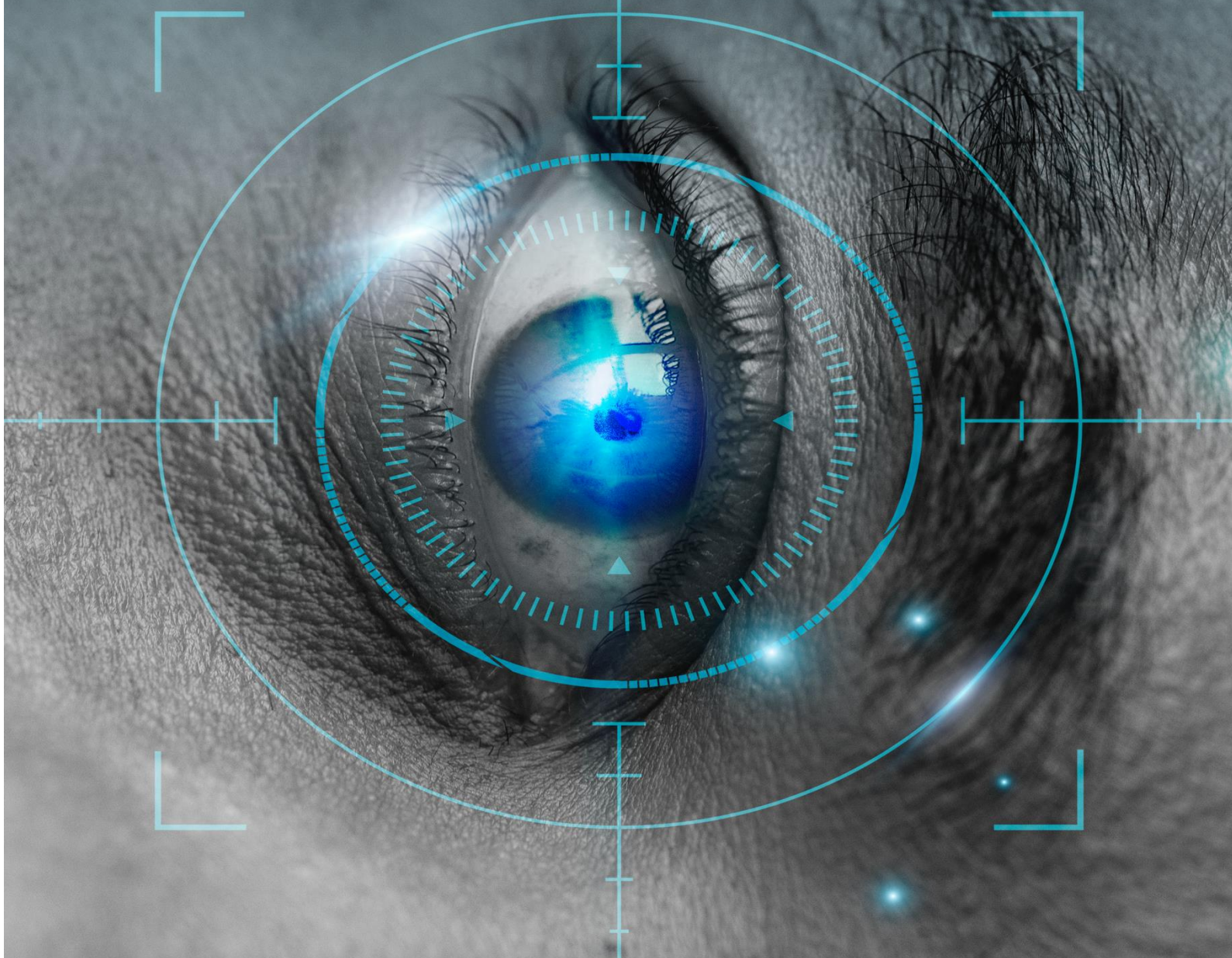# The 2nd International Conference on Advances in Communication Technology and Computer Engineering

24-25 June 2022
Meknes, Morocco

Online Mode

Conference Program

ABOUT THE CONFERENCE

In recent years, we have observed an acceleration in the development of new technologies, mainly linked to the growth of the population, particularly in urban areas, which has led to a significant acceleration relating to reversals in research and innovation. What gave birth to a new concept is the smart city. This concept appeared at the crossroads of two strong tendencies, the exponential urbanization of humanity and the digital revolution, information and communications technologies are equipping cities with the objective of providing tools to help decision thus improve urban functioning.

Artificial Intelligence and Internet of Things have introduced themselves today as must-have technologies in almost every sector. Ranging from agriculture to industry, and healthcare, the scope of applications of AI and IoT is as wide as the horizon. Nowadays, these technologies are extensively used in developed countries, but they are still at an early stage in emerging countries. As these countries were more affected by the COVID-19 pandemic, both healthcare-wise and economy-wise, the need to adopt new solutions to sustainable development challenges has become more crucial than ever.

The International Conference on Advances in Communication Technology and Computer Engineering will be organized from 24 to 25 June 2022 in Meknes, Morocco by The African Center for IT and Cybersecurity Research (ARCIC). The conference is organized with the objective of bringing together innovative scientists, professors, research scholars, students and industrial experts in the field of Computing and Communication to a common forum.

There were 110 paper submissions from 15 countries. Each submission was reviewed by at least three chairs or PC members. We accepted 47 regular papers (42%).

We would like to thank all authors and reviewers for their work and valuable contributions. The friendly and welcoming attitude of conference supporters and contributors made this event a success!

Conference Chairs

THE CONFERENCE TOPICS

Track 1: Communication Networks

- Wireless Communications
- Mobile Ad-Hoc Networks
- Software Defined Networks
- Information Theory and Coding
- Cloud Communications and Networking : Fog/Edge/Cloud
- Wearable Network and Systems
- Personal Communication Systems
- Vehicular Networks and Applications
- M2M and MTC Communications
- Internet of Things
- Architecture and protocols
- Satellite Communication
- Quantum Networking
- Qos Provisioning and Architectures
- Computer Security
- Network Security
- Cyber Security

Track 2: Computational Intelligence

- Big Data
- Data Mining
- Artificial Intelligence
- Evolutionary algorithms
- Swarm Intelligence
- Fuzzy Sets and Vague Sets
- Hybrid Computational Intelligence
- Computer Vision
- Soft Computing
- Decision Support and Decision making
- Image Processing

Track 3: Embedded Systems and Smart Applications

- Industry 4.0
- Robotics
- Smart Cities
- Smart Grid
- Green Energy
- Renewable Energy and Storage
- Smart Healthcare
- Smart Agriculture

CONFERENCE COMMITTEE

General Chairs

- Zakaria Boulouard, Hassan II University, Casablanca, Morocco
- Mariya Ouaissa, Moulay Ismail University, Meknes, Morocco

Technical Program Chairs

- Mariyam Ouaissa, Moulay Ismail University, Meknes, Morocco
- Sarah El Himer, Sidi Mohamed Ben Abdallah University, Fez, Morocco
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- Mohammed Kaosar, Murdoch University, Australia

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- Muhammad Fayaz, University of Central Asia, Russia

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- Mariyam Ouaissa, Moulay Ismail University, Meknes, Morocco
- Sarah El Himer, Sidi Mohamed Ben Abdallah University, Fez, Morocco
- El Mehdi Mellouli, Sidi Mohamed Ben Abdallah University, Fez, Morocco
- Inam Ullah Khan, Kings College London, United Kingdom

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- Subrata Chowdhury, Computer Science Svcet Engineering College, India
- Nabil El Akchioui, Abdelmalek Essaadi University, Morocco

CONFERENCE KEYNOTES

Prof. Dr. Imed Romdhani
Edinburgh Napier
University, United Kingdom

Prof. Dr. Imed Romdhani is a full time Associate Professor in networking at Edinburgh Napier University since June 2005. He was awarded his PhD from the University of Technology of Compiegne (UTC), France in 2005. He holds also an engineering and a MSc degree in networking obtained respectively in 1998 and 2001 from the National School of Computing (ENSI, Tunisia) and Louis Pasteur University (ULP Strasbourg, France). He worked extensively with Motorola Research Labs in Paris and authored 4 patents. Dr Romdhani contributed to several IETF drafts and RFCs and published several research articles and papers in high quality peer reviewed journals and conferences. He is currently an expert and rapporteur with the European Commission and a member of Huawei ITC academy advisory board. His research interests include: IoT, networking protocol design, SDN and AI.

Prof. Dr. Neeraj Kumar
Thapar Institute of
Technology, Patalia, India

Prof. Dr. Neeraj Kumar (SMIEEE) (2019, 2020, 2021 highly-cited researcher from WoS) is working as a Full Professor in the Department of Computer Science and Engineering, Thapar Institute of Engineering and Technology (Deemed to be University), Patiala (Pb.), India. He has published more than 400 technical research papers in top-cited journals and conferences which are cited more than 23500 times from well-known researchers across the globe with current h-index of 85. He is serving as editors of ACM Computing Survey, IEEE Transactions on Sustainable Computing, IEEE TNSM, IEEE Network Magazine, IEEE Communication Magazine, Elsevier Journal of Networks and Computer Applications, Elsevier Computer Communication, Wiley International Journal of Communication

CONFERENCE KEYNOTES

Prof. Dr. CELESTINE IWENDI
University of Bolton, United Kingdom

Prof. Dr. Celestine Iwendi is an Associate Professor (Senior Lecturer) with the School of Creative Technologies, University of Bolton, United Kingdom and a visiting Professor with Coal City University Enugu, Nigeria. He is also a Fellow of the Higher Education Academy, United Kingdom and a Fellow of the Institute of Management Consultants. He is a Distinguished Speaker, ACM; Senior Member of IEEE; Member, ACM; Member, IEEE Computational Intelligence Society; Senior Member. Listed among

Prof. Dr. Pushan Kumar Datta

Amity University, Kolkata, India

Prof. Dr. Pushan Kumar Datta is an G-II Assistant Professor at Amity University located in Kolkata, India. He received his PhD from Jadavpur University, India in the field of electronics and communication engineering. His past assignments include Erasmus Post doctoral grant with University of Oradea, Romania, research coordinator with Rajeev Gandhi Memorial College, Andhra Pradesh India and Faculty with a Shipping organization and a visiting fellow with SAARC disaster management ceter, India and National Center of Earth Physics, Bucharest, Romania. He has received grants for innovation with Bengal Chamber of Commerce, India and been selected with group for innovation projects in innovation projects. He has bene selected by the government of India as a NITI Aayog Mentor of Change for innovation driven programs. He has authored over 80 research articles and is supervising/co-supervising several graduates (MS and PhD) students. His research interests include internet of things, wireless networks, distributed systems, mechatronics , machine learning, etc.
He has been taking courses on python, IoT, simulation, mechatronics, robot autonomy, wireless sensor network, artificial intelligence and machine learning.
He is serving member of IET Kolkata network and has been leading many conferences as session and track chair in flagship conferences at the national and international level. He plans to introduce new courses in the UG level for students in bringing digital innovation and give them new ideas for uplifting research and self-development from eLearning course outcomes.

CONFERENCE PROGRAM

Time zone in GMT+1

June 24, 2022

Time	Program
8:30 – 9:00	**Registration**
9:00 – 09:30	**Opening Speech**
9:30 – 10:15	**Keynote 1: Prof. Dr. Celestine Iwendi** **Chair: Dr. Zakaria Boulouard**
10:15 – 10:30	**Break**
10:30 – 11:15	**Keynote 2: Prof. Dr. Imed Romdhani** **Chair: Dr. Mariya Ouaissa**
11:15 – 13:15	**Session I: Computational Intelligence** **Chairs: Dr. Sara Arezki** **Dr. Badr Hssina** **Session II: Computer Vision** **Chair: Dr. Ahmed Oussous**
13:15 – 14:00	**Lunch Break**
14:00 – 14:45	**Keynote 3: Prof. Dr. Neeraj Kumar** **Chair: Dr. Mariyam Ouaissa**
14:45 – 15:00	**Break**
15:00 – 18:00	**Session III: Communication Networks** **Chairs: Dr. Inam Ullah Khan** **Dr. Meriem Houmer**

June 25, 2022

Time	Program	
9:00 – 9:45	**Keynote 4: Prof. Dr. Pushan Kumar Datta** **Chair: Dr. Sarah El Himer**	
9:45 – 10:00	**Break**	
10:00 – 13:30	**Session IV: Intelligent Systems** **Chairs: Dr. Sara Mensou** **Dr. Sarah El Himer**	
	Special Session: Modeling and Controlling of Complex Autonomous Systems with Artificial Intelligence **Chairs: Dr. El Mehdi Mellouli** **Dr. Nabil El Akchioui**	
	Track1: Automatic Systems **Chairs: Dr. El Mehdi Mellouli** **Dr. Nabil El Akchioui**	**Track2: Telecommunications** **Chairs: Dr. Younes Balboul** **Dr. Youssef Elafou**
13:30 – 14:00	**Closing Ceremony**	

CONFERENCE SESSIONS PROGRAM

Session I	Computational Intelligence	Chairs: Dr. Sara Arezki, Hassan I University, Settat, Morocco Dr. Badr Hssina: Hassan II University, Casablanca, Morocco
Paper ID		
05	**Comparing and Evaluating Supervised and Unsupervised Machine Learning Techniques for Iot Security** El Mahdi Boumait, Ahmed Habbani, Reda Mastouri, Mohamed Boutahair Mohammed V University, Rabat, Morocco	
33	**A Disambiguation Approach Based on the Vector Representation of Words with Camembert** Btissam El Janati, Ilyas Ghanimi, Fadoua Ghanimi Ibn Tofail university, Kenitra, Morocco	
34	**Recent Arabic Information Retrieval Trends and Techniques: An Overview** Abdelkrim Aarab, Ahmed Oussous, Mohammed Saddoune Hassan II University, Casablanca, Morocco	
48	**An overview of the Most Efficient Methods for Predicting Healthcare Disorders** Aicha Oussous, Abderrahmane Ez-zahout, Soumia Ziti, Ahmed Oussous Hassan II University, Casablanca, Morocco	
51	**Using Neural Topic Model and CamemBERT to extract topics from Moroccan News in the French language** Nassera Habbat, Houda Anoun, Larbi Hassouni, Hicham Nouri Hassan II University, Casablanca, Morocco	
52	**Comparing Machine Learning Models for Large Scale Prediction of Parking Space Availability** Abdoul Nasser Hamidou Soumana, Mohamed Ben Salah, Soufiane Idbraim, Abdellah Boulouz Ibn Zohr University, Agadir, Morocco	
63	**Behavioral Intentions to use Artificial Intelligence among Managers in Small and Medium Enterprises** Alaa S. Jameel, Sinan Abdullah Harjan, Abd Rahman Ahmad Cihan University-Erbil, Erbil, Iraq	
67	**Improving Scalability of Recommendation System using Ontology and Dimensionality Reduction Techniques** Sajida Mhammedi, Hakim El Massari, Noreddine Gherabi Sultan Moulay Slimane University, Beni Mellal, Morocco	

CONFERENCE SESSIONS PROGRAM

Session II	Computer Vision	Chair: Dr. Ahmed Oussous, Hassan II University, Casablanca, Morocco
Paper ID		
16	**A Framework for Privacy Preserving Medical Content based Image Retrieval** Abdelhalim Kamrani, Khalid Zenkouar, Said Najah Sidi Mohamed Ben Abdellah University, Fez, Morocco	
19	**Prediction of Tomato Leaf Disease Using Transfer Learning Algorithms InceptionV3 and Inception Resnetv2** Uhasree Myneni, Pradeepini G Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, India	
27	**MFOOD-32: Moroccan Food Dataset for Food Image Recognition** Merieme Mansouri, amia Benabdellah Chaouni, Said Jai Andaloussi, Ouail Ouchettod Hassan II University, Casablanca, Morocco	
31	**Application to Efficient RGB-D Sign Language Recognition using Multi-channel Jacobi Moment Invariants** Ilham El Ouariachi, Rachid Benouini, Khalid Zenkouar, Arsalane Zarghili Sidi Mohamed Ben Abdellah University, Fez, Morocco	
58	**Efficient Selective Image Encryption Based on Chaos and Tchebichef Moments** Abdelhalim Kamrani, Khalid Zenkouar, Said Najah Sidi Mohamed Ben Abdellah University, Fez, Morocco	

CONFERENCE SESSIONS PROGRAM

Session III	Communication Networks	Chairs: Dr. Inam Ullah Khan, Kings College, London, UK Dr. Meriem Houmer, Ibn Zohr University, Agadir, Morocco
Paper ID		
06	**Survey on Internet Of Things Security and Medical Data Protection: Challenges and Perspectives** Doudou Dione, Idy Diop, Ibrahima Gueye, Sidi Mouhamed Farssi Cheikh Anta Diop university, Dakar, Senegal	
15	**An Overview of Vertical Handover Decision Algorithms** Narimane Elhilali, Mostapha Badri, Mouncef Filali Bouami Mohammed First University, Oujda, Morocco	
26	**Comparative Analysis of Penetration Testing Approaches for IoT Devices** Keshav Kaushik, Aarohi Mangal University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India	
41	**A Comprehensive Review of WiFi Sensing Technologies: Tools, Challenges and Future Research Directions** Hicham Boudlal, Mohammed Serrhini, Ahmed Tahiri Mohammed First University, Oujda, Morocco	
65	**Study of existing LTE Handover Algorithms: Review** Samia Hakkou, Tomader Mazri, Nabil Hmina Ibn Tofail University, Kenitra, Morocco	
77	**Collaborative Intrusion Detection System in Blockchain : A Review** Hicham Boukhriss, Omar Boutkhoum, Aouatif Arqane, Abdelmajid El Moutaouakil Chouaib Doukkali University, El Jadida, Morocco	
78	**Internet of Connected Vehicles: Challenges and Opportunities** Soukayna Riffi Boualam, Mariya Ouaissa, Mariyam Ouaissa, Abdellatif Ezzouhairi Sidi Mohamed Ben Abdellah University, Fez, Morocco	
80	**Impact of DoS Attacks in Software Defined Networks** Meryem Chouikik, Mariyam Ouaissa, Mariya Ouaissa, Zakaria Boulouard, Mohamed Kissi Hassan II University, Casablanca, Morocco	
FET_1	**Building Blocks of Incident Response: Security Operation Centers** Muhammad Tehmasib Ali Tashfeen The Bank of Punjab, Information Systems Audit. IAF bedian road, Lahore. Pakistan	
FET_2	**Metaheuristics for Capacitated Vehicle Routing for Flood Victims Evacuation** Hafiz Suliman Munawar, Ahmed W.A. Hammad, Travis Waller, Mohammad Mojtahedi, Junaid Akram University of New South Wales, Kensington, Sydney, Australia	

CONFERENCE SESSIONS PROGRAM

Session IV	Intelligent Systems	Chairs: Dr. Sara Mensou, Mohamed V University, Rabat, Morocco Dr. Sarah El Himer, Sidi Mohamed Ben Abdellah University, Fez, Morocco
Paper ID		
17	**What is The Status of Weeding Robots in The World since 2011 to 2021?** Najia Ait Hammou, Hajar Mousannif, Brahim Lakssir Cadi Ayyad University, Marrakech	
29	**Modeling of Indoor Radon Concentration by Using the MRT- Lattice Boltzmann in Ventilated Room** El houcine Youssoufi, Lhoucine Oufni*, Rabi Rabi Sultan Moulay Slimane University, Beni Mellal, Morocco	
30	**Predicting Energy Consumption of Grinding Mills in Mining Industry : A Review** Chaimae Loudari, Moha Cherkaoui, Rachid Bennani, Imad El Harraki, Zakaria El Younsi, Mohamed El Adnani, EL Hassan Abdelwahed, Intissar Benzakour, François Bourzeix, Karim Baina National School of Mines of Rabat (ENSMR), Rabat, Morocco.	
32	**Studies of Soil Degradation In Lower And Middle Guinea: Geoscientific Analysis of The Factors and Geotechnical Perspectives for Sustainable Structures** Ibrahima Diogo Diallo, Chakib Darraz, Diaka Sidibe, Amine Tilioua University Abdelmalek Essaadi, Tetouan, Morocco	
50	**Parameter Identification of The Li-Ion Battery Model using the Particle Swarm Optimization** Elmahdi Fadlaoui, Noureddine Masaif Ibn Tofail University,Kenitra, Morocco	
54	**Modeling Approach for Extracting the Single-Diode Model Parameters and Predicting PV Modules Performance** Kawtar Tifidat, Noureddine Maouhoub, Fatima Ezzahra Ait Salah Ibn Zohr University, Agadir, Morocco	
56	**Smart Embedded System for Sleep Apnea Monitoring From ECG** Signals Mohammed Ammar,Noureddine Messaoudi, Djouher Faked, Rima Noui, Said Mahmoudi University M'Hamed Bougara, Boumerdes, Algeria	
73	**A Model-Driven Approach for Industry 4.0** Mahmoud El Hamlaoui, Youness Laghouaouta Mohammed V University, Rabat, Morocco	
75	**Validation of MPPT Controller based on Backstepping using the Model and the Processor in the Loop with a 32-Bit Microcontroller** Omar Diouri, Saloua Senhaji, Sanaa Faquir, Mohammed Ouazzani Jamil Private University of Fez - UPF, Fez, Morocco	
79	**Comparative Study of Extended Kalman Filter and AH Approach for the State of Charge Estimation Applied in Lithium Batteries Oof Electric Vehicles** Elmehdi Nasri, Tarik Jarou Ibn Tofail University, Kenitra, Morocco	
FET_3	**Robotic and its Implications on Future Wars** Maria Nawaz Chohan, Usama Ali, Nadeem Ahmed, Ali Haider, Sana Nawaz Chohan National Defence University, Islamabad, Pakistan	

CONFERENCE SESSIONS PROGRAM

Special Session	Modeling and Controlling of Complex Autonomous Systems with Artificial Intelligence
Paper ID	**Track1: Automatic Systems** Chairs: Dr. El Mehdi Mellouli, University of Sidi Mohamed Ben Abdellah, Fez, Morocco Dr. Nabil El Akchioui, University of Abdelmalek Essaadi, Tetouan, Morocco
1	**Limits of Direct Fluidification of Stochastic Petri Nets by Timed CPNs** Hamid El-Moumen, Nabil El Akchioui, Mohammed Hassani Zerrouk University of Abdelmalek Essaadi, Tetouan, Morocco
2	**Artificial Neural Network Optimized by Whale Optimization Algorithm for Partial Shading Fault Detection** Saliha Sebbane, Nabil El Akchioui University of Abdelmalek Essaadi, Tetouan, Morocco
3	**Deep Learning Perception for Self-Driving Cars: A Survey on What to Expect** Bouasria Ihssane, Walid Jebrane, Nabil El Akchioui University of Abdelmalek Essaadi, Tetouan, Morocco
4	**Neural Networks Based on Fast Terminal Sliding Mode Lateral Control for Autonomous Vehicle** Najlae Jennana, El Mehdi Mellouli Sidi Mohammed Ben Abdellah University, Fez, Morocco
5	**Artificial neural networks based MPPT to improve photovoltaic system productivity in shaded areas** Noamane Ncir, Nabil El Akchioui University of Abdelmalek Essaadi, Tetouan, Morocco
6	**Prediction of Wind Energy by Using Long Short-Term Memory Neural Networks** Mohammed Bouafia, Azeddine El-Hammouchi, Nabil El Akchioui, Amine El Fathi University of Abdelmalek Essaadi, Tetouan, Morocco
7	**A Review on Plant diseases detection using artificial intelligence techniques** Aissam El Ibrahimi, Nabil El Akchiouib University of Abdelmalek Essaadi, Tetouan, Morocco
8	**Neural Network and Terminal Sliding Mode Control for Controlling an Uncertain Autonomous Vehicle** Ayoub Belkheir, Abdillah Moussa, El Mehdi Mellouli Sidi Mohammed Ben Abdellah University, Fez, Morocco
9	**Modeling and Control of a Photovoltaic Energy System using MPPT Algorithm** Soumia Edalle, Bouchra Sefriti, El Mehdi Mellouli, Tissir Elhoussaine Sidi Mohammed Ben Abdellah University, Fez, Morocco
10	**Autonomous Vehicles Motion Planning Techniques: Recent Advances and Future Trends** Walid Jebrane, Ihssane Bouasria, Nabil El Akchioui Sidi Mohammed Ben Abdellah University, Fez, Morocco

CONFERENCE SESSIONS PROGRAM

	Track2: Telecommunications Chairs: Dr. Younes Balboul, University of Sidi Mohamed Ben Abdellah, Fez, Morocco Dr. Youssef Elafou, University of Sidi Mohamed Ben Abdellah, Fez, Morocco
11	**Detailed Analysis and Comparison of Communication Protocol-Oriented IoT Applications** Ouijdane Fadli, Younes Balboul, Mohammed Fattah, Said Mazer, Moulhime Elbekkali Sidi Mohammed Ben Abdellah University, Fez, Morocco
12	**A Machine Learning Based Intrusions Detection for IOT Botnet Attacks** Yahya Rbah, Mohammed Mahfoudi, Younes Balboul, Kaouthar Chetioui, Mohammed Fattah, Said Mazer, Moulhime Elbekkali, Benaissa Bernoussi Sidi Mohammed Ben Abdellah University, Fez, Morocco
13	**Design of a New Microstrip Patch Antenna at 60GHz for 5G** Salah-Eddine Didi, Imane Halkhams, Mohammed Fattah, Younes Balboul, Said Mazer, Moulhime El Bekkali Sidi Mohammed Ben Abdellah University, Fez, Morocco
14	**A Comprehensive Analysis of Fog Computing Task Scheduling Approaches** Saad-Eddine Chafi,,Younes Balboul, Mohammed Fattah, Said Mazer, Moulhime El Bekkali, Benaissa Bernoussi Sidi Mohammed Ben Abdellah University, Fez, Morocco

Welcome to the 2nd International Conference on Advances in Communication Technology and Computer Engineering