6SCS-2022

# 6th IET Smart Cities Symposium 2022

Symposium Proceedings will be submitted to the IET Inspec, IEEE Xplore, and Scopus Elsevier's

## IET SMART CITIES JOURNAL

Hybrid Symposium
Technical Program

6-8 December 2022
Access Symposium - University of Bahrain

Details are found at:
https://www.6th-smartcities-2022.com/

Symposium Keynote, Papers, and Proceeding Volume Summary

The Institution of Engineering and Technology

TECHNICAL SPONSOR AND SUPPORT

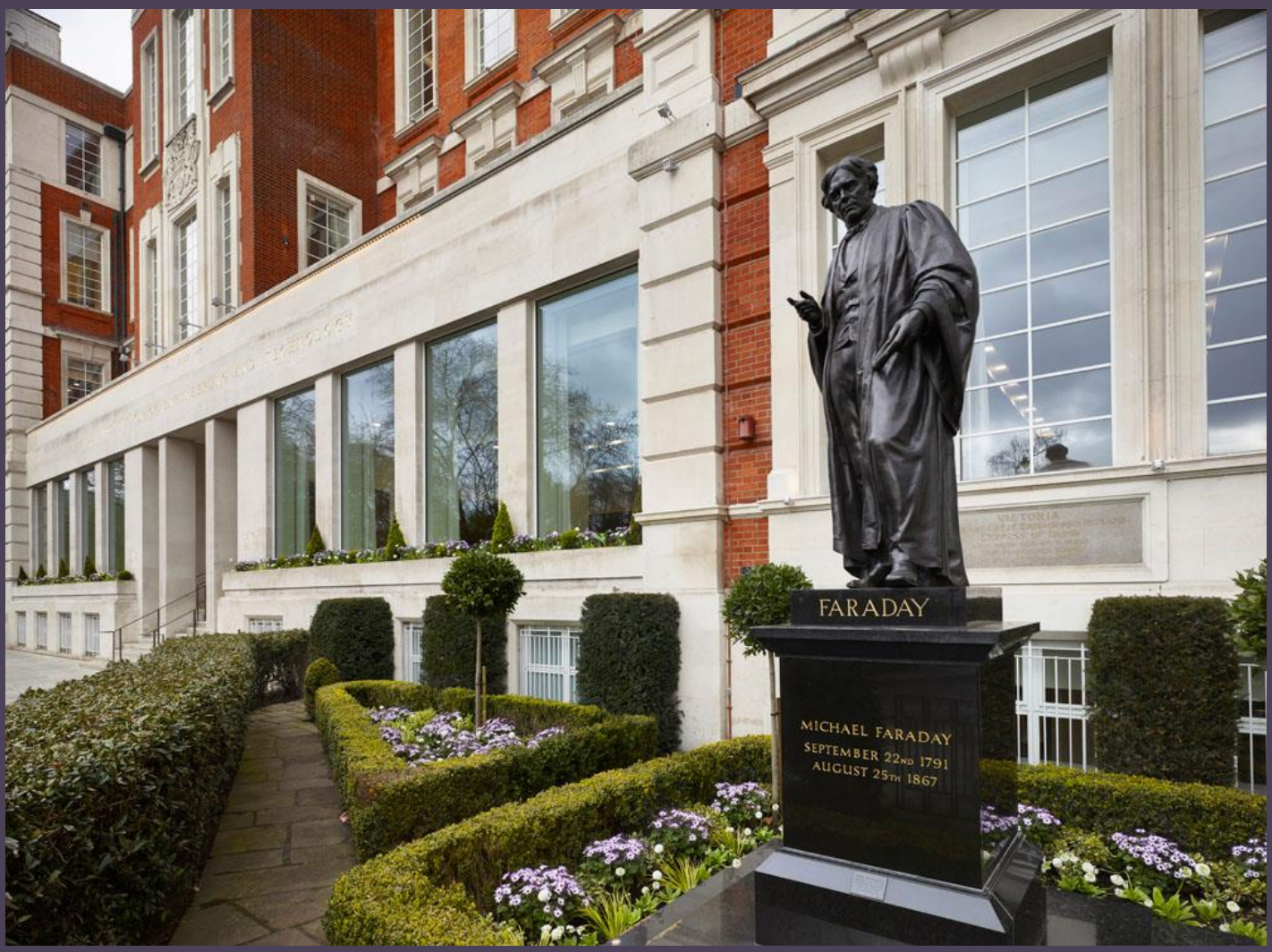
*To create awareness about the prospects of Smart Cities. The symposium is a platform to exchange ideas and thoughts in international prospects.*

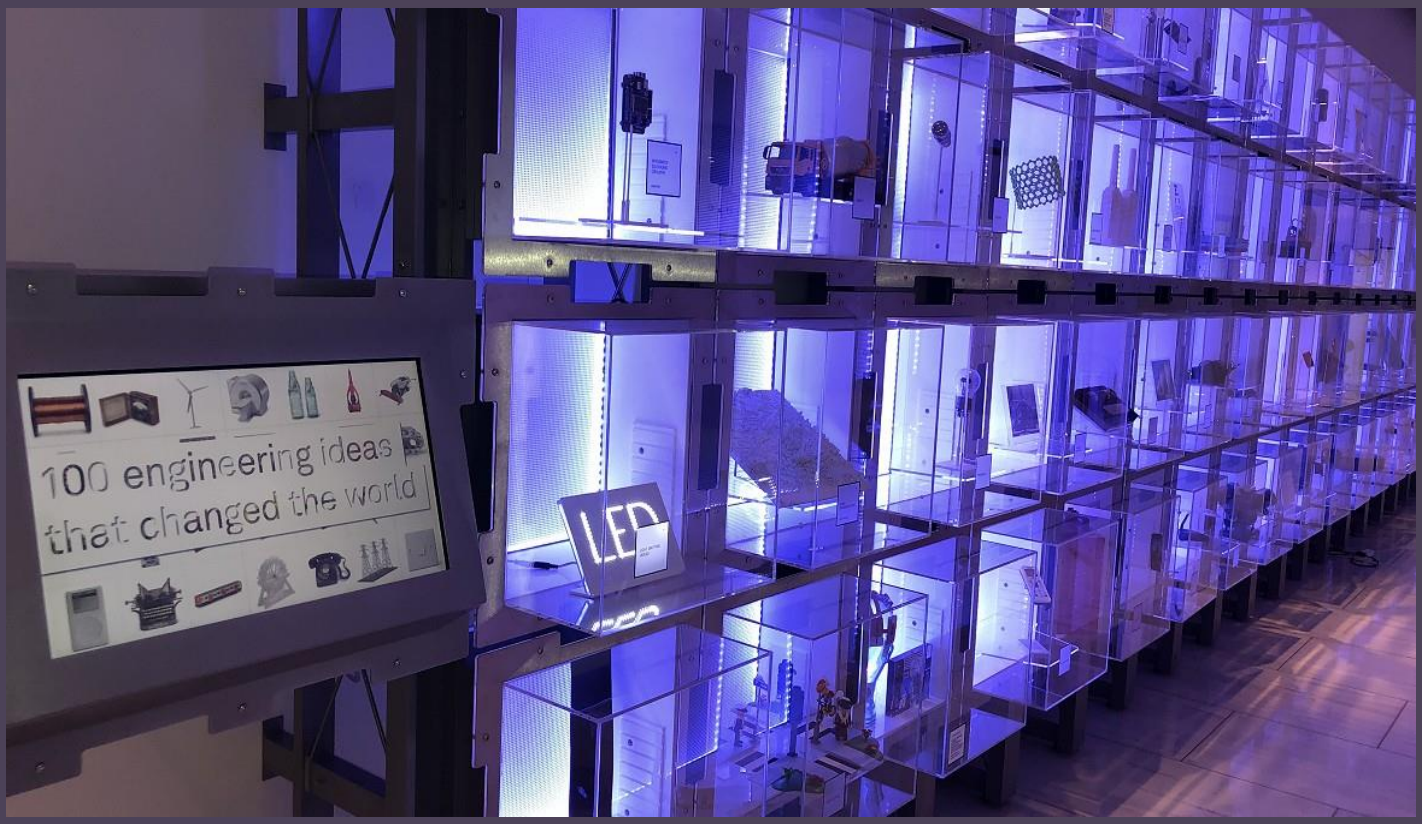
*The symposium is a platform for emphasizing the role of universities in promoting Smart Cities, Consultancies, Projects, Smarter Ideas, and Consultancies.*

*The symposium is a platform for research continuity in the form of publications and creating innovative solutions.*

# The 6th IET SCS-2022 SYMPOSIUM Setup and Thoughts

IET Technical Support:  6TH SMART CITIES SYMPOSIUM:  PARTNER AND TECHNICAL SUPPORT



## OUR WAY FORWARD SINCE 2008

The first IET forum was during 2008, also the first IET Smart System International Conference was during 2008. Since that year, we have been organizing IET forums, and then indexed Symposiums in an annual basis at University of Bahrain.

This University of Bahrain 6th Smart Cities Symposium (6-8 December 2022) is being organized with collaboration of the IET, (The Institution of Engineering and Technology), UK.

Smart Cities is a new and emerging concept that have received a substantial attention for a while. This is because of the fast development of Engineering Concepts, IT and ICT sectors. In reality, Smart cities is a used term used to define employment of smart technologies and data as the means to solve cities' sustainability challenges and prosper. In this sense, many cities are in the process of transforming themselves to be smart. This can be achieved while relying on and using data and technology to improve several sectors. Sectors that are applicable for such transformations are:

{Transport, Energy use, Health issues, Health care, and Air quality, or to Drive economic growth}. Others are being built to be smart from the start. This is a term that relates to the present and to the future. Nevertheless, in general notion, cities world-wide consume substantial resources and global energy supply, which make them much under demand to be transformed to smart. Reports are also showing that, there are growing numbers of the world' s natural resources, global energy supply, healthcare issues, the need of fast and easy transports, and easy health care. In addition, over the coming twenty years, it is expected that cities worldwide will generate not less than 60 per cent of global GDP. In this sense there are potentials that, Engineering and High Technologies will help and participate to resolve several issues and demands of current cities.

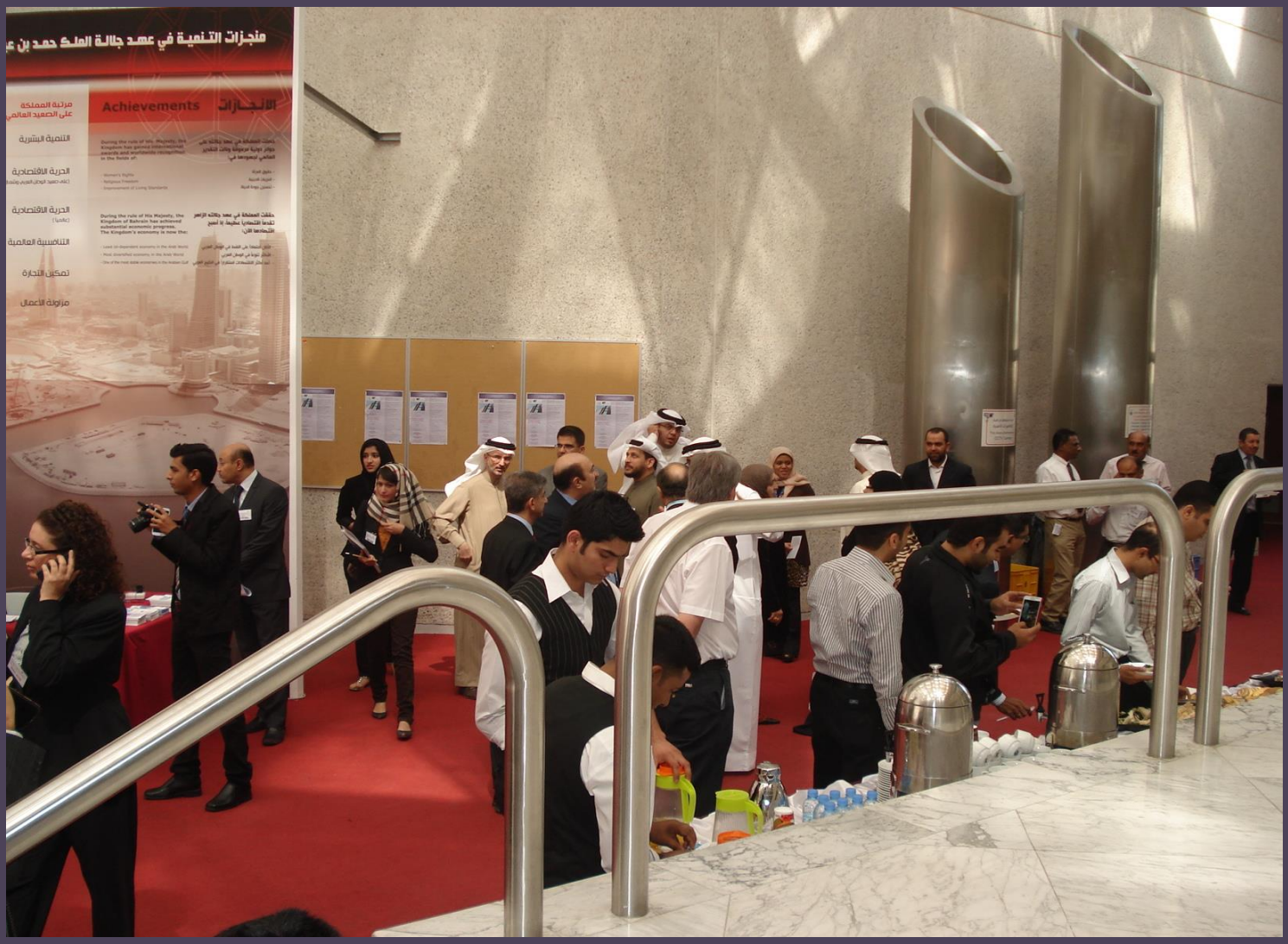
The regional infrastructure, and the ICT backbone, are developing very fast, that makes the concept of smart cities are very applicable concepts locally. Therefore, the event will be an excellent platform and a site for energetic and dynamic discussions between locally demanding parties, possible international experts, and the community of academics, decision makers, researchers, practitioners, real estate developers in Bahrain, investors, and policy makers from the urban spheres. This is all with the aim to explore such emerging trends and innovative solutions to green and smart cities within the region.

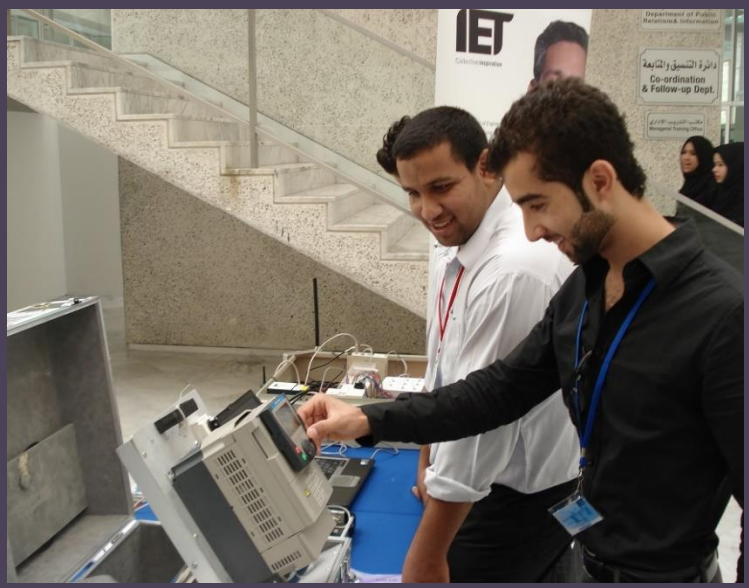
The main purpose of the event is to create awareness about the prospects of Smart Cities. The event will serve as a platform to exchange ideas and throughout in an international prospect. The event objectives are also in emphasizing the role of academic institutions in promoting a smarter kingdom via its consultancy, building smarter ideas or continuity in the form of publications, and creating innovative solutions. In addition, such organization of the event, will also focus on networking opportunities, and that the event is a good starting point and could help in making networking opportunities for smart cities.

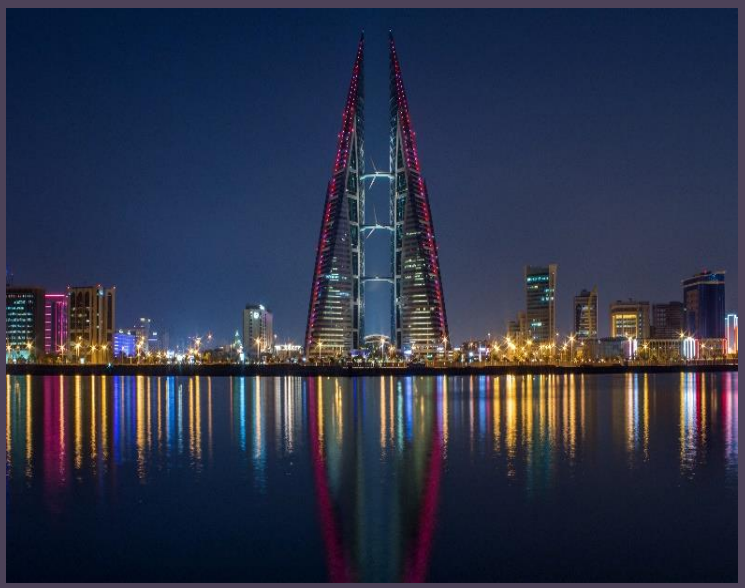
The event venue (the symposium) will be at University of Bahrain, and will run for three days, 06-08 December 2022. The symposium will involve both invited speakers (talking about load needs for smart cities), in addition to academic submitted papers (with review), as they will be published afterward within the IET (once satisfying the needed technical standards).

6th Smart Cities Symposium:  IET Partner and Technical Support

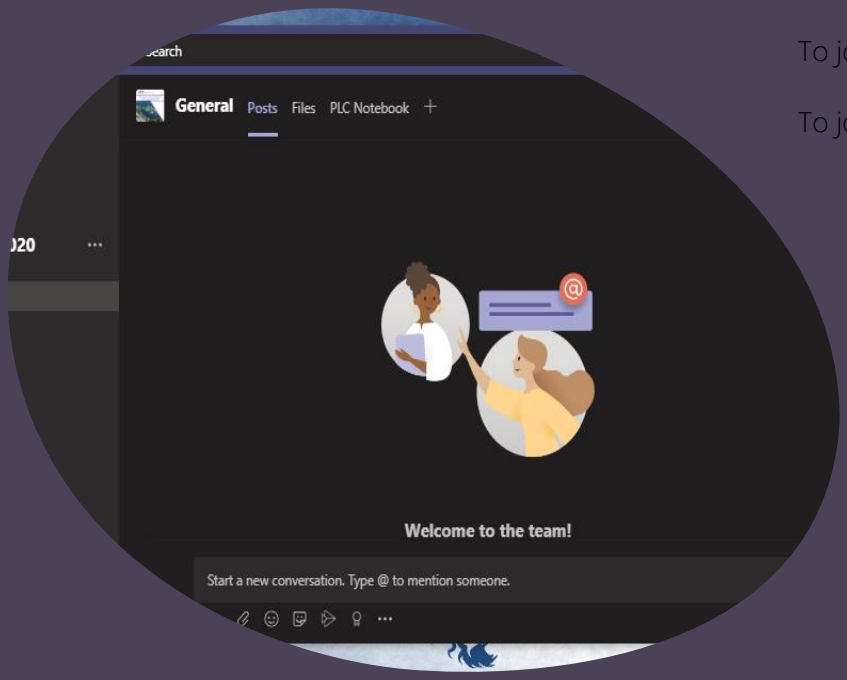
13 Years of Continuous Annual IET Forms and Symposiums at UoB



# ACCESSING
# 6TH SCS-2020 - HALLS
# 06-08 DECEMBER 2022



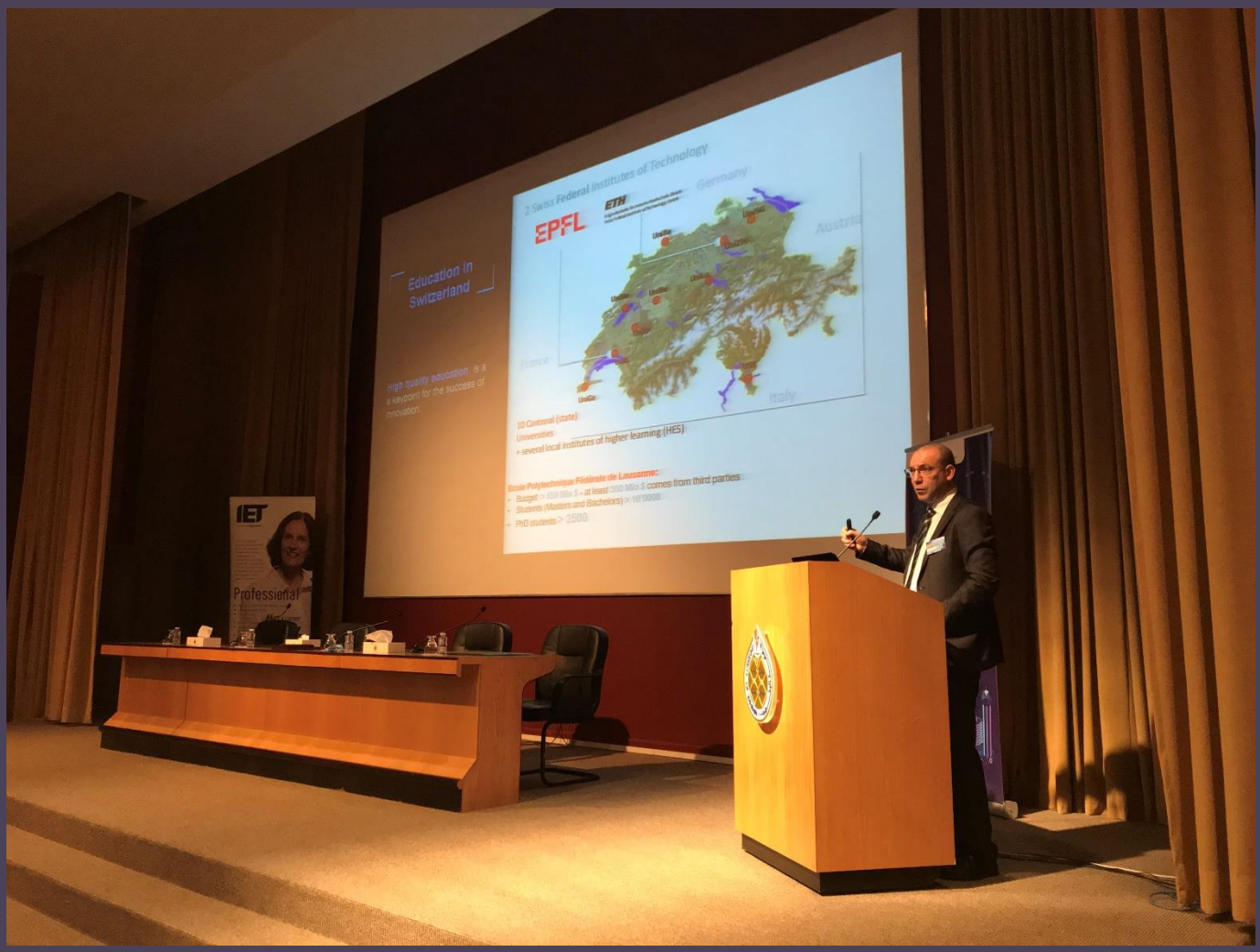

Sessions Access:

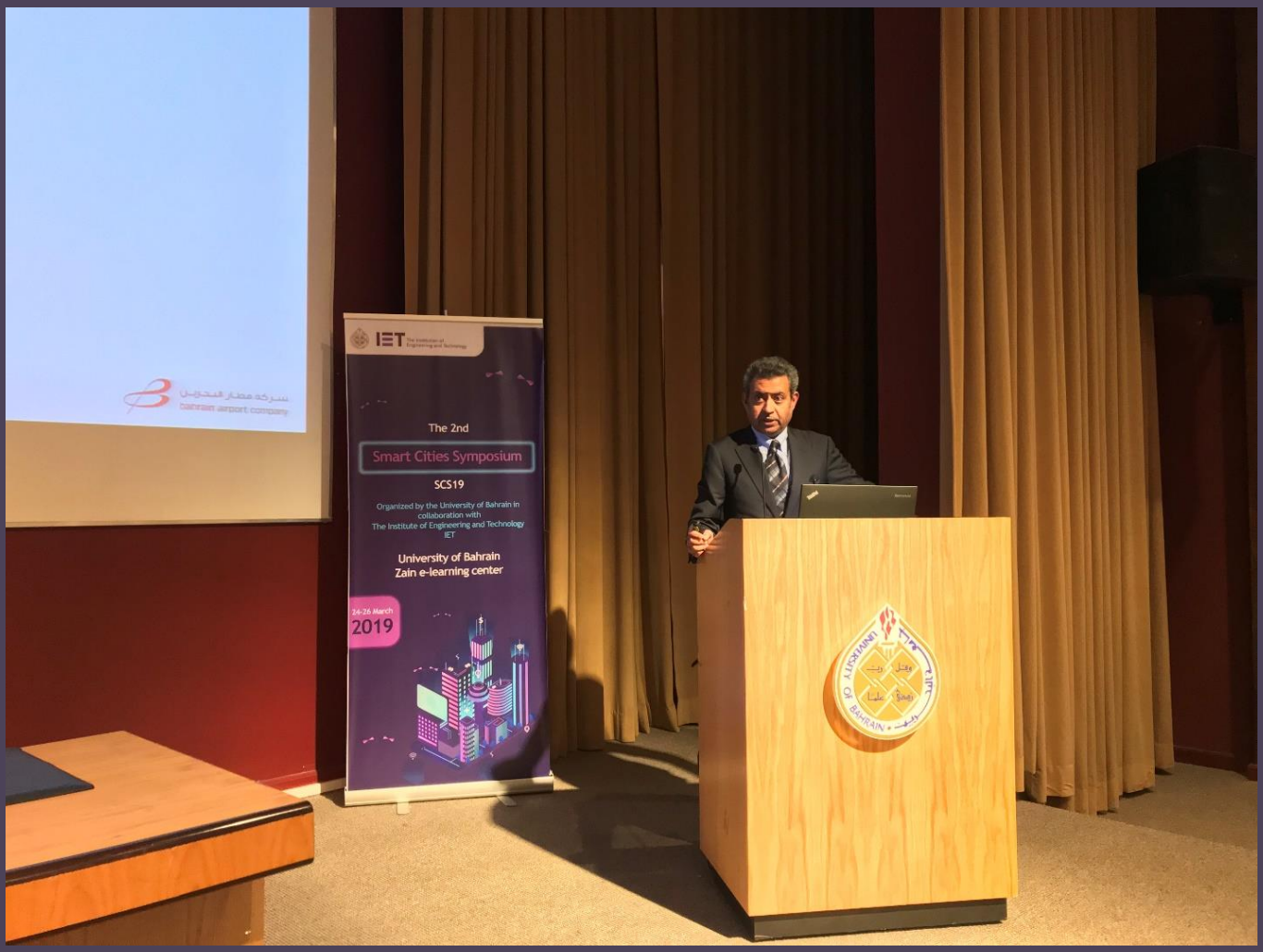
To join sessions in Main-Hall

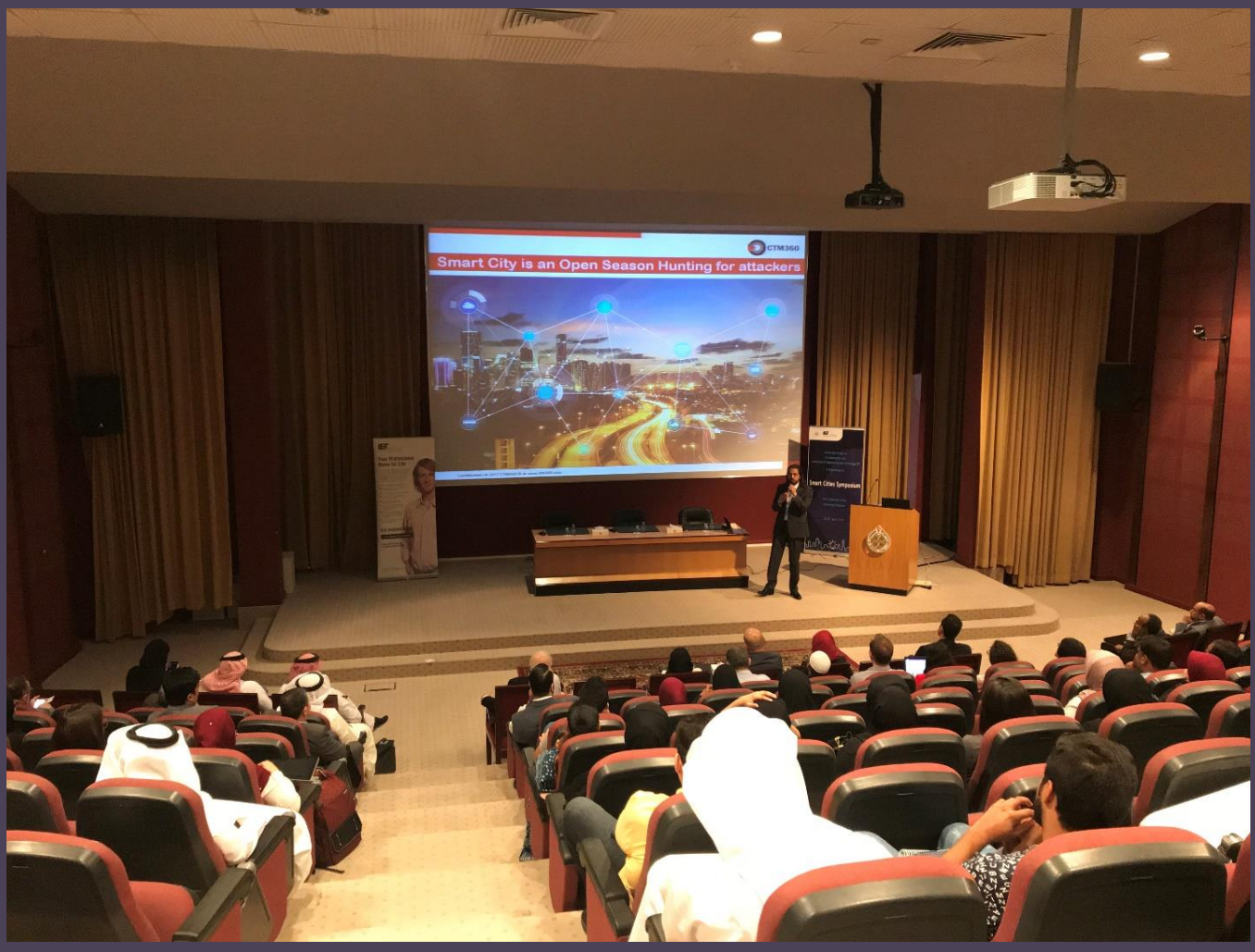
To join sessions in Room-01

To join sessions in Room-02

To join sessions in Room-03




IET
The 2nd
Smart Cities Symposium
SCS19
Organized by the University of Bahrain in collaboration with
The Institute of Engineering and Technology
IET
University of Bahrain
Zain e-learning center
24-26 March
2019


CTM360
Smart City is an Open Season Hunting for attackers

# Detailed Technical Program and Parallel Sessions

# Day -I

Tuesday, December 06, 2022

Tuesday, December 6th, 8:30 - 9:00 (Asia/Bahrain)

D1: Day1 - Getting Ready, Registration and Platform Technical Setting - Help (if Any)

# DAY -I

Tuesday, 6th December 2022 9:05 - 9:10 (Asia/Bahrain)

OC1: Opening Ceremony: Welcoming to the 6th SMART CITIES SYMPOSIUM

6th SMART CITIES SYMPOSIUM - the Committee

Main-Theatre Hall

Opening Ceremony Speech: Welcoming to the 6th SMART CITIES SYMPOSIUM

## Opening Speech

# Towards Smart Cities and Digital Twin Cities: A Novel Paradigm

by

Her Excellency Dr. Jawaher Shaheen AlMudhahkah
University of Bahrain President

Main-Theatre Hall

December 6th - 2022, 09:00+03 - 09:10+03

University of Bahrain - Sukhair - Kingdom of Bahrain

# DAY -I

Tuesday, 6th December 2022 9:10 - 9:15 (Asia/Bahrain)

OC1: Opening Ceremony: Welcoming to the 6th SMART CITIES SYMPOSIUM

Main-Theatre Hall

Opening Ceremony Welcome Speech: Welcoming to the 6th SMART CITIES SYMPOSIUM

Welcome Speech

## University of Bahrain Smart Cities Event

Welcome Speech by
Dr. Sheikha Haifa Bint Ebrahim Alkhalifa
College of Engineering Dean

Main-Theatre Hall

6th December 2022, 09:10+03 - 09:15+03

University of Bahrain - Sukhair - Kingdom of Bahrain

Tuesday, 6th December 2022 9:15 - 9:20 (Asia/Bahrain)

CP: IET Smart cities Symposiums, Projection from the Past, and the Future: Thanks, and Appreciations.

6th SMART CITIES SYMPOSIUM - the Committee

Thanks, and Appreciation
Main-Theatre Hall

# DAY -I

Keynote Speech: 01: Tuesday, 6th December 2022, 09:20+03 - 09:50+03 (Asia/Bahrain)

## Satellite Imagery and Big Data for Smart Cities

Keynote Speaker
Dr. Michael Kio
FIET, Fellow of the Institution of Engineering and Technology
James Clarke School of Engineering
University of Maryland College Park, USA
Session Chair: Prof. Dinesh Hurreeram, MIET, Director General, University Technology, Mauritius
Main-Theatre Hall

Talk Abstract: Satellite technology provides images for every location on planet earth with onboard computers processing large amounts of data, producing insightful information and analysis. This is an application of big data, going above and beyond not only reading images obtained from space but also improving lives here on earth. Satellites implementing artificial intelligence (AI) are beginning to be utilized for real time images and analysis on how smart cities are transforming. One example is real time changes of when green areas are converted to build areas. By training computers on what to spot in images processed or produced by satellites, machine learning algorithms are implemented on large and expanding data sources which reveals how city development aligns with zoning and planning of communities exposed to flooding and climate change. From this big data, the machine learning algorithms predicts the temporal and spatial distribution of land use and land cover which are analysed and utilized for the management of smart cities.

Dr Michael Kio a fellow of the institution of engineering and technology IET has his PhD in Aerospace Engineering from Cranfield University in the United Kingdom and was a chief engineer in a national space agency and a consultant in satellite and communication technology, energy systems and project management. Dr Kio worked as a postdoctoral associate in the University of Maryland College Park and is currently an assistant research professor in the faculty of engineering University of Maryland. Dr Kio is a project management professional (PMP) in the United States of America and a senior member of the American Institute of Aeronautics and Astronautics (AIAA), where he chaired several technical sessions and reviewed manuscripts in the institution' s journals and conference proceedings.

# DAY -I

Keynote Speech: 02: 6th Tuesday, December 2022, 9:50 - 10:30 (Asia/Bahrain)

# Microgrids Digital Twins Towards Biomimetics

Professor Josep M. Guerrero
Professor Villum Investigator | AAU Energy
The Villum Center for Research on Microgrids (AAU CROM)
Aalborg University | Pontoppidanstraede, Aalborg Ø
Denmark

Session Chair: Dr. Suresh Vishwakarma, MIET, Chairman, Chartered Engineers Pacific, Vancouver, Canada

Main-Theatre Hall

Talk Abstract: This talk will begin by introducing the control of microgrids, the parallelisms with the human brain and the research for possible sources of inspiration in last frontiers of Neuroscience. The talk will present Digital Twin concepts, Cybersecurity and Smart Homes. Then, control in electric power systems of satellites and space platforms will be presented, showing approaches that are extended from terrestrial microgrids and explaining the differences and challenges when it comes to apply them out in the space. Further, multi-microgrid systems will be discussed for moon craters in future lunar manmade bases. Finally, the extension from the hierarchical control of microgrids to bioastronautics in the control of closed ecological systems to support with oxygen, water, and food to the astronauts and creating thus creating new ecosystems for the moon and future mars bases.

About Professor Josep M. Guerrero

Josep M. Guerrero (S' 01-M' 04-SM' 08-FM' 15) received the B.Sc. degree in telecommunications engineering, the M.Sc. degree in electronics engineering, and the Ph.D. degree in power electronics from the Technical University of Catalonia, Barcelona, in 1997, 2000 and 2003, respectively. Nowadays he is working towards the M.Sc. Degree in Psychobiology and Cognitive Neuroscience at the Autonomous University of Barcelona. Since 2011, he has been a Full Professor with AAU Energy, Aalborg University, Denmark, where he is responsible for the Microgrid Research Program. From 2019, he became a Villum Investigator by The Villum Fonden, which supports the Center for Research on Microgrids (CROM) at Aalborg University, being Prof. Guerrero the founder and Director of the same center (www.crom.et.aau.dk). His research interests is oriented to different microgrid frameworks in applications like microgrid clusters, IoT-based and digital twin, maritime microgrids for electrical ships, vessels, ferries and seaports, and space microgrids applied to nanosatellites and closed ecological systems. Prof. Guerrero is an Associate Editor for a number of IEEE TRANSACTIONS. He has published more than 800 journal papers in the fields of microgrids and renewable energy systems, which are cited more than 80,000 times. During eight consecutive years, from 2014 to 202022, he was awarded by Clarivate Analytics (former Thomson Reuters) as Highly Cited Researcher with 55 highly cited papers. In 202022, he received the IEEE Bimal Bose Award for Industrial Electronics Applications in Energy Systems, for his pioneering contributions to renewable energy based microgrids. In 2022, he received the IEEE PES Douglas M. Staszesky Distribution Automation Award, for contributions to making the hierarchical control of microgrid systems a practical reality.

# DAY -I

Keynote Speech: 03: 6th Tuesday , December 2022, 10:30 - 11:00 (Asia/Bahrain)

## Application of Artificial Intelligence and Machine Learning Methods for Smart Cities

Keynote Speaker
Dr. Mrinal R. Bachute
Industry Liaison Officer
Associate Professor, Department of Electronics & Telecommunication Engineering
Symbiosis Institute of Technology
Pune-41202215. Maharshtra
India

Main-Theatre Hall

Session Chairing
Session Chair: Dr Ruchi Tyagi, Birmingham City University-RAK Campus, UAE.

Talk Abstract:

Growth of urbanization presents new challenges. Smart Cities are part of the solution to the growing challenges of urbanization. AI can efficiently sift through large quantities of Big Data to generate data predictions and cost-effective solutions to fuel Smart City technologies. The way this works depends on whether the AI is supervised or unsupervised. In supervised learning, datasets and target values are created to train AI networks to find specific solutions in the collected raw data. The AI will then carry out programmed tasks and actions, whilst exploring new opportunities and possibilities that may provide better outcomes than current solutions. In unsupervised learning, non-labelled and non-classified datasets are used to train and ask questions of AI networks, which will then find latent characteristics and hidden patterns in the data, AI plays a crucial role in developing smart transportation system, sensors and cameras can be used to save lives and lower crime. Traffic lights and congestion data can be used by emergency services to get to their destinations quicker and more safely. Building automation systems say for example store owners and retailers can use sensors to track the peak times that individuals enter and use the stores, as well as towards which areas the public gravitates. Through the use of AI, the data generated can help to produce consistent predictions and track daily, weekly and seasonal differences.

About Dr. Mrinal R Bachute:

Dr. Mrinal R Bachute, PhD (Electronics), ME (Digital Electronics) is an Associate Professor and Head of Industry Connect at Symbiosis Institute of Technology, Pune under Symbiosis International (Deemed University) Pune, India. She has more than 22 years of experience in teaching and research. She has guided many postgraduate and undergraduate students in their projects. She is currently guiding the doctoral research of 5 scholars. Dr. Mrinal's areas of specialization include Digital Image Processing, Machine Learning Artificial Intelligence, and Adaptive Signal Processing. She has received research funding from the University of Pune and All India Council for Technical Education's Quality Improvement Program grants. She has presented her work at many international workshops and conferences and chaired technical sessions also. Her research papers have been published in reputed journals and conference proceedings at the national and international levels. Dr. Mrinal Bachute has also delivered invited talks and expert sessions at many national and international platforms, including at IET-UK's seminar in Vancouver Canada, ZE Power Engineering, Vancouver Canada, and at IET local network in Trinidad and Tobago. She has been a paper reviewer for conferences and reputed journals including IEEE access, springer nature and Elsevier.

DAY -I: Tuesday, December 6 11:00 - 13:00 (Asia/Bahrain):

Parallel Session: SA01: Internet of Things and Smart Applications-PART-A

Hall Room-01: Session Joining: Room-01

Chair: Dr. Ramya G

11:00 IoT based Advanced Prediction Methodology for Fault Localization in Machine Monitoring
Jayalakshmi Saravanan, Ananth kumar Tamilarasan, Divya Pulikodi and R Partipan (IFET College of Engineering, India); Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India)

11:20 Lightweight Detection System for Low-Rate DDoS Attack on Software-Defined-IoT
Ayat Droos, Qasem Abu Al-Haija and Mohammad Alnabhan (Princess Sumaya University for Technology (PSUT), Jordan)

11:40 Intelligent Water Quality Monitoring and Domestic Usage Management System using the Internet of Things (IoT)
T Narmada (St Joseph Institute of Technology, India); Tv Padmavathy (Vellore Institute of Technology, India); Lilly Raamesh (St Joseph Institute of Technology, India); Ramya G (Vellore Institute of Technology, India)

12:00 Aumann Agreement Theorem Based Human Resource Performance Monitoring with IoT and 6G Technology
Perumalla Srinivasa Rao (CVR College of Engineering, India); Subhamanasini Nayak (Radhakrishna Institute of Technology and Engineering, India); Abhishek Gautam (Shaheed Bhagat Singh State University, India); Melanie Elizabeth Lourens (Durban University of Technology Durban, South Africa); Subrata Chowdhury (Sri Venkateswara College of Engineering and Technology, India)

12:20 An IoT Based Air Pollution Monitoring System for Smart City Applications
Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India); Renjith V Ravi (M E A Engineering College, India); Wen Cheng Lai (National Yunlin University of Science and Technology, Taiwan)

12:40 APIs in Internet of Things Communications Security Threats and Solutions
Shayma Ahmed Altayaran (Saudi Arabia); Taher Homeed (University of Bahrain, Bahrain); Wael M El-Medany (University of Bahrain, Bahrain)

DAY -I: Tuesday, December 6 11:00 - 13:00 (Asia/Bahrain):

Parallel Session: SA02: Artificial intelligence (AI) Tools

Hall Room-02: Session Joining: Room-02
Chair: Dr. Araddhana Deshmukh

11:00 Deep Learning and Internet of Things for Intelligent Reservation and Gate Control
Mohammed Majid M. Al-Khalidy (University of Bahrain & Engineering College, Bahrain); Ahmed Mohammed Al Khalidy (UoB, Bahrain)

11:20 A Proposed Model for Fingerprint Recognition based on Convolutional Neural Networks
Shahad Hazim Mahmood and Alaa Kadhim Farhan (University of Technology, Iraq); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt)

11:40 A Systematic Review of Homomorphic Encryption Applications in Internet of Things
Jaffar AbdulJalil Jaffar, (University of Bahrain, Bahrain); Wael M El-Medany (University of Bahrain, Bahrain)

12:00 Virtual Steering with Gesture Control using 3D Hand Modeling
Bhavana G (Chennai Institute of Technology, India); Surendran R (Saveetha Institute of Medical and Technical Sciences, India); Ramya P (Chennai Institute of Technology, India)

12:20 Neural Network-Based Distributed Denial of Service (DDoS) Attack Detection in Smart Home Networks
Ismeil Ahamed, Farhan Ahmad and Vasile Palade (Coventry University, United Kingdom (Great Britain)); Abdullahi Ahmed (Canterbury Christ Church University, United Kingdom (Great Britain))

12:40 Forecasting and modeling on average rainwater and vapor pressure in Chelyabinsk Russia using deep Learning models
Mostafa Abotaleb, Tatiana Makarovskikh and Hussein Alkattan (South Ural State University, Russia); Oluwaseun A Adelaja (Lagos State University, Nigeria)

DAY -I: Tuesday, December 6 11:00 - 13:00 (Asia/Bahrain)

Parallel Session: SA03: Smart Homes, Smart Hospitals, and Smart Campuses-PART-A

Hall Room-03: Session Joining: Room-03

Chair: Dr. Surendran R

11:00 Adaptive Edge-Based Bilinear Interpolation for Smart Healthcare
MVV Prasad Kantipudi (Symbiosis Institute of Technology, Symbiosis International Deemed University, India); Neetha Cholleti (Sreyas Institute, India)

11:20 Detecting Mental Depression Using NLP
Faizal Hajamohideen (College of Applied Sciences, Sohar, Oman); Bashair AlSaidi and Samah AlMamari (University of Technology and Applied Sciences, Oman)

11:40 Convolutional Neural Network (CNN) for Image Detection and Recognition in Medical Diagnosis
S Praveen Chakravarthy (CVR College of Engineering, India); C Gunasundari (Roever Engineering College, India); K S Bhuvaneswari (University College of Engineering, India); Bhisham Sharma (Chitkara University, India); Subrata Chowdhury (Sri Venkateswara College of Engineering and Technology, India)

12:00 Analysis and Comparison of the Intelligent Systems for the Early Prediction of Heart Disease
Mahesh T r (JAIN University, India)

12:20 A survey on Supervised and Unsupervised NLP algorithms for Mental Health detection applications
Faizal Hajamohideen (College of Applied Sciences, Sohar, Oman); Bashair AlSaidi and Samah AlMamari (University of Technology and Applied Sciences, Oman)

12:40 Clustering of Modified Gaussian UAVs Swarm using Machine Learning Approach
Hisham Khalil (The University of Lahore, Pakistan)

Tuesday, December 6 13:00 - 13:30 (Asia/Bahrain)

ZB1: Day-1 - Mid-Day Break

DAY -I: Tuesday, December 6 13:30 - 15:30 (Asia/Bahrain):

Parallel Session: SB01: Smart Homes, Smart Hospitals, and Smart Campuses-PART-B

Hall Room-01: Session Joining: Room-01

Chair: Dr. Reem Sultan

13:30 Deep Learning-Driven Intrusion Detection Systems for Smart Cities-A Systematic Study
Ramya Chinnasamy (Anna University & Kongu Engineering College, India); Malliga. S Malliga (Kongu Engineering College, India); Nandita Sengupta (University College of Bahrain, Bahrain)

13:50 Simulation and Implementation of a MPPT Charge Controller
Maamar Taleb (UOB, Bahrain); Mishal Qambar, Yaseen Abdalli and Hussain AbdulJalil (University of Bahrain, Bahrain)

14:10 Developing a star ranking tool for evaluating children's inclusion in kindergarten classrooms
May Walid Lafi and Reem Sultan (University of Bahrain, Bahrain)

14:30 Impact of Share Market based on Global Happening and future prediction
Tamoghna Mukherjee and Anirban Mitra (Amity University Kolkata, India); Subir Gupta (Dr B C Roy Engineering College, India)

14:50 Review on HR Digitalisation and Artificial Intelligence Contributing to Smart Cities
Anurag Sharma (Industry Fellow, India); Ruchi Tyagi (Dr Ruchi Tyagi, Birmingham City University-RAK Campus, UAE.); Ashutosh Verma (GNA Business School, India); Suresh Vishwakarma (BC Hydro, Canada)

15:10 Phonocardiography (PCG)-Based Early Detection of Heart Anomalies Using Deep Learning
Abbas Hasan and Zouhir Bahri (University of Bahrain, Bahrain)

DAY -I: Tuesday, December 6 13:30 - 15:30 (Asia/Bahrain):

Parallel Session: SB02: Cyber Security Solutions

Hall Room-02: Session Joining: Room-02
Chair: Dr. Ujwala Kshirsagar (Belorkar)

13:30 Blockchain for IoT-Based Healthcare applications: A Review on Security Issues and Challenges
Azhar Alsunbul (University of Bahrain, Bahrain); Wael M El-Medany (University of Bahrain, Bahrain)

13:50 Prevention of Phishing Website Attacks in Online Banking Systems Using Visual Cryptography
Mohammad K. Abu Snober (Princess Sumaya University for Technology, Jordan); Ayat Droos and Qasem Abu Al-Haija (Princess Sumaya University for Technology (PSUT), Jordan)

14:10 RFD based technique on QoS parameters using cloud computing
Nihar Ranjan Nayak (Presidency University Bangalore, India); Srinivas Mishra (Presidency University, India); Subrata Chowdhury (Sri Venkateswara College of Engineering and Technology, India)

14:30 A new type of audio steganography with increased privacy using different ratios of LSB embedding
Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India); Abdul Rehman Javed (Air University, Pakistan); Kassian Amesho (Regent Business School, South Africa); Abhimanyu Bhowmick, Rahul P and Madhushree Sannigrahi (Amity University Kolkata, India); Vimal Shanmuganathan (Ramco Institute of Technology, India); Saubhik Bandopadhyay (Amity University Kolkata, India)

14:50 Secure Authentication Framework based on One-time Password for Internet of Things
Abdullah Hakami (Saudi Arabia); Wael M El-Medany (University of Bahrain, Bahrain)

DAY -I: Tuesday, December 6 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SB03: Smart Transportation System

Hall Room-03: Session Joining: Room-03
Chair: Dr. Md Shah Alam

13:30 Enhancement of the Smart City concept through a low-cost-on-the-Road-Unit for traffic management
Christos Spandonidis (Prisma Electronics, Greece); Fotios Giannopoulos (Prisma Electronics S.A., Greece); Elias Sedikos (Prisma Electronics UK, United Kingdom (Great Britain)); Dimitris Reppas and Kostas Sakatis (Prisma Electronics S.A., Greece); Panagiotis Theodoropoulos (University of Patra, Greece)

13:50 ARISTOTLE: AddRessIng falSe daTa injectiOn atTacks in vehicLE platoons
Sean J Taylor (Coventry University & Systems Security Group, Centre for Future Transport and Cities, Coventry University, United Kingdom (Great Britain)); Farhan Ahmad, Hoang Nga Nguyen and Siraj Shaikh (Coventry University, United Kingdom (Great Britain)); David Evans (ASRG, United Kingdom (Great Britain)); Charles Wartnaby (IDIADA Automotive Technology UK, United Kingdom (Great Britain))

14:10 Drivers, the missed attack surface of connected vehicles
Asma Adnane (Loughborough University, United Kingdom (Great Britain)); James Hardy (University of Derby, United Kingdom (Great Britain)); Farhan Ahmad (Coventry University, United Kingdom (Great Britain)); Andrew Morris and Ashleigh Filtness (Loughborough University, United Kingdom (Great Britain))

14:30 Image Processing and Pattern Recognition-Based Car Classification for Intelligent Transportation System
Varsha Dange and Sayali Pophale (Vishwakarma Institute of Technology, India); Nitin Raut and Finney Daniel Shadrach (KPR Institute of Engineering and Technology, India); Ramya G (Vellore Institute of Technology, India)

14:50 Traffic Signs Recognition and Vehicle Identification Using Python
P Nithya (PSG College of Arts and Science, India); A Anandkumar (Jai Shriram Engineering College, India)

15:10 Properties and Effect of Fly Ash in Concrete
A. B. M. Saiful Islam (Imam Abdulrahman Bin Faisal University, Saudi Arabia); Md. Arifuzzaman (King Faisal University, Saudi Arabia); Md Shah Alam (University of Bahrain, Bahrain); Md Kamrul Islam and Muhammad Rahman (King Faisal University, Saudi Arabia)

Tuesday, December 6 15:25 - 15:30 (Asia/Bahrain)

CD-1: Closing of Day-1

# Day -II

Wednesday, December 07, 2022

# DAY -II

7th Wednesday, December 2022, 8:30 - 9:00 (Asia/Bahrain)

D2: Day2 - Getting Ready, and Virtual Platform Technical Setting - Help (if Any)

Keynote Speech: 04: 7th Wednesday, December 2022, 9:00 - 9:30 (Asia/Bahrain)

## Smart Cities Technologies from Theory to Practice

Keynote Speaker
Professor A. R. Al-Ali
Computer Science and Engineering Department, College of Engineering
American University of Sharjah
UAE

Main-Theatre Hall
Session Chairing
Session Chair: Dr. Rahul P Bachute, Pune University and Ajeenkya D Y Patil School of Engineering, India

Talk Abstract: Governments and City Councils nowadays are deploying smart applications ranging from health, education, transportation, energy, buildings and to factories. Citizens engage with smart-city ecosystems in a variety of ways using their smartphone, mobile devices, laptops, desktops, fog and cloud-computing platforms. Smart-city applications are built and developed using enabling technologies starting from the physical layers and to the cloud layer. The conceptual model of a smart city consists of edge sensing computing devices layer, communications and fog computing layer, data analytics and cloud computing platforms layer, applications layer and a cyber-security layer that overlap with all layers to provide security and privacy. This talk will discuss the computing layers and software platforms that enable the smart cities authorities and its citizens to communicate to exchange, process, analysis and visualize data. Also, the talk will present some applications that show how smart cities save governments, businesses and citizens money as well as to make better decisions that improve quality of life.

A. R. Al-Ali (SM IEEE) received his Ph.D. in electrical engineering and a minor in computer science from Vanderbilt University, Nashville, TN, USA. Professor Al-Ali worked as an associate/assistant professor in KFUPM, Saudi Arabia (1991-2000), and has been a Professor of Computer Science and Engineering at the American University of Sharjah (UAE) since 2000. His research and teaching interests include embedded systems hardware and software architectures, smart homes automation, smart grid evolution and development, smart factories and cities. Professor Al-Ali has many conference and journal publications including two USA and European Patents. He has also been invited to deliver keynote speeches on the recent evolution and development on the Internet of Things, Cyber-Physical Systems, smart grid and smart cities at several local and international conferences. He organized and co/chaired several international conferences.

# DAY -II

Keynote Speech: 05: 7th Wednesday, December 2022, 9:30 - 10:00 (Asia/Bahrain)

# A System of Systems Integration Approach to Make Smart Cities! Smart

Keynote Speaker

Dr. Nesrine Miro Padovani
UpGradelle Cs Training and Consulting WLL - co-founder & CEO of UpGradelle Training & Consulting, France

Main-Theatre Hall
Session Chair: Dr. Bader Almannai, University of Bahrain, Bahrain

Talk Abstract: The global population is expected to grow by 70% in 2050 and it' s undoubtedly sure that these people will live in cities. Looking at what the future may look like, in 30 years from now we will have built as many cities as in all of human history. The future of humanity is inevitably urban, and digitization stands as an essential, unstoppable revolution to ensure future-proof cities focused on people and the environment. Until recently, city leaders thought of smart technologies primarily as tools for becoming more efficient behind the scenes. After a decade of trial and error, they are starting to realize that smart-city strategies do start with people, not technology. "Smartness" is not just about installing digital interfaces in traditional infrastructure or streamlining city operations. It is also about using technology and data purposefully to make better decisions and deliver a better quality of life. Smart cities put data and digital technology to work to make better decisions and improve the quality of life. More comprehensive, real-time data gives authorities and dedicated agencies the ability to watch events as they unfold, understand how demand patterns are changing, and respond with faster and lower-cost solutions. For smart cities to be effective, they must be able to collect, analyze, and act from disparate data resources. That' s when an integrated system-of-systems approach can be used as a solution to leverage information from various data sources, anticipate and resolve problems even before they are presented, coordinate various resources and processes to operate seamlessly, and generally make more strategic decisions. This approach is a great way of providing a centralized infrastructure where heterogenous data can be managed and shared at all levels to make smart cities really smart. At the crossroads of tech and cities, there' s an opportunity for a more sustainable and inclusive world which can only be achieved through an overall consideration of the different dimensions and components that can be interfaced together to form the cities of the future "smart cities".

About Dr. Nesrine Miro Padovani: Dr. Nesrine Miro Padovani is a serial entrepreneur and Tech investor, she' s the co-founder and CEO of the french based e-learning startup "THE ASIDE PROJECT" and Bahrain-based training and consulting firm "UpGradelle Cs". Dr. Nesrine holds a PhD in systems engineering and complex systems design from the "ENSAM: Ecole Normale Superieure des Arts & Métiers" ParisTech in France and she has been lecturing and researching digital transformations and industry 4.0 solutions for more than 10 years within Europe key accounts players and the European Commission for sustainable projects and future urbanization. She has worked as a project director in the E-mobility sector within leading automotive makers such as Renault Nissan Group, Stellantis Group (ex-PSA Peugeot Citroen), and as a top-tier strategy and management consultant and digital transformations expert for Europe leading companies such as Paris Airport Group, Airbus, Safran Aeronautics, Saint Gobin, EDF, Framatome, etc. Dr. Nesrine has been involved in digital transformations, E-Mobility, and the future of urbanization projects since 2011, and her work is illustrated by her +11 international patents, academic publications, and her keynote speech at world-leading industrial conferences (CTI Symposium, SAE E-Mobility, PLM International conference, COP2022 Paris, etc.). She' s a member of the AWS solutions architect community, Bitcoin Blockchain architect public community, IEEE and INCOSE fellow, and women in tech advocate and business leader. Dr. Nesrine believes in the power of advanced technologies in bringing more sustainability and inclusiveness to our life, she' s a consulting professor for M2 students at ENSAM ParisTech and an experienced online educator.

7th Wednesday, December 2022 10:00 - 10:10 (Asia/Bahrain)

SB-2: Short Break-2

# DAY -II

Keynote Speech: 06: 7th Wednesday, December 2022, 10:10 - 10:40 (Asia/Bahrain)

## Digitization and Artificial Intelligence Contributing to Smart Cities

Assoc. Prof. Dr. Ruchi Tyagi
Dr Ruchi Tyagi, Senior Faculty, Birmingham City University-RAK Campus
UAE
Main-Theatre Hall

Session Chair: Dr. Tagore Ramlal, MIET, Assistant Professor and Chairman, IET Trinidad and Tobago, University of Trinidad and Tobago

Talk Abstract: Many technologies and solutions have contributed to the foundation and development of vibrant cities. Artificial intelligence (AI) is now emerging as an essential part of how smart cities work. Let us have a look at AI investments: (i) By 202022, 30% of city government service interactions would be fulfilled and/or completed, at least in part, through an AI-powered conversational channel. (ii) 66% of 167 cities inquired for study by ESI thought Lab is investing heavily in AI, and 80% will do so over the next three years. North American cities (83%) and small cities (74%) lead in the use of AI. The percentage of cities making large investments will increase the most for Digital Twins, rising from 11% in 202022 to 31% in three years' time—an increase of almost 300%. (iii) Digital platforms as ' city brains' : where all urban activity is orchestrated and operated, providing a holistic view of the city, allowing for events correlation, fast and assertive 'root cause analysis, predictive analysis (through machine learning) and incident management, and providing operational insights through visualization. (iv) Digital Twin: A Digital Twin can be used to provide support for day-to-day operations, simulate a natural disaster and its potential impact on the city, or evaluate the flow of breezes that cool the city and the trees to ensure shade in streets and parks. With the evolution of new technologies with higher processing capabilities (namely, fast problems root-cause analysis identification). Digital Twins will become increasingly powerful in enabling data-driven decisions. They will have a high adoption rate among city governments, promising to turn cities more resilient. ABI Research has predicted that by 2025 the number of Digital Twins will exceed 500.

About Dr. Ruchi Tyagi: Dr. Ruchi Tyagi has done a post-doctorate on the project, "Low-cost Conservation Measures for Energy Conservation in the residential sector of Trinidad and Tobago", collaborated by the Ministry of Planning and Development, St Augustine, Trinidad and Tobago, West Indies. Dr Tyagi is an Adjunct Professor (Honorary) to the Utilities Engineering Department of the University of Trinidad and Tobago (202022) for her professional expertise. In addition, she was an invited speaker at a seminar of IET-UK in Vancouver, Canada; Dept of Ethics, Moscow State University, Nizhny Novgorod Institute of Management and Business, Leningrad State University, Vladimir University, Russian Federation. Dr Ruchi Tyagi, Senior Faculty, Birmingham City University-RAK Campus, UAE.

Wednesday, 7th December 2022, 11:00 - 11:20 (Asia/Bahrain)

CB3: Short Break-3

DAY -II: Wednesday, December 7 11:20 - 13:00 (Asia/Bahrain)

Parallel Session: SC02: Smart Algorithms and Applications-A

Hall Room-01: Session Joining: Room-01

Chair: Dr. Faizal Hajamohideen

11:20 Marine debris Detection System: An approach to eliminate the Toxicological Threats of Plastic using AI and Deep Neural Network
Faizal Hajamohideen (College of Applied Sciences, Sohar, Oman); Manar Khamis Alsaadi (UTAS-Suhar, India); Sara Salim Alshibli (UTAS-Suhar, Oman)

11:40 Survey on Human Activity Recognition by Deep Learning and Machine Learning
S Sunitha (Koneru Lakshmaiah Education Institute, India); Vithya Ganesan (Koneru Lakshmiah Education Foundation, India)

12:00 Proposing a Framework for Consumers' Decision on Solar Innovations
Yunis Ali Ahmed (SIMAD University, Somalia); Ammar Rashid and Umar Adeel (Ajman University, United Arab Emirates); Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India)

12:20 Attention-based mechanism for Arabic text Classification
Ghassan Khazal Ali (Tomsk State University, Iraq); Mostafa Abotaleb and Tatiana Makarovskikh (South Ural State University, Russia); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt); Ammar Kadi and Hussein Alkattan (South Ural State University, Russia)

12:40 Food Traceability in Supply Chain Management with Application of Machine Learning and Blockchain
S B Goyal (City University & Director, Faculty of Information Technology, City University, Malaysia); Chen Chuqiao (City College of Huizhou, China & City University, Malaysia); P Senthil (Kurinji college of Arts and Science, India)

13:00 An Advanced Composting Processing Technology using IoT and Deep Learning: An impeccable solution for Municipality and Fertilizer companies
Faizal Hajamohideen (College of Applied Sciences, Sohar, Oman)

DAY -II: Wednesday, December 7 11:20 - 13:00 (Asia/Bahrain)

Parallel Session: SC03: New Technologies for Smart Cities-PART-A

Hall Room-02: Session Joining: Room-02

Chair: Dr. Raja Mohamed M Sumsudeen

11:20 Field Programmable Gate Array based low power multipurpose display board using 3 Dimensional LED Cube
Emmanuel Mberi and Munyaradzi Charles Rushambwa (Harare Institute of Technology, Zimbabwe); Tinashe Chamunorwa (Trasnlvania University of Brasov, Romania); Rajkumar Palaniappan (University of Technology Bahrain, Bahrain); Govinda Raj (Vivekanda College of Engineering and Technology, India); Calvin Mugauri (Harare Institute of Technology, Zimbabwe)

11:36 Intelligent Cloud-based Prediction Model for Smart Agriculture
Abhinav Chandu Ch. (KPMG Gobal Services, India); M. d. n Akash (Searce Inc, India); MVV Prasad Kantipudi (Symbiosis Institute of Technology, Symbiosis International Deemed University, India); Rajanikanth Aluvalu (Chaitanya Bharathi Institute of Technology, India & Noble International University, USA)

11:53 Optimally spaced helical antenna fabrication with high directive gain for High speed Communication
A Anand (St Martin Engineering College, India); Mohan Prakash (Karpagam College of Engineering (Autonomous), India); K Vijayakumar (St Joseph Institute of Technology, India); Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India)

12:10 Advances in Diagnostic Medicine through developments in genomic, genetic and molecular biology
Deepmala Verma (SS Jain Subodh Autonomous College, India); Rashid D Alshammari (Sulaiman Al-Rajhi University, Saudi Arabia); Manish Kumar (Narain College, India); Farida Habib Khan (University of Hail, Saudi Arabia); Pradeep Mishra (Jawaharlal Nehru Krishi Vishwavidyalaya, India); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt)

12:26 MODERN TRENDS IN QUALITY OF RAILWAY ENGINEERING TO BENEFIT FUTURE SMART CITIES
Suresh Vishwakarma (BC Hydro, Canada)

12:43 Novel Approach for Reservoir Sedimentation Analysis of Khadakwasla Dam Catchment, Maharashtra, India - A Field Data Base Model
Shambhau Ban (G H Raisoni College of Engineering, India); Rahul Bachute (Pune University, India); Akshay N Surade (Walchand Institute of Technology, India)

Wednesday, December 7 13:00 - 13:30 (Asia/Bahrain)

ZB2: Day-2 - Mid-Day Break

DAY -II: Wednesday, December 7 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SD01: New Technologies for Smart Cities-PART-B

Hall Room-01: Session Joining: Room-01

Chair: Dr. Dalia Eldardiry

13:30 The smart vertical farm inside houses is vital for future food security in the kingdom of Bahrain
Islam Hamdi El Ghonaimy (University of Bahrain & Associate prof, Bahrain); Dalia Eldardiry (Imam Abdulrahman Bin Faisal University, Saudi Arabia); Walaa Husain (Bahrain)

13:54 Effective Comparison of Meta-heuristics Algorithm in Cloud Computing
Nihar Ranjan Nayak (Presidency University Bangalore, India); Subrata Chowdhury (Sri Venkateswara College of Engineering and Technology, India); Srinivas Mishra (Presidency University, India)

14:18 Smart Lysimeter - Plant Monitoring System with Artificial Lighting
Sujatha Rajkumar, Apoorv Singh, Ayush Ranjan and Pratyay Halder (Vellore Institute of Technology, India)

14:42 Challenges in Metaverse in problem-based learning as a game-changing virtual-physical environment for personalized content development
Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India); Manoswita Bose and Akash Sinha (Amity University Kolkata, India); Samrat Ray (Peter the Great St Petersburg University, Russia); Sudipta Roy (Jio Institute, India); Kolla Bhanu Prakash (Vaddeswaram & Koneru Lakshmaiah Education Foundation, India); Ramakant Bhardwaj (Amity University Kolkata, India)

15:06 Indian Sign Language Detection using Tensor Flow and Deep Learning
Hussain Sabunwala (Symbiosis Institute of Technology, India); Mrinal Bachute (India)

DAY -II: Wednesday, December 7 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SD03: Smart Energy Systems - Technology Solutions

Hall Room-02: Session Joining: Room-02

Chair: Dr. Norrideen Mansour

13:30 A Strategy for Solar Photovoltaic Power Converter Control to Improve Power System Transient Stability
Raja Mohamed M Sumsudeen (University of Bahrain, Bahrain); Mohammed AlAqil (King Faisal University, Saudi Arabia)

13:50 Solar Powered SMURT (Sustainably Managed Urban Real-Time) Waste Bin for Intelligent Solid Waste Management System in Saudi Arabia
Raja Mohamed M Sumsudeen (University of Bahrain, Bahrain); Muhammad Rahman and Mohammed Alarfaj (King Faisal University, Saudi Arabia)

14:10 Performance of a Grid-Connected Solar PV System Using Class D Chopper
Maamar Taleb (UOB, Bahrain); Norrideen Mansour and Khaled Zehar (University of Bahrain, Bahrain)

14:30 Smart Charging Station For PHEVs
Mani T (Jai Shriram Engineering College, India & Tirupur, India); B Saritha (Jai Shriram Engineering College, India); M Kathirvelu (KPR Institute of Engineering and Technology, India); G Kalaiarasi (VSB Engineering College, Karur); Ramya G (Vellore Institute of Technology, India)

14:50 Classification of Benign and Malignant Breast Tumor Using Machine Learning and Feature Selection Algorithms
Abdul Fattah Salman, Zainab Hasan Ali Shehab and Mustafa Hammad (University of Bahrain, Bahrain)

15:10 Ant Colony Optimization for Optimal Placement of Capacitors
Nisha Dagade (SITS, India); Rahul Dagade (University of Pune, India); Nishant Godha (Senior Engineer, India)

DAY -II: Wednesday, December 7 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SD04: Smart City Architecture and its Applications

Hall Room-03: Session Joining: Room-03
Chair: Dr. Qasem Abu Al-Haija

13:30 Privacy and Sustainability in Contemporary Bahraini Houses: Developing the Indigenous Courtyard
May Walid Lafi and Fay Al khalifa (University of Bahrain, Bahrain)

13:50 Tor Network Traffic Classification Using Machine Learning Based on Time-Related Feature
Mustafa Ahmad Al-Fayoumi (Princess Sumaya University for Technology, Jordan); Ahmad Elayyan (FinCERT Unit Central Bank of Jordan, Jordan); Ammar J Odeh (Princess Sumaya University for Technology, Jordan); Qasem Abu Al-Haija (Princess Sumaya University for Technology (PSUT), Jordan)

14:10 Smart National Parks after COVID Pandemic suitability to special needs in the Kingdom of Bahrain
Islam Hamdi El Ghonaimy (University of Bahrain & Associate prof, Bahrain)

14:30 Smart Cities benchmarking methods
Maha Talbi (Universty Abdelmalek Essaadi, Morocco); Mehdi Lakhouil (University Abdelmalek Essaidi, Morocco); Amina El murabet and Anouar Abtoy (Abdelmalek Essaadi University, Morocco)

14:50 Provable Chaotically Authenticated Encrypted Biomedical Image Using OFDM Transmission
B M El-den (Delta University, Egypt); Abdelhameed Ibrahim (Mansoura University, Egypt); Abdelaziz Abdelhamid (College of Computing and Information Technology Shaqra University, Saudi Arabia); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt); Marwa M Eid (Delta University for Science and Technology, India)

15:10 Activity Based Working: Reinventing Smart way to Enhance Office Interiors
Anamika Jiwane and Fariel Khan, Department of architecture and Interior Design, University of Bahrain, Bahrain

Wednesday, December 7 15:30 - 15:35 (Asia/Bahrain)

CD-2: Closing of Day-2

# Day -III

Thursday, December 08, 2022

# DAY -III

Thursday, 8th December 08, 2022, 8:30 - 9:00 (Asia/Bahrain)

D3: Day3 - Getting Ready, and Platform Technical Help

Keynote Speech: 07: 8th Tuesday, December 2022, 9:00 - 9:45 (Asia/Bahrain)

# Application of 5G in Smart Cities

Keynote Speaker
Damini Rajiah
Telecommunication Professional
Telecommunication Service Providers
Mauritius

Main-Theatre Hall
Session Chair: Dr. Araddhana Deshmukh, Associate Professor & Head - AI and Data Science, India

Talk Abstract: Smart cities have a wide array of information to process, from city traffic to buildings' info. The smart functioning of these facilities requires greater bandwidth as well as real-time processing. Revolutionizing smart cities with most modern communication technologies anticipate high-quality connectivity for the increased number of Internet-of-things (IoT) objects, which tend to be small with low processing capability, of which the output drive immediate actions. 5G communication technology unlocks the potential of IoT and can be a driving force for smart cities by addressing and overcoming the issues of poor support for simultaneous connections, high power consumption, and high price per bit in the existing 4G technology. The telecom service providers worldwide have an instrumental role to play in deploying the main backbone for 5G technology in the existing as well as future smart cities across the globe. 5G technology has several features that can positively impact digital experiences and smart cities. Technologists worldwide are exploring the best possible use and advantages of the application of 5G communication technology in developing smart cities.

About Damini Rajiah

Damini Rajiah is a telecommunication professional. She has undergraduate and postgraduate degrees in Information and Communication Technology (with Distinction) from the University of Mauritius. She has been working with one of the major Telecom Service providers in Mauritius for more than 25 years. Her current role is Principal Officer (Information Systems). Damini has been involved in major data migration projects, management of information systems, and auditing in the telecommunication sector.

Thursday, December 8th 2022, 10:15 - 10:30 (Asia/Bahrain)

# DAY -III

Keynote Speech: 08: 8th Tuesday, December 2022, 9:45 - 10:45 (Asia/Bahrain)

KN8: Keynote Speaker-8
Special Session: 6th IET SMART CITIES SYMPOSIUM

## Enhancement of the Smart City concept through a low-cost-on-the-Road-Unit for Traffic Managemen

Keynote Speaker: Dr. Fotis Giannopoulos

Christos Spandonidis (Prisma Electronics, Greece); Fotios Giannopoulos (Prisma Electronics S.A., Greece); Elias Sedikos (Prisma Electronics UK, United Kingdom (Great Britain)); Dimitris Reppas and Kostas Sakatis (Prisma Electronics S.A., Greece); Panagiotis Theodoropoulos (University of Patra, Greece)

Main-Theatre Hall

Session Chair: Dr. Suresh Vishwakarma, MIET, Chairman, Chartered Engineers Pacific, Vancouver, Canada

Abstract

The advent of the 4th Industrial Revolution has completely changed the landscape of many scientific disciplines. An extension of the Industry 4.0 revolution concerns the Internet of Vehicles, integrating interconnected vehicles in a network exchanging information, rapidly enhancing efficient transportation and the passengers' and pedestrians' safety. In the context of the ODOS2020 project, a sensing networking architecture is presented to conduct vehicular detection based on MEMS magnetometers, as well as allowing predictive maintenance of the infrastructure, contributing to the increase of road safety. The integrated solution is intended to be of low cost and cover all types of vehicles. The focal point of the current work is on evaluating the prototype On-the-Road Unit laid on the road for detecting bypassing vehicles and measuring their speed and movement direction by employing low-cost magnetic sensor modules. The developed system is able to detect vehicle movement, alongside its direction and speed using a single device acquiring data from a number of low-cost sensors. The developed system has been evaluated in controlled and real environments.

About Dr. Fotis Giannopoulos: Dr. Fotis Giannopoulos received his diploma in Electrical and Computer Engineering from the National Technical University of Athens. He has a PhD degree in Signal Processing and Pattern Recognition from the National Technical University of Athens. He is experienced in designing, simulating and testing analog and digital circuits. He is also experienced in designing Internet of Things (IoT) applications and products. He is currently a member of the R&D department of Prisma Electronics.

DAY -III: Thursday, December 8 10:30 - 13:00 (Asia/Bahrain)

Parallel Session: SE02: Smart City Based on IoT

Hall Room-01: Session Joining: Room-01

Chair: Dr. Abhishek Gautam

10:30 A Comparative Analysis of Cloud based Services Platform
Karan Bajaj and Bhisham Sharma (Chitkara University, India); Raman Singh (University of the West of Scotland, United Kingdom (Great Britain)); Manik Guptaa (Chitkara University, India); Mukesh Kumar (Lovely Professional University, India); Subrata Chowdhury (Sri Venkateswara College of Engineering and Technology, India); Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India)

10:55 Survey on Internet of Things based prototype design for aquaculture using machine learning
Katragadda Niraja (BVRITH, India)

11:20 Utilizing the Output of Azure IoT Hub to Comprehend the Software Functionalities
Faisal Buzaid (University of Bahrain, Bahrain); Fawzi Abdulaziz Albalooshi (University of Bahrain & College of IT, Bahrain); Mohsen Rouached (University of Bahrain, Bahrain)

11:45 The prediction of students' Academic performances with a classification model built using data mining techniques
Hussein Alkattan, Mostafa Abotaleb and Ammar Kadi (South Ural State University, Russia); Oluwaseun A Adelaja (Lagos State University, Nigeria); Alhumaima Ali Subhi (University of Diyala, Iraq); Hassan K Ibrahim Al-Mahdawi (South Ural State University, Russia)

12:15 Privacy and security of IoT applications: A Review on limitations, and Measures to mitigate the security risks
Wael M El-Medany (University of Bahrain, Bahrain)

12:40 IoT Based Vehicle Blackbox for Enhanced Safety Standards
Ahmed A. Alsahlawi (University of Bahrain, Bahrain); Mohab A. Mangoud (University of Bahrain, Bahrain)

DAY -III: Thursday, December 8 10:30 - 13:00 (Asia/Bahrain)

Parallel Session: SE03: Smart Homes, Smart Hospitals, and Smart Campuses

Hall Room-02: Session Joining: Room-02

Chair: Dr. Islam Hamdi El Ghonaimy

10:30 Green Innovation for Sustainable Development
Suresh Vishwakarma (BC Hydro, Canada); Ruchi Tyagi (Dr Ruchi Tyagi, Birmingham City University-RAK Campus, UAE.); Amrita Chaurasia (Christ University, Ghaziabad, India)

10:50 Comparative influence of lateral loadings on multistoried structures in coastal region
A. B. M. Saiful Islam, Khalid Saqer Alotaibi, Walid A. Al-Kutti, Fahad Anwar, Rakan Alghamdi, Muhammad Nasir, Yousef Khalid Algatam, Ammar AlEid and Ali Alqahtani (Imam Abdulrahman Bin Faisal University, Saudi Arabia)

11:10 Smart Cities Measurement: How the Impact of Smartness on Improvement Quality of Life In Smart Cities Implementation? (Learning from Indonesia Smart City Index)
Hendra Firmansyah (Institut Teknologi Bandung, Indonesia); Suhono Harso Supangkat (Bandung Institute of Technology, Indonesia); Arry Arman (Institut Teknologi Bandung, Indonesia)

11:30 Design and Fabrication of a Motorized Screw Jack
Atif Saeed (SZABIST, Pakistan); Farhan Mumtaz (Shaheed Zulfikar Ali Bhutto Institute of Science & Technology, Pakistan); Muhammad Adeel Hussain (SZABIST, Pakistan)

11:50 Investigating the Implementation of Biophilic Design in Waiting Areas of Bahrain Hospitals
May Walid Lafi, Ayat AlBaitam, Hana Aljowder and Fatema A.Aziz Qaed (University of Bahrain, Bahrain)

12:10 Forecasting of Forest Fires using Machine Learning Techniques: A Comparative Study
Fuad Ahmad Musleh (University of Bahrain, Bahrain); Ranyah Taha (UOB, Bahrain)

DAY -III: Thursday, December 8 10:30 - 13:00 (Asia/Bahrain)

Parallel Session: SE04: Robotics and Intelligence

Hall Room-03: Session Joining: Room-03
Chair: Dr. Salwa Baserrah

10:30 Video Object Segmentation with Self-Supervised Framework for an Autonomous Vehicle
Ujwala Kshirsagar (Belorkar) (Symbiosis International University, Lavale Campus Pune., India & Symbiosis Institute of Technology, India); Amey Joshi, Hrishitaa Kurchania and Abhimanyu Patwa (Symbiosis Institute of Technology, Pune., India); Krishnaraja Sagar (Symbiosis Institute of Technology, Pune, India); Deepali R Vora (Symbiosis International Deemed University, Pune & Symbiosis Institute of Technology, India)

10:55 Continuous Compliance to Ensure Strong Cybersecurity Posture Within Digital Transformation in Smart Cities
Wael M El-Medany (University of Bahrain, Bahrain)

11:20 Deep Learning for Fire Detection Using Fire-Fighting Drone
Mohammed Majid M. Al-Khalidy (University of Bahrain & Engineering College, Bahrain)

11:45 ROS Integrated Agricultural Robot
Ujwala Kshirsagar (Belorkar) (Symbiosis International University, Lavale Campus Pune., India & Symbiosis Institute of Technology, India); Saijal Singhal, Vinay Patil, Yash Sakaria and Tejas Rathod (Symbiosis Institute of Technology, Pune., India)

12:10 Autoencoder and Machine Learning Method for Myocardial Infarction (MI) Detection Application
Halima Altorabi and Liqaa Nawaf (Cardiff Metropolitan University, United Kingdom (Great Britain))

12:25 Low-Key Shallow Learning Voice Spoofing Detection
Dalal Samer Ali (Bahrain); Sarah Al-Shareeda (University of Bahrain, Bahrain); Najla Abdulrahman (Bahrain)

12:40 Generative Adversarial Networks: A Recent Survey
Ghadeer Alharmi (University of Bahrain, Bahrain); Ayman Al-Khazraji (University of Bahrain, Bahrain)

Thursday, December 8 13:00 - 13:30 (Asia/Bahrain)

ZB3: Day-3 - Mid-Day Break

DAY -III: Thursday, December 8 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SF00: Healthcare - Covid-19 Technology Solutions

Hall Room-01: Session Joining: Room-01

Chair: Dr. Zouhir Bahri

13:30 Breast Cancer: Deep Transfer Learning Techniques for Breast Tumor Detection in Mammography
Saida Sarra Boudouh (LIM Laboratory University of Laghouat Algeria, Algeria); Mustapha Bouakkaz (University of Laghouat - LIM Laboratory Algeria, Algeria & University of Lyon2 - ERIC Laboratory France, France)

13:50 The Impact of COVID-19 on the Design of Apartment Buildings: A Case Study of Bahrain
May Khalfan, Lejla Karajica and Huda Almadhoob (University of Bahrain, Bahrain)

14:10 Analyze the use of machine learning models in the Pima diabetes data set for early-stage detection
Harsh Tita, Rashi Sharma, Ankit Nayak, Anisha Sancheti and Saubhik Bandopadhyay (Amity University Kolkata, India); Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India)

14:30 Diagnosing the Severity of covid-19 in Lungs using CNN models
V Anjana Devi (Rajalakshmi Institute of Technology, India); Vithya Ganesan (Koneru Lakshmiah Education Foundation, India); Subrata Chowdhury (Sri Venkateswara College of Engineering and Technology, India)

14:50 Analysing the Impact of COVID-19 outbreak and Economic Policy Uncertainty on Stock Markets in Major Affected Economies
Adelajda Matuka (University of Bologna, Italy & Research Fellow, Italy); Shuffield Seyram Asafo (University of Macerata, Italy); Gamaliel O Eweke (Niger Delta University, Nigeria); Pradeep Mishra (Jawaharlal Nehru Krishi Vishwavidyalaya, India); Soumik Ray (Centurion University of Technology and Management, India); Tatiana Makarovskikh (South Ural State University, Russia); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt)

15:10 Quality of life during the Pandemic; A cross sectional study about Attitude, Individual perspective and behavior change affecting general population in daily life
Fahmida Khatoon (University of Hail KSA, Saudi Arabia); Manish Kumar (Narain College, India); Ayesha Akbar Khalid (East Kent NHS Foundation Trust Margate, United Kingdom (Great Britain)); Zahid Balouch (Hail university, Pakistan); Farida Habib Khan (University of Hail, Saudi Arabia); Pradeep Mishra (Jawaharlal Nehru Krishi Vishwavidyalaya, India); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt)

DAY -III: Thursday, December 8 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SF01: Internet of Things and Smart Applications-PART-B

Hall Room-02: Session Joining: Room-02
Chair: Dr. Abdul Fattah Salman

13:30 A Survey of Image Super-Resolution Algorithms Based on Convolutional Neural Networks for Smart City Health Care Applications
MVV Prasad Kantipudi (Symbiosis Institute of Technology, Symbiosis International Deemed University, India); Neetha Cholleti (Sreyas Institute, India); Priti Shahane (Symbiosis Institute of Technology, Pune., India)

13:50 Internet of Things-Based Garbage Collection for Smart Cities
Renjith V Ravi (M E A Engineering College, India); Pushan Kumar Dutta (Amity University Kolkata, India & Amity School of Engineering and Technology, India); Wen Cheng Lai (National Yunlin University of Science and Technology, Taiwan)

14:10 Crop Tracker - A Web Application to Sell or Buy Crops and Predict Crop Price Using Machine Learning
Nithish Krishnan S (Chennai Institute of Technology, India); Surendran R (Saveetha Institute of Medical and Technical Sciences, India); Nathan M (Chennai Institute of Technology, India)

14:30 Enhancing citizens' well-being using a gait monitoring smart wearable device
Dimitris Spyropoulos and Fotios Giannopoulos (Prisma Electronics S.A., Greece); Christos Spandonidis (Prisma Electronics, Greece)

14:50 Industrial Internet of Things Platform for Leak Detection and Localization in Oil and Gas Pipelines
Nektarios Galiatsatos (Prisma Electronics S.A., Greece); Georgios - Panagiotis Kousiopoulos (Aristotle University of Thessaloniki, Greece); Areti Petsa (Prisma Electronics, Greece); Dimitrios Kampelopoulos (Aristotle University of Thessaloniki, Greece); Fotios Giannopoulos (Prisma Electronics S.A., Greece); Christos Spandonidis (Prisma Electronics, Greece); Spiros Nikolaidis (Aristotle University of Thessaloniki, Greece)

15:10 Bird Hazard Mitigation System (BHMS): Review, Design, and Implementation
Salwa Baserrah (University of Bahrain, Bahrain)

DAY -III: Thursday, December 8 13:30 - 15:30 (Asia/Bahrain)

Parallel Session: SF03: Urban Planning, Design Solutions & Smart Cities Design-PART-B

Hall Room-03: Session Joining: Room-03
Chair: Dr. Uneb Gazder

13:30 Driving Strategies to Achieve Social Sustainability in the Built Environment to Facilitate Human Well-being
Balqees Akram (University of Bahrain & Abu Shuja Contracting, Bahrain); Fay Al khalifa (University of Bahrain, Bahrain)

13:50 Increasing the efficiency of the renovation projects in the heritage areas via using the Smart devices, case of the pearling path, Al-Muharraq, Bahrain
Islam Hamdi El Ghonaimy (University of Bahrain & Associate prof, Bahrain); Wafa Hasan Al-Madani (The University of Bahrain, Bahrain); Walaa Husain and Zina Babili (Bahrain); Saifalla Moosa (University of Bahrain, Bahrain); Nora Alanzi (Manama, Bahrain)

14:10 Vertical Conveyor System
Atif Saeed (SZABIST, Pakistan); Muhammad Ismail Mansoor (Shaheed Zulfikar Ali Bhutto Institute of Science and Technology, Malaysia); Farhan Mumtaz (Shaheed Zulfikar Ali Bhutto Institute of Science & Technology, Pakistan)

14:30 Modelling of Full-Scale Reinforced Beams Strengthened with TRM
Fawwad Masood and Salman Mubeen (NED University of Engineering and Technology, Pakistan); Uneb Gazder (University of Bahrain, Bahrain)

14:50 Food resources in food system technology: Bifunctional food system technology based on Pickering emulsions
Irina Potoroko, Ammar Kadi and Uday Bagale (South Ural State University, Russia); Anastasia Paymulina (Russian Academy of Sciences, Russia); Mostafa Abotaleb (South Ural State University, Russia); Sayed Kenawy (Delta Higher Institute for Engineering & Technology (DHIET), Mansoura, Egypt)

15:10 The Use of Indoor Green Environments to Offset the Psychological Effects of the Absence of Nature in Bahrain
Ayat AlBaitam and Fay Al Khalifa (University of Bahrain, Bahrain)

DAY -III: Thursday, December 8 15:30 - 15:35 (Asia/Bahrain)

LB3: DAY -III: - Symposium Sessions Ending

(Short Break)

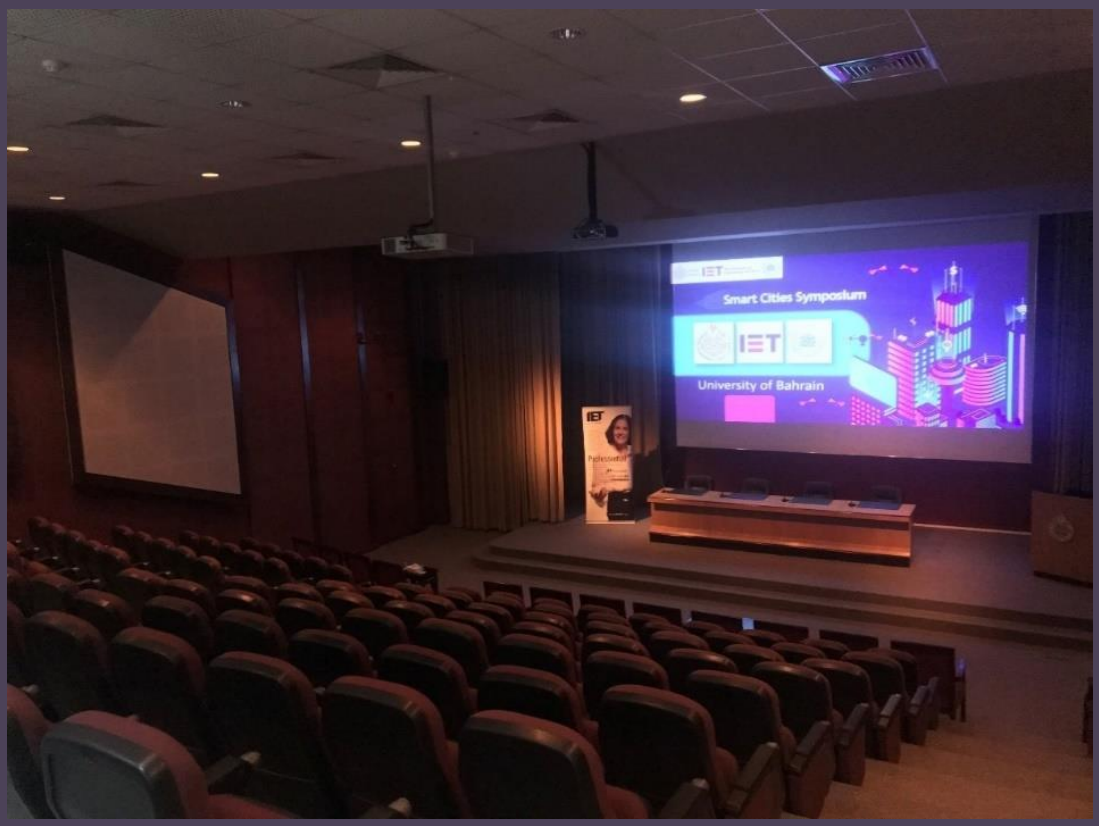
Thursday, December 8 15:40 - 16:00 (Asia/Bahrain)

CD-3: Closing Remarks of 6th SMART CITIES SYMPOSIUM, 2022

## Closing Remarks of 6th IET SMART CITIES SYMPOSIUM, 2022

Chair: Dr. Suresh Vishwakarma
Session Chair: Dr. Suresh Vishwakarma, MIET, Chairman, Chartered Engineers Pacific, Vancouver, Canada
Main-Theatre Hall

# Keynotes and Parallel Sessions Hybrid Joining




Keynotes and Parallel Sessions Hybrid Joining:

Sessions Access:

To join sessions in Main-Hall

To join sessions in Room-01

To join sessions in Room-02

To join sessions in Room-03

# IET Certificate of Papers Presentation, and Attendance

IET will issue Certification for Papers Presentations and Attendance.

Please contact the Symposium Organization Committee for the Certificates.

https://www.6th-smartcities-2022.com/

# Symposium Presentation Templates

Presentation Templates, are found the event website

https://www.6th-smartcities-2022.com/

# Symposium Registration is Open

This is a free attendance event supported by the IET, for Symposium Registration, visit the IET Registration Platform

IET Registration Platform
https://localevents.theiet.org/register.php?event=441fce

# 6th IET Smart Cities Symposium Program
# 6-8 December 2022
# Keynotes and Parallel Sessions Details

## DAY-I

## Tuesday, 6th December 2022

Main-Hall
Registration: Main Hall Opening by 8:30 am

9:00 am
Main-Hall

Opening Ceremony
OPENING SPEECH

### Towards Smart Cities and Digital Twin Cities: A Novel Paradigm

Opening Speech by Her Excellency Dr. Jawaher Shaheen AlMudhahkah
University of Bahrain President
Sunday 6th December 2022, 09:00+03 - 09:10+03

WELCOME SPEECH

### University of Bahrain Smart Cities Event

Welcome Speech by
Dr. Sheikha Haifa Bint Ebrahim Alkhalifa
College of Engineering Dean
6th December 2022, 09:10+03 - 09:15+03

KN1: KEYNOTE SPEAKER -1

### SATELLITE IMAGERY AND BIG DATA For Smart Cities

Dr. Michael Kio
Fellow of the Institution of Engineering and Technology
James Clarke School of Engineering, University of Maryland College Park,
USA
Tuesday the 6th of December 2022, 09:15+03 - 10:00+03
Session Chair: Prof. Dinesh Hurreeram, MIET, Director General, University Technology Mauritius

KN2: KEYNOTE SPEAKER-2

### Microgrids Digital Twins Towards Biomimetics

Professor Josep M. Guerrero
Professor, Villum Investigator | AAU Energy
The Villum Center for Research on Microgrids (AAU CROM)
Aalborg University | Pontoppidanstraede, Aalborg Ø
Denmark
Tuesday the 6th of December 2022, 10:00+03 - 10:30+03
Session Chair: Dr. Suresh Vishwakarma, MIET, Chairman, Chartered Engineers Pacific, Vancouver Canada

KN3: KEYNOTE SPEAKER-3

### Application of Artificial Intelligence and Machine Learning Methods for Smart Cities

Dr. Mrinal R. Bachute
Industry Liaison Officer
Associate Professor, Department of Electronics and Telecommunication Engineering
Symbiosis Institute of Technology, Pune-41202215. Maharshtra
India
Tuesday the 6th of December 2022, 10:30+03 - 11:00+03
Session Chair: Dr Ruchi Tyagi, Senior Faculty, Birmingham City University-RAK Campus UAE

Tuesday 6th December 6, 2022
11:00 +03 to 01:00 +03

| Room-01 | Room-02 | Room-03 |
|---|---|---|
| SA01 | SA02 | SA03 |
| Internet of Things and Smart Applications-PART-A | Artificial intelligence (AI) | Smart Homes, Smart Hospitals, and Smart Campuses-PART-A |

13:00 +03 to 13:30 +03
ZB1: Day-1 - Mid-Day Break

Tuesday 6th December 6, 2022
13:30 +03 to 15:30 +03

| Room-01 | Room-02 | Room-03 |
|---|---|---|
| SB01 | SB02 | SB03 |
| Smart Homes, Smart Hospitals, and Smart Campuses-PART-B | Cyber Security Solutions | Smart Transportation System |

CD-1: Closing of Day-1

# 6th IET Smart Cities Symposium Program
# 6-8 December 2022
# Online Sessions Access
# Parallel Sessions

## DAY-II

## Wednesday, 7th December 2022

Main-Hall
Getting Ready: Main Hall Opening by 8:30 am

9:00 am
Main-Hall

KN4: KEYNOTE SPEAKER -4

### Smart Cities Technologies from Theory to Practice

Professor A. R. Al-Ali
Computer Science and Engineering Department, College of Engineering
American University of Sharjah
UAE
Wednesday 7th December 2022, 09:00+03 - 09:30+03
Session Chair: Dr. Rahul P Bachute, Pune University and Ajeenkya D Y Patil School of Engineering
India

KN5: KEYNOTE SPEAKER-5

### A System of Systems Integration Approach to Make Smart Cities! Smart

Dr. Nesrine Miro Padovani
UpGradelle Cs Training and Consulting WLL - co-founder & CEO of UpGradelle Training & Consulting
France
Wednesday 7th December 2022, 09:30+03 - 10:15+03
Session Chair: Dr. Bader Almannai, University of Bahrain
Bahrain

KN6: KEYNOTE SPEAKER-6

### Digitization and Artificial Intelligence Contributing to Smart Cities

Assoc. Prof. Dr. Ruchi Tyagi
Senior Faculty, Birmingham City University-RAK Campus
UAE
Wednesday 7th December 2022, 10:15+03 - 11:50+03
Session Chair: Dr. Tagore Ramlal, MIET, Assistant Professor and Chairman, IET Trinidad and Tobago, University of Trinidad and Tobago
Trinidad and Tobago

Wednesday 7th December 2022
11:00 +03 to 13:00 +03

| Room-01 | Room-02 | Room-03 |
|---|---|---|
| SC01 | SC02 | SC03 |
| Urban Planning, Design Solutions & Smart Cities Design-PART-A | Smart Algorithms and Applications-A | New Technologies for Smart Cities-PART-A |

ZB2
Day-2 - Mid-Day Break
13:00 +03 to 13:30 +03

Wednesday December 7, 2022
13:00 +03 to 15:15 +03

| Room-01 | Room-02 | Room-03 |
|---|---|---|
| SD01 | SD03 | SD04 |
| New Technologies for Smart Cities-PART-B | Healthcare and Medicine (IoMT) - Technology Solutions | Smart City Architecture and its Applications |

CD-2: Closing of Day-2

# 6th IET Smart Cities Symposium Program
# 6-8 December 2022
# Online Sessions Access
# Parallel Sessions

## DAY-III

## Thursday, 8th December 2022

Main-Hall
Getting Ready: Main Hall Opening by 8:30 am

9:00 am
Main-Hall: 6SCS-2022

KN7: KEYNOTE SPEAKER -7

### Application of 5G in Smart Cities

Damini Rajiah, MIET
Telecommunication Professional
Telecommunication Service Providers
Mauritius
Thursday , 8th 2022, 09:00+03 - 09:45+03
Session Chair: Dr. Araddhana Deshmukh, Associate Professor & Head - AI and Data Science
India

KN8: KEYNOTE SPEAKER -8
Thursday, 8th December 08, 2022, 9:50 - 10:45 (Asia/Bahrain)
Enhancement of the Smart City concept through a low-cost-on-the-Road-Unit for Traffic Management

Keynote Speaker:
Christos Spandonidis (Prisma Electronics, Greece); Fotios Giannopoulos (Prisma Electronics S.A., Greece); Elias Sedikos (Prisma Electronics UK, United Kingdom (Great Britain)); Dimitris Reppas and Kostas Sakatis (Prisma Electronics S.A., Greece); Panagiotis Theodoropoulos (University of Patra, Greece)

Session Chair: Dr. Suresh Vishwakarma, MIET, Chairman, Chartered Engineers Pacific, Vancouver, Canada

Thursday December 8, 2022
10:30 +03 to 01:00 +03

| Room-01 | Room-02 | Room-03 |
|---|---|---|
| SE02 Smart City Based on IoT | SE03 Smart Homes, Smart Hospitals, and Smart Campuses | SE04 Robotics and Intelligence |

ZB-3
Mid Day Break
13:00 +03 to 13:30 +03

Thursday December 8, 2022
01:30 +03 to 15:30 +03

| Room-01 | Room-02 | Room-03 |
|---|---|---|
| SF00 Healthcare - Covid-19 Technology Solutions | SF01 Internet of Things and Smart Applications-PART-B | SF03 Urban Planning, Design Solutions & ... -PART-B |

Main-Hall: 4SCS-2021
CD-3
Closing Remarks of 6th SMART CITIES SYMPOSIUM,
15:30 +03 to 16:00 +03

### Closing Remarks of 6th IET SMART CITIES SYMPOSIUM, 2022

Chair: Dr. Suresh Vishwakarma
Session Chair: Dr. Suresh Vishwakarma, MIET, Chairman, Chartered Engineers Pacific, Vancouver, Canada
Hall: Main-Hall
Joining Session by Code: n8003I2

SB-3: Day-3 - Symposium Ending