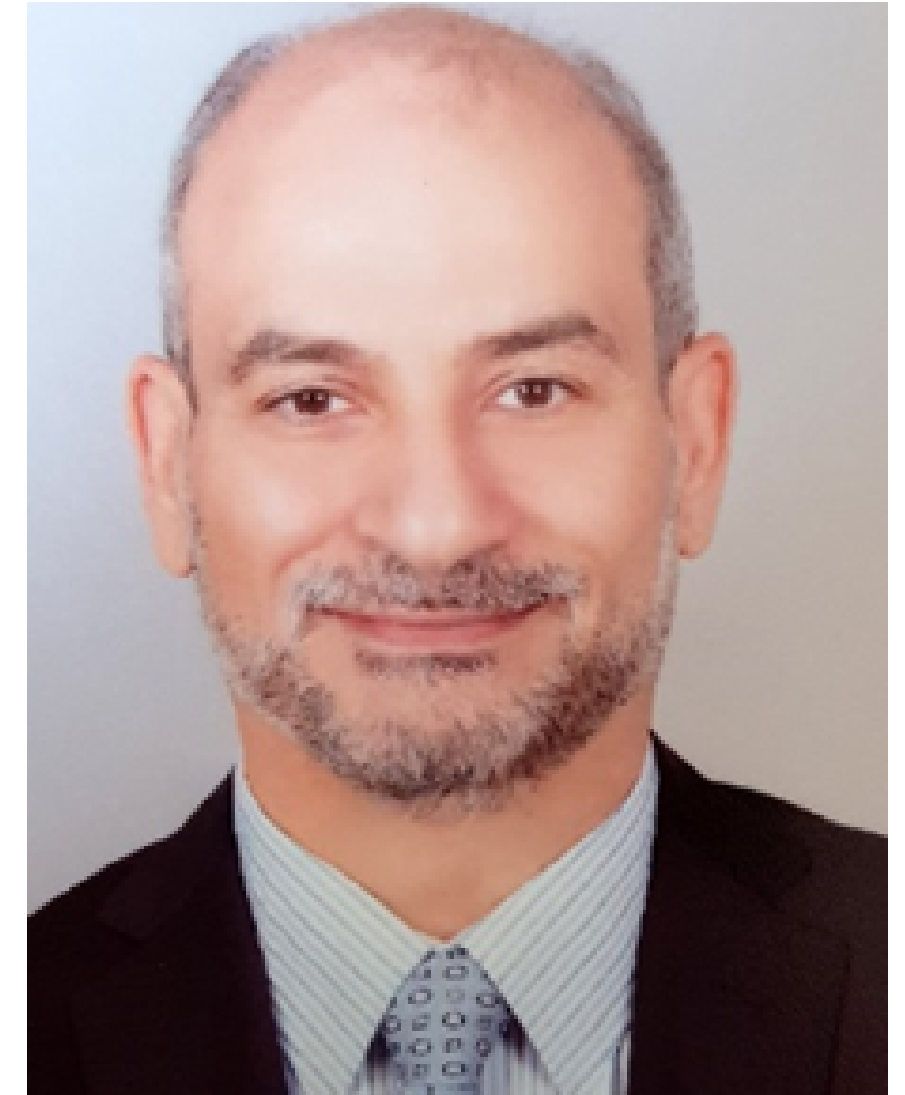


Dr. Ali A. El-Moursy

secured connectivity and much safer information exchange. Both hardware and software components of new digital systems or even digitized appliances should be designed with security aspects in mind. Our new program in Bachelor of Cybersecurity Engineering is tailored to prepare the bachelor graduates with the basic knowledge and skills to build and design secured computing systems.

Story from College Faculty

The field of Cybersecurity is expanding rapidly, and the Department of Computer Engineering is aiming to be there to support you in getting into this high demand area of employment. This is why we are excited to announce the introduction of a Master's of Science degree in Cybersecurity Engineering. A program that is designed to prepare professionals to assume Cybersecurity leadership roles in corporations, agencies, and organizations. The Master of Science in Cybersecurity Engineering Program is offered after standard work hours,



Dr. Bassel Soudan

allowing students to complete coursework in a timeframe that fits their schedule. The aim is for you to complete this program while you work full time, applying the cyber security concepts and technical skills you learn in the classroom directly on the job. This program has been developed by our academic experts who have had extensive experience in academic program development. The program consists of 33 credit hours that have been distributed into a set of compulsory requirements and elective courses.

Story from College Faculty

The program starts with a set of core courses that provide necessary fundamental skills in cybersecurity, security management and research. Then the program offers a wide variety of elective courses that delve into advanced topics in areas such as network security, security of software and hardware systems, cryptography, digital forensics, security governance, security defenses, physical security and critical infrastructures. Each course will be led by highly-credentialed professors with industry experience. The maximum enrollment in these courses is set at 20 students allowing for high interactivity and improved discussions. The courses will typically consist of a mixture of weekly guided discussion, interaction, engagement, assessments, as well as research projects and papers.

The goals of the MSc in Cybersecurity Engineering program are to:

1. Provide graduate students with the advanced knowledge and skills required to solve research oriented technical problems in Cybersecurity Engineering.
2. Provide graduate students with an advanced grasp of theories and the insight required to enhance their professional careers and/or to pursue further higher education and lifelong learning.
3. Fulfill the future needs of the Research and Development (R&D) for various industries and establishments of the United Arab Emirates (UAE) and the region at large.
4. Promote a sense of leadership with emphasis on scholarship and professional ethics.

Story from College Faculty

When you complete this program, you are expected to have acquired the following job-related skills:

1. Apply advanced theories and methodologies in the field of Cybersecurity Engineering.
2. Propose advanced engineering solutions with sustainability factors in global, economic, environmental, and societal context.
3. Communicate effectively in oral and written forms to present complex and diverse problems to a variety of audience.
4. Evaluate professional ethics issues and develop fair and valid judgments in Cybersecurity Engineering contexts.
5. Function on multidisciplinary teams with management and leadership capabilities.
6. Design and conduct experiments/simulation for research in Cybersecurity Engineering related fields.
7. Use proper tools to analyze and interpret data.

Story from College Faculty

Admission Requirements

A candidate must meet the following requirements to be admitted to the MSc Program in Cybersecurity Engineering:

1. Must have a bachelor's degree in Computer Engineering (or a closely related field) from a recognized college or university with an overall undergraduate grade point average of 3.00 (out of 4.0) or higher.

- Candidates with a CGPA between 2.5 and 2.99 may be admitted conditionally. Such candidates are required to enroll in prerequisite courses, which they have not taken in their prior studies, as deemed necessary by the Department's "Graduate Studies Committee" and approved by the College and University. These prerequisite courses should be completed within no more than two semesters (Full-Time) and will not be considered as part of the required credit load for the graduate degree.

2. Candidates are required to demonstrate English language proficiency by obtaining: A minimum of 550 on the Institutional TOEFL (administered at the University of Sharjah) or its equivalent on the iBT or CBT; or 6 on the academic IELTS.

- Candidates may be admitted conditionally if they obtain 530 or higher on TOEFL provided that they enroll in an English language course and receive a TOFEL score of 550 by the end of their first semester of study. Students who do not meet these two conditions will be dismissed from the program.

Story from College Faculty

Graduation Requirements

Before graduation, a candidate should complete all graduation requirements that include:

- Completing successfully all courses of the program – 24 credit hours
- Completing successfully 9 credit hours worth of research and successfully defending a thesis based on this research.
- Obtaining a minimum cumulative GPA of 3.0.

The time limit for complete graduate program at UOS has been established as follows:

a. Full-time students: no less than three semesters and not more than eight semesters.

The student may postpone or withdraw his/her study up to two academic semesters thus making the maximum time limit 10 semesters, excluding the summer session.

b. Part-time students: no less than six semesters and not more than 10 semesters. The student may postpone or withdraw his/her study up to four academic semesters thus making the maximum time limit 14 semesters, excluding the summer session. In both cases, the maximum time limit, however, in certain justified cases, and for the purposes of defending the thesis, may be extended up to only one semester, upon a recommendation from the supervisor, and after the approval of the Dean and the Council.

A decorative vertical bar on the left side of the slide, featuring a complex geometric pattern of overlapping triangles in various shades of blue, ranging from light sky blue to deep navy blue.

Story from College Faculty

Accreditation

The Department of Computer Engineering is currently in the final stages of achieving Initial Accreditation for this program through the Commission for Academic Accreditation of the Ministry of Education in the UAE.

Story from College Faculty

Masters of Business Analytics

Data Analytics refers to the abilities, technologies, and practices associated with the continuous iterative exploration and investigation of historical business performance to gain insight and inform business planning.

Department of Information System in the College of Computing and Informatics is waiting for Ministry approval to start a Masters of Business Analytics degree. The program is designed in collaboration with the College of Business and Administration and the College of Sciences. The tripartite nature of the program from the leading colleges shows the character and approach of the program university of Sharjah are embarking on.



Dr. Saadat M. Alhashmi

The Masters of Business Analytics degree will sit on three pillars: technical skills, employability, and thought leadership. Students can finish the program in 18-months with eight compulsory courses; this includes a thesis and two electives. Students can choose from a diverse set of courses carefully developed to address the program's multidisciplinary nature.

Story from College Faculty

Masters of Business Analytics

Besides other areas of interest, the Data Analytics degree will focus on addressing business applications. It can help construct customer insights. The customer data can provide a wealth of information about their habits, demographic attributes, interests, and objectives, boosting Security and further helping to improve manufacturing trends and future market trends prediction. The degree aims to prepare students to interpret and use data science to solve business challenges, giving them the skill set needed for careers in various industries such as management consulting, financial services, technology and healthcare. During the program, students take part in a thesis, in which they will work on real-life problems.

Story from College Students

Students Meet Google event is the first offline event and it happened in 2022.

The leads of the Google student developer clubs have talked about their leadership experiences, running several technical and social activities, expanding the network and impacting the community. The Senior Program Manager Sebastian has delivered a talk on successful leaders and Dr. Nabil jaber, an Expert Google Cloud Authorised Trainer, has delivered technical workshop for all students. There were also several talks on generating blog posts with AI, data leakage detection and prevention and lastly misconceptions about AI. At the end of the event, the solution challenge was discussed and there was a networking session. This event allows UoS students the ability to connect to real life, generates a good idea on how work fields can be and a fun way to learn about many technical topics.



Interview with Alumni



- What is your name? Maha AlNahdi
- What is your major? Bsc. In MIS, Minor of Marketing
- When did you graduate? 2013
- What is your current career? Corporate & Personal Development Consultant, Trainer & Coach + Entrepreneur + Business Growth Manager @ Edufikra
- How did the university prepare you ? UOS didn't only prepare me from the technical skills, but also developed my personality and life skills
- Can you give an advice for the current student? Enjoy your college years and seize all the opportunities to learn and grow, contribute & participate in students activities and always have side projects, don't only focus on memorizing and collecting grades, live the college life to the fullest



Interview with Alumni



- What is your name? Masa Abushamleh
- What is your major? Computer Science
- When did you graduate? Spring 2019
- What is your current career? I currently work as Cloud Platform Engineer where I focus on designing solutions for our clients and partners around hybrid cloud technologies. I also work with the developer communities to help them rapidly grow by enabling their skills around cloud-native technologies
- How did the university prepare you? Participating in extracurricular activities such as hackathons and conferences helped me get an idea of what it is like outside academia. Through these activities, I got to apply and connect what I learned in my courses and even expand my knowledge and skills further
- Can you give an advice for the current student? Through the university, you will get to experience so many opportunities, so leverage that to discover what you want to do next. Have a mentor, someone you admire or who works in the field you are interested in, a mentor can teach you from their own experience which will help pave the path for your career and give you an insight on how you can grow. And finally, technical skills and soft skills come together. When you work with people, you want to communicate your skills and projects with them and deliver a clear message about your work



Interview with Alumni



- What is your name? Norhan Abdalla
- What is your major? Computer Engineering
- When did you graduate? 2019
- What is your current career? Embedded Software Engineer
- How did the university prepare you ? University of Sharjah
- Can you give an advice for the current student? Undergrad can be daunting, have fun while you are at it, learn to understand not to collect grades. Also, I am sad to tell you that university doesn't equip you enough for the market after graduation, so always work hard on yourself and keep a variety of options when you choose a career. Help others, others will help you. Trust me when you help other people with whatever you know, God makes others help you in return and that's the beauty of it. Again, don't forget to have fun while you are at, it is not fun after graduation



Emerging Technology around the UAE

Individuals, government organizations and private companies are racing to the future. Faster processing speed along with easily available high-speed internet access allows people to dream, create and innovate. The following eye-catching advancements in technology in our region look promising.

1) Dubai is home to the largest 3D printed two-storey building in the world

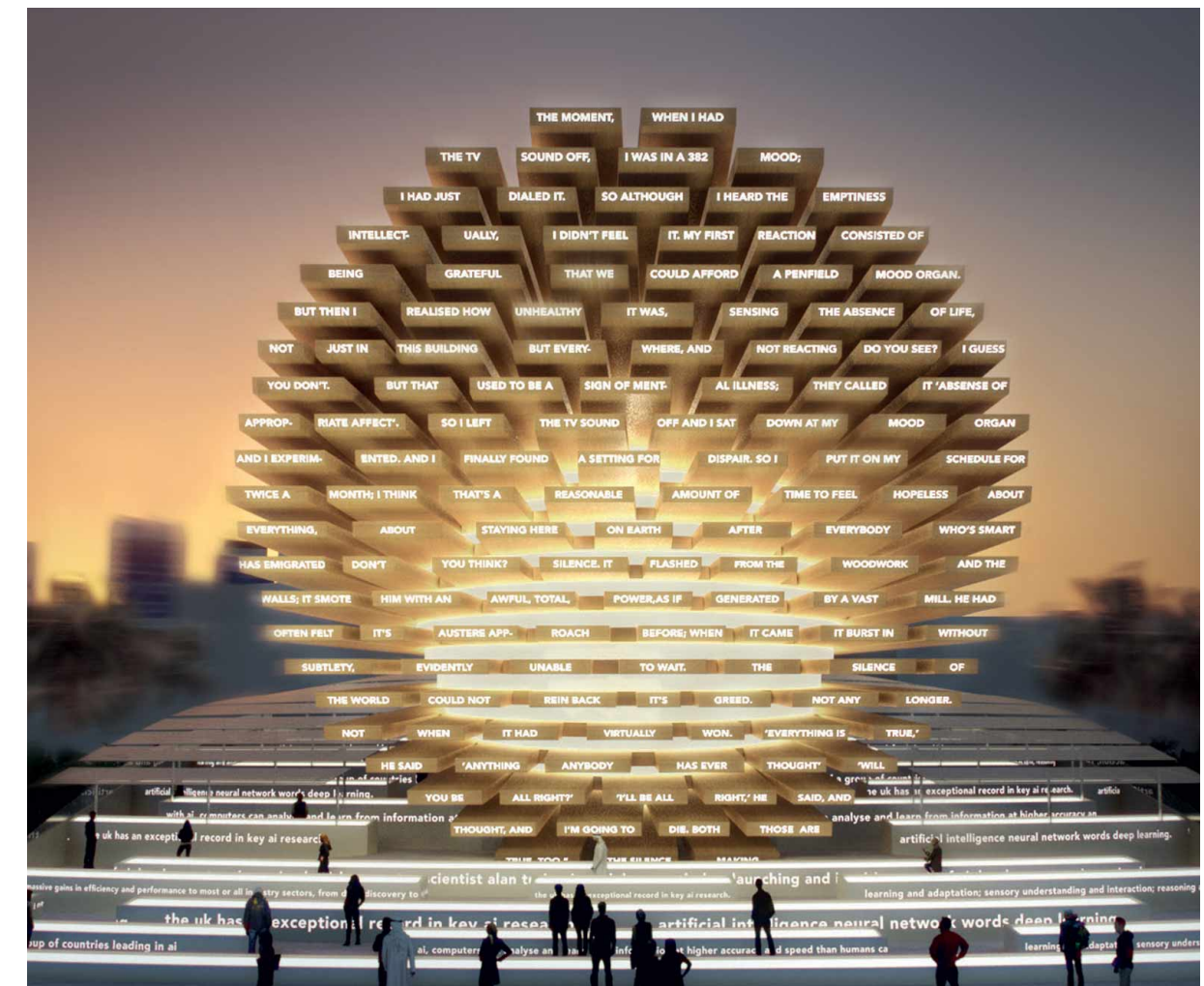
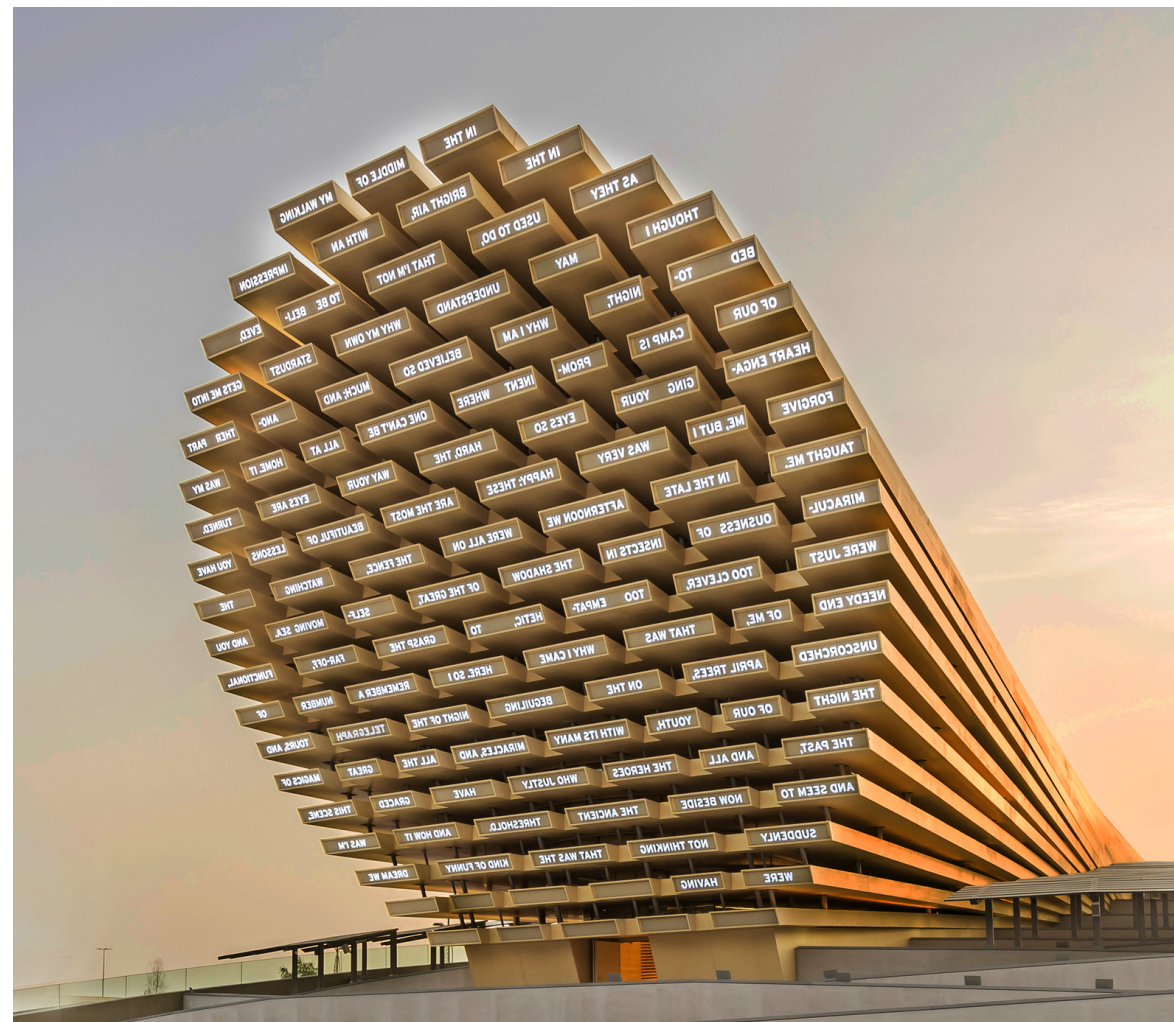
Adding an architectural as well as technological achievement to its list, Dubai municipality purposed this building for administration use. It was an engineering accomplishment as it required only 3 workers and 1 printer. The future holds more 3D structures nation-wide. The 3D printed material was developed locally and tested for holding up in harsh conditions.



Emerging Technology around the UAE

2) Artificial Intelligence at EXPO 2020

The UK pavilion aka the Poem Pavilion uses machine learning and artificial intelligence algorithms to generate a collective poem given one word by the visitor.



Emerging Technology around the UAE

3) Small Sharjah startup creates laser robot

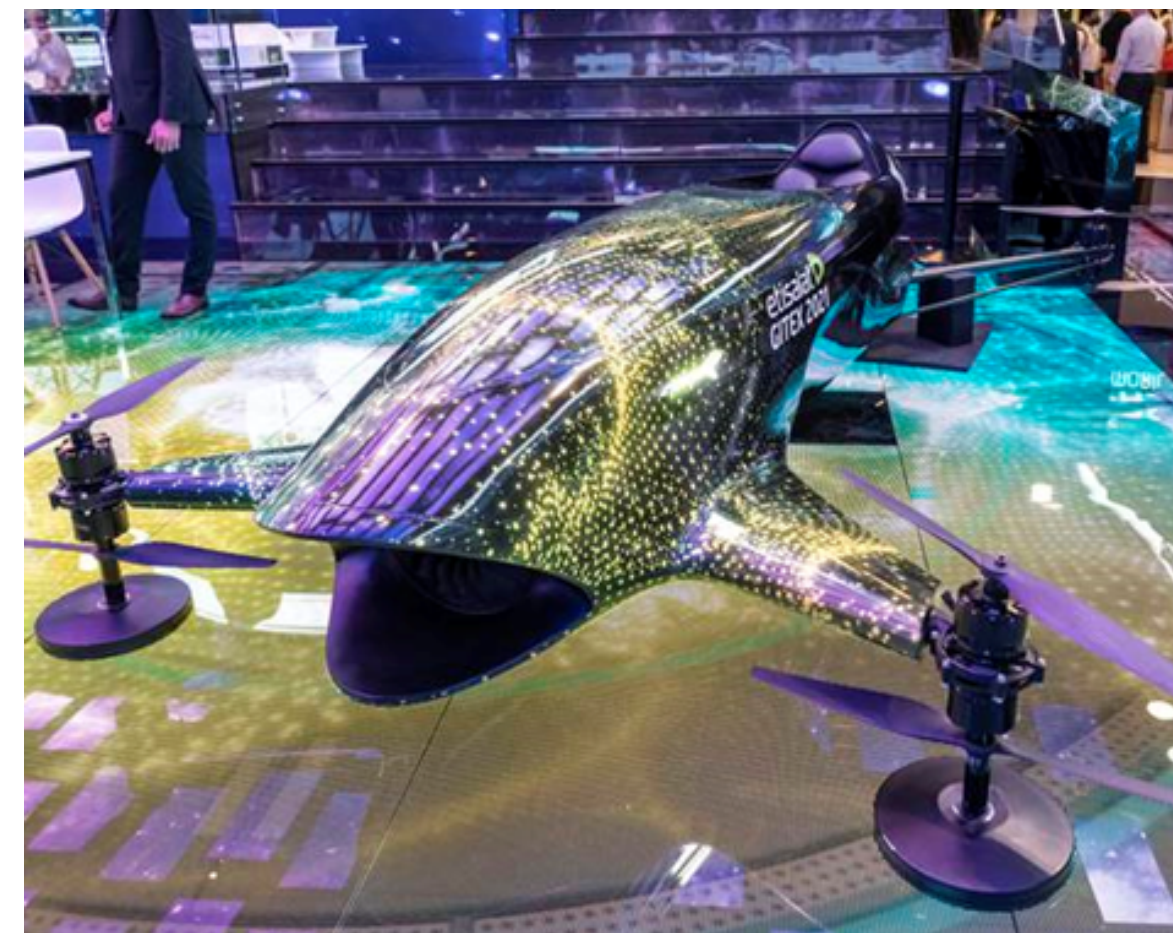
The iLaser robot uses artificial intelligence as well as machine learning to analyze skin type and remove hair precisely without burning. The idea is to overcome human error based on the data collected. The robot is called a medical 'cobot' as it works collaboratively with human beings.



Emerging Technology around the UAE

4) F1 in the sky

Airspeed drones were unveiled at Gitex. Dubai is in line to host a high-speed ariel race. The Airspeeder is a bullet-shaped pod powered by 8 motors that can reach a maximum speed of 160 km/hr. It is the world's first flying race car series which also has collision avoidance technology. Batteries need to be charged around every 10 minutes limiting the race time duration.



Emerging Technology around the UAE

5) Dubai Metro distributed acoustic technology

The first metro worldwide to utilize fiber cables with vibration sensors. This allows the metro to be a safe option as these optical sensors can detect obstacles on the railway track in real-time. Additionally, it can detect unauthorized vehicles on the track as well as track and wheel defects.



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