

BOOK OF ABSTRACTS



October 2018

EL OUED, ALGERIA



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Editors: Abdelhamid MELLOUK, Saci MEDILEH, Sami SOUIHI, Salim BITAM & Said HOCEINI,

October 2018

Welcome Message

On behalf of all SACONET committee members, we welcome you to the 7th International Conference on Smart Communications in Network Technologies (SACONET'2018) held in El-Oued, Algeria, during October 27-October 31, 2018.

The SACONET conference is now a well-established conference and focus on the new trends of the growing smart communications fields embedded in complex systems for a wide variety of applications in the future generation of network and cloud computing technologies. SACONET focuses on how smart communications and ICT networks impact not only on network technologies (protocols, equipment, algorithms, power, MANET, VANET, etc.), but also on creating collective and individual awareness about the multiple sustainability threats which our society is facing nowadays at social, environmental and political levels, considering a wide family of applications (healthcare, underwater, vehicular, robotic, economics, etc).

Indeed, autonomous applications embedded in complex configurations and dynamic environments have rapidly expanded from classical applications where different modular devices, actuators and sensors interact closely. This has considerably impacted the control of a given system in a centralized manner. Current trends are to propose new autonomic architecture schemes that manage and control future emerging networks: sky of clouds, Internet of things, Smart Grids, Smart Cities, etc. The evolution of Internet usages appeals for more quality guarantees in order to support stringent services. Aligned to these trends, the Open Data initiative fuels novel development scenarios, business opportunities and markets. In this context, for example, Healthcare and wellness applications such as helping elderly people, assisting dependent persons, habitat monitoring in a smart environment constitute some of the potential scenarios of convergence between autonomous systems and smart network technologies. These applications, which are based on high-level commands, accomplish some specific tasks, reveal new challenges regarding mechanic design, portability, acceptability, power support and efficiency, control theory, cost, economic aspects, scalability, security, etc.

A major outcome of this conference is to provide researchers and designers a better understanding of real-world challenges for smart communication technologies and enable them to develop innovative solutions to address such challenges. We also hope to be able to identify critical issues that will require further investigations and analysis in the future. The conference attracted many high quality submissions from around the world. Each paper went through a rigorous peer review process that was made possible by members of the International Technical Program Committee as well as additional reviewers. Based on the detailed comments from the reviews, we accepted 40 regular papers for presentation and publication. These papers cover a range of topics that include Next Generation Networks; Autonomic and Robot based Networks; Sensor and Vehicular Networks; Next Generation Services; Network Architecture & Applications.

We thank all authors who submitted their papers for consideration for this conference. We would also like to thank the members of the Technical Program Committee and additional reviewers for their feedback and review support that helped us to prepare a high quality technical program.

Finally, we wish to thank many people who contributed to the local organization. We are particularly grateful to Saci Medileh, Salim Bitam, Abbas Messaoud, Ismail Kertiou, Sami Souihi, Thiago Abreu, Said Hoceini, José Diaz and many other colleagues from El Oued University (Samir Othmani, Mouadh Bali, Abdelkamel Benali, Abdennasser Khaleifa and many others) for their dedication and hard work throughout the preparation of this conference.

We hope that the 7th SACONET conference provided an interesting and up-to-date scientific program. We also hope that all participants enjoyed the technical and social conference program, the Sahara hospitality, the exciting Desert door and the City of 1000 domes.

Editors: Abdelhamid MELLOUK, Saci MEDILEH, Sami SOUIHI, Salim BITAM and Said HOCEINI.

October 2018

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SACONET 2018 Autumn School Program

Welcome : Saturday, Oct 27th, 08:00-08:30

Abdelhamid Mellouk

Title: " Welcome to the SACONET Family "

Bio: Abdelhamid MELLOUK (mellouk@u-pec.fr) is a full permanent Professor at University of Paris-Est (UPEC), Networks & Telecommunications (N&T) Department and TincNET/LiSSi Laboratory France. He graduated in computer network engineering from the Computer Science High Eng. School, University Oran-EsSenia, Algeria, and the University of Paris Sud XI Orsay-*Ecole Polytechnique* Palaiseau, received his Ph.D. in computer science from the Paris XI university, and a Doctorate of Sciences (Habilitation) diploma from UPEC. Founder of the UPEC Network Research activity and Curricula academic degrees with extensive international academic and industrial collaborations, his general area of research is in adaptive real-time bio-inspired control for high-speed new generation dynamic wired/wireless networking in order to maintain acceptable quality of service/experience for added value services. He is an active member of more than 10 international or national scientific organizations, such as the IEEE Communications Society, held several offices including leadership positions in IEEE Communications Society Technical Committees (Chair, GITC member, etc.), head of CNRS GDR WG, etc. He has published/coordinated 11 books, 3 lecture notes and several (~200) refereed international publications in journals, conferences, and books, in addition to numerous keynotes and plenary talks in flagship venues. He serves on the Editorial Boards or as Associate Editor for several journals (IEEE Communications Surveys and tutorials, IEEE Communications Letters, IEEE Transaction on Parallel and Distributed Systems, JNCA, IJCS, etc.), and he is chairing or has chaired (or co-chaired) more than 60 of the top international conferences and symposia, including the TPS Chair of ICC 2017 ComSoc Flagship conference.

Day 1: Saturday Oct 27 - Location: Documentation Centre, El Oued University

Scientific tutorials and practical workshops: Saturday, Oct 27th, 08:00-19:00

Saturday, Oct 27th, 08:00-10:50

Yassine Hadjadj-Aoul

Title: "Analysis of caching strategies for content centric networks"

Bio: Yassine HADJADJ AOUL (yhadjadi@irisa.fr) is currently working as an associate professor at the University of Rennes 1, France, where he is also a member of the IRISA Laboratory and the INRIA project-team Dionysos. He received a B.Sc. In computer engineering with high honours from Mohamed Boudiaf University, Oran, Algeria, in 1999. Dr. Hadjadj received his Master's and Ph.D. degrees in computer science from the University of Versailles, France, in 2002 and 2007, respectively. He was an assistant professor at the University of Versailles from 2005 to 2007, where he was involved in several national and European projects such as NMS, IST-ATHENA, and IST-IMOSAN. He was also a post-doctoral fellow at the University of Lille 1 and a research fellow, under the EUFP6 EIF Marie Curie Action, at the National University of Dublin (UCD), where he was involved in the DOM'COM and IST-CARMEN projects, which aim at developing mixed Wi-Fi/WiMAX wireless mesh networks to support carrier grade services. His main research interests concern the fields of wireless networking, multimedia streaming architectures and protocols, congestion control protocols and QoS provisioning, and satellite and space communications. Dr. Hadjadj has been on the technical program committee of different IEEE conferences, including Globecom, ICC, VTC, PIMRC and IWCMC. His work on multimedia and wireless communications has led to more than 40 technical papers in journals and international conference proceedings.

Coffee break & Posters presentation: 10h50-11H20

Saturday, Oct 27th, 11:20-13:10

Thiago Abreu

Title: "Fiabilité et communication des données de santé"

Bio: Thiago Abreu received his degree in Computer Engineering in 2009 and his M.Sc. degree in Electrical Engineering in 2011, both from Universidade Federal do Pará. He obtained his Ph.D. degree in Computer Science from Université Claude Bernard Lyon 1 in 2015 on the field of modeling and performance evaluation of multi-hop wireless networks. While finishing its thesis, he spent 1 year as a research engineer at the Laboratoire d'Informatique de Paris 6 (LIP6) at Université Pierre et Marie Curie, where he continued his researches on the field of cellular networks. Shortly after, he started a 1-year post-doctoral fellowship at IRISA Rennes, mainly in the field of performance evaluation of information-centric networking. In September 2016, he became associate professor at the Université Paris-Est Créteil (UPEC) where he teaches at the Ecole

Supérieure d'Ingénierie de Paris-Est Créteil (ESIPE-Créteil). His research interests are currently performance evaluation and system modeling in the area of sensor wireless networks, applied to e-health systems and body-area networks.

Lunch: 13h10-13H50

Saturday, Oct 27th, 13:50-15:40

Saïd Hoceini

Title: "Sécurisation des échanges de données"

Bio: Saïd Hoceini is an associate professor at University of Paris-Est Créteil VdM (UPEC), Networks and & Telecommunications (N&T) Department and LiSSi-TincNet Laboratory, IUT Creteil/Vitry, France. He graduated in computer network engineering from the University Houari Boumediene, Algeria, and the D.E.A diploma from University of Versailles Saint Quentin en Yvelines. He received his PhD degree in computer networks from UPEC. His research focuses on routing algorithms, Quality of Service, Quality of Experience, and wireless sensor networks, as well as bio-inspired artificial intelligence approaches. His work has been published in several international conferences and journals (ICC, GLOBECOM, Computer Communications, IEEE Communications Letters, ETT). Dr. Hoceini served as a Technical Program Committee (TPC) member for international conferences (SaCoNet, WWIC, GlobeCom, ICC).

Coffee break & Posters presentation: 15h40-16H10

Saturday, Oct 27th, 16:10-19:00

Rosa Abbou

Title: "Les techniques de modélisation de systèmes dynamiques"

Bio: Rosa is ABBOU is a professor associate at IUT/ University of Nantes, and the head of QLIO department (Quality, Industrial Logistics and Organization), FRANCE. She graduated in and Electronic and Automatic Engineering from the Electronic Institute, Tizi-Ouzou University, ALGERIA, and the double competence Engineer-Manager from ENSIMAG at Grenoble. She received her Ph.D. Thesis in Automatic and Production Engineering from LAG (Automatic Laboratory at Grenoble)

Her research area deals, in a global way, with the modeling and the study of the resilience of dynamical systems under uncertainties. Dynamical systems englobe various fields of application area (aeronautic field, agri-food sector, production and transport systems, hospital field,...). The main objective is to guarantee the stability and the robustness of dynamical systems subject to specific constraints.

She is an active member at CNU (National Council of Universities) from 61th Section (Computer Engineering, Automation and Signal Processing).

Day 2: Sunday Oct 28 - Location: Documentation Centre, El Oued University

Scientific tutorials and practical workshops: Sunday, Oct 28th, 08:00-19:00

Sunday, Oct 28th, 08:00-10:50

Jean-Marc Thiriet

Title: "Sûreté de fonctionnement et Cyber-sécurité des systèmes cyber-physiques"

Bio: Jean-Marc Thiriet has been a professor in Université Grenoble Alpes (formerly Université Joseph Fourier) – Grenoble Images Parole Signal Automatique (GIPSA-Lab UMR 5216 CNRS-INPG-UJF) since September 2005. His main research and teaching activities deals with networks, dependability/safety and cyber-security of networked control systems, he has supervised or co-supervised 14 PhD, 2 are presently running. He was coordinator of the European Thematic Network Project EIE-Surveyor from 2005 to 2009. He was Director of the Gipsa-lab (Grenoble Images Parole Signal Automatique) Research Centre in Grenoble from 2011 to 2015. He is now in charge of international affairs at IUT1-Univ. Grenoble Alpes.

Coffee break & Posters presentation: 10h50-11H20

Sunday, Oct 28th, 11:20-13:10

Sami Souihi

Title: " Les réseaux logiciels (ou Software-defined networking), une révolution?"

Bio: Associate Professor of Computer Science at the Networks and Telecommunications (N&T) Department of Paris-Est University, and the LiSSi Laboratory, France. He received his MSc degree from the University of Paris 6, France in 2010, and his PhD degree from the University of Paris-Est Cret'ueil (UPEC, ex. Paris 12 University) in 2013. His research work focuses on adaptive mechanisms in large-scale dynamic networks. These mechanisms are based on context-enhanced knowledge, Network Functions Virtualization (NFV) and also on Software-Defined Networking (SDN). He also served as a Technical Program Committee (TPC) member for international conferences (e.g. IEEE SACONET, IEEE ICC, IEEE Globecom and WWIC) and as a TPC Co-Chair of the IEEE ICC 2017 Symposium on Communications QoS, Reliability and Modeling. In addition, he is a reviewer for several IEEE conferences and journals, including IEEE ICC, IEEE WCNC, IEEE Globecom, IEEE Transactions on Networking, and IEEE Transactions on Communications.

Lunch: 13h10-13H50

Sunday, Oct 28th, 13:50-15:40

Mustapha Senouci

Title: " Tools for scientific writing & Academic publishing"

Bio: Mustapha Reda Senouci received the Magister degree in mobile computing from USTHB, Algeria in 2009 and the Engineer diploma in computer science from EMP, Algeria in 2005. He received the PhD degree in mobile computing from both USTHB and the Paris-Est University, France in 2014. He is now working as an associate professor at EMP. His research interests include wireless sensor networks, the belief functions theory and optimization algorithms in wireless networks, and information-centric networks.

Coffee break & PhD. Oral presentation: 15h40-16H10

Sunday, Oct 28th, 16:10-19:00

Denis Genon-Catalot

Title: "New trends for IPV6 low bandwidth: 6LowPAN"

Bio: Denis Genon Catalot is Ass Professor in Network and Telecommunications in University Grenoble Alpe. He received his B.S. degree in Mathematics and Sciences (1982) from UCB Lyon, M.S. in Electronic Systems (1989) from INPG -Grenoble and PhD in Applied Physics from Joseph Fourier University - Grenoble France in 1993. In 1995, he was the electronic department leader for the creation of the ESISAR Engineering school of Grenoble Institute of Technology.

In 1996, he was one of the three founders of the LCIS (Laboratory for Conception and Systems Integration) research laboratory in Valence. In 1998 he is committed for the creation of the new Network and Telecom department in Valence he managed from 2008 to 2013.

His research contributions focus on embedded systems design architecture (networking, low power RF and powerline communication system). Currently, his main research activities concern DC architecture communications for Smart Building and Smart City (safety, reliability and security for energies). Dr Denis Genon-Catalot successfully supervised 7 Ph.D. students with 3 presently running and more than 10 Master and DRT Thesis. He has published more than 50 internationals conferences communications and participate to 2 chapters of scientific books and 3 industrials patents. IEEE member and EAEEIE treasurer since 2006, he has leading several industrial partnerships and was the LCIS coordinator for several CEE research program: ITEA2-OSAmI (Energy efficient building French demonstrator), ARTEMIS-ARROWHEAD (testbench for optimize electric lift control and irrigation distributed control command) and national programs BGLE-ADN4SE (new lifts safety communications)-ANR-DGA ASTRID (news challenges for wireless indoor localization)

SACONET 2018 Conference Program

Day 1: Monday, October 29 - Location: La Gazelle Hotel, El Oued

Welcome Ceremony: Monday, Oct 29, 09:00-09:15,

Pr. Abdelhamid Mellouk

Keynote: Monday, Oct 29, 09:15-10:00

Keynote Presentation: Jean-Marc Thiriet

Title: "Some Considerations on Dependability Issues and Cyber-Security of Cyber-Physical Systems"

Session Chair: Abdelhamid Mellouk

For the last recent years, there has been a convergence between computer engineering approaches and automation aspects (industrial systems, internet of things) also called cyber-physical systems, for the development of process based cyber-security strategies. Classically, security studies are based on risk analysis. Compared to classical IT approaches, the actual process (for instance a nuclear power plant or a chemical process) or system (autonomous car, drone) are taken into account in our approach for two reasons. The first reason is that the vulnerabilities of such systems or processes vary dynamically as a function of the time, the second reason is because the "standards" context is depending on the application domain and relationships with the IEC 61508 functional safety standard seems relevant. The paper presents a state of the art of problematics and proposed some approaches to these issues.

Session I: Cell Network (Monday, Oct 29, 10:00-11:20)

Session Chair: Thiago Abreu

- 1 - Joint Optimization of Communication Latency and Resource Allocation in Cloud Radio Access Networks, Niezi Mharsi (IRT SystemX, France); Makhlof Hadji (IRT System X, France)
- 2 - An Accurate Computational Algorithm for Call Admission Control in Small Cell Networks, Ahmed Alioua (University of Sciences and Technology, USTHB Algiers & RIIMA Laboratory, Algeria); Samira Moussaoui (USTHB, Algeria); Ihcen Ben M'Hamed (Constantine 2 University, Algeria)
- 3 - Improved Spectral Efficiency of Spatial Modulation, Mokrane Hamitouche (Ecole Militaire Polytechnique, Algeria); Mustapha Djeddou (Military Polytechnic School, Algeria); Mustapha Benssalah (Ecole Militaire Polytechnique, Algeria)
- 4 - Simplified ANN for 256 QAM Symbol Equalization Over OFDM Rayleigh Channel, Fateh Bouguerra and Lamir Saidi (University of Batna 2, Algeria)

Refreshments - Coffee Break: 11:20 – 11:40

Session II: Internet of Things (Monday, Oct 29, 11:40-13:00)

Session Chair: Christophe Chassot

- 5 - A Semantic Model for Service Description in the Internet of Things, Samir Berrani (Military Polytechnic School (EMP), Algeria); Ali Yachir (Paris-Est University (France), EMP School and USTHB

University (Algeria), Algeria); Badis Djamaa and Mohamed Aissani (Ecole Militaire Polytechnique, Algeria)

6 - Privacy-preserving Schemes for Fog-based IoT Applications: Threat models, Solutions, and Challenges, Mohamed Amine Ferrag (Guelma University, Algeria); Abdelouahid Derhab (King Saud University, Saudi Arabia); Leandros A. Maglaras (De Montfort University, United Kingdom (Great Britain)); Mithun Mukherjee (Guangdong University of Petrochemical Technology, Maoming, China); Helge Janicke (De Montfort University, United Kingdom (Great Britain))

7 - Efficient lightweight chaotic secure communication system for WSNs and IoT, Akila Zirem and Mustapha Reda Senouci (EMP, Algeria)

8 - Flexible WSN Data Gathering through Energy-aware Adaptive Sensing, Paulo Carvalho (Centro Algoritmi, Universidade do Minho, Portugal); João Marco C. Silva (HASLab, INESC TEC & Universidade do Minho, Portugal); Kalil A Bispo (Federal University of Sergipe, Brazil); Solange Rito Lima (Centro Algoritmi, University of Minho, Portugal)

Lunch Break: 13:00 – 14:30

Keynote: Monday, Oct 29, 14:40-15:20

Keynote Presentation: Christophe Chassot

Title: “Towards QoS management for middleware-based IoT applications in heterogeneous IT environments”

Session Chair: Salim Bitam

The Internet of Things (IoT) will have to meet the non-functional needs (QoS, security, etc.) of new business applications supported by the cloud. To do this, the interactions between the underlying application software and the communicating objects will rely on networks and communication middleware with configurable, programmable and dynamically deployable capabilities. These capabilities will be available both on pre-existing entities but also on virtual entities, i.e. that will be dynamically created in the Cloud according to the need. In this new ecosystem, meeting the end-to-end QoS needs of these future applications is a major challenge. In this context, this keynote introduces our approach for a self-adaptive QoS management for IoT applications.

Bio: Christophe Chassot has a PhD in Computer Science from the National Polytechnic Institute of Toulouse, France (INPT), 1995. He is Professor in Computer networks at the National Institute of Applied Sciences (INSA) of Toulouse, and Director of Research and Valorisation of the INSA Toulouse. He is also associate researcher at LAAS-CNRS in the Services and Architectures for the Advanced Networks (SARA) team. His main fields of interests include self-adaptive architectures and protocols, Quality of service, virtualized communication infrastructures, Internet of things and autonomic computing. He has participated in numerous national and European research projects in these areas, notably the European project NetQoS. He is also authors and co-authors of numerous international publications.

Session III: Multimedia Services (Monday, Oct 29, 15:20-16:40)

Session Chair: Yassine Hadjadj-Aoul

9 - Performance evaluation of TCP and UDP based video streaming in vehicular ad-hoc networks, Sofiane Zaidi (University of Souk Ahras, Algeria); Salim Bitam (University of Biskra & LESIA Laboratory, Algeria); Abdelhamid Mellouk (UPEC, University Paris-Est Creteil Val de Marne, France); Atef Ghanam (University of Souk Ahras Algeria, Algeria); Sahraoui Yesin (Souk Ahras University, Algeria)

10 - Hardware and Software Implementation of H.256 CABAC Encoder/Decoder, Ouahiba Menasri (USTHB, Algeria); Skoudarli Abdellah, A. (USTHB Alger Algeria, Algeria); Aichouche Belhadj Aissa (USTHB, Algeria); Mohamed Salah Azzaz (EMP, Algeria)

11 - Towards the Virtualization of Transport-level Functions and Protocols, El-Fadel Bonfoh (LAAS-CNRS of France, France); Samir Medjiah (LAAS-CNRS & Université Paul Sabatier, France); Christophe Chassot (LAAS-CNRS, Université de Toulouse & INSA Toulouse, France); Jose Aguilar (Universidad de Los Andes & PROMETEO Resarcher, Universidad Tecnica Particular de Loja, Venezuela)

12 - Compressed Sensing Investigation in an End-to-End Rayleigh Communication System: Speech Compression, Houria Haneche (University of Sciences and Technology Houari Boumediene, Algeria); Bachir Boudraa (USTHB University of Science & Technology, Algeria); Abdeldjalil Ouahabi (PolytechTours, France)

Refreshments - Coffee Break: 16:40 – 17:00

Session IV: Wireless Sensor Network & Routing (Monday, Oct 29, 17:00-18:00)

Session Chair: Rosa Abbou

13 - Smart Ring Search for Reactive Routing Protocols in the Internet of Things, Badis Djamaa (Ecole Militaire Polytechnique, Algeria); Mustapha Reda Senouci (EMP, Algeria)

14 - A routing approach based on (N,p) -equitable b -coloring of graphs for Wireless Sensor Networks, Samiha Ait Taleb (Bejaia University & LIMED Laboratory, Algeria); Hachem Slimani (LIMED Laboratory, University of Bejaia, Algeria); Mohamed Essaid Khanouche (Medical Computing Laboratory (LIMED) - University of Bejaia, Algeria)

15 - Towards A Multi-Objective Reinforcement Learning Based Routing Protocol for Cognitive Radio Networks, Chouaib Messikh and Necereddine Zarour (Université Constantine 2, Algeria)

Day 2: Tuesday October 30 - Location: La Gazelle Hotel, El Oued

Keynote: Tuesday, Oct 30, 09:00-09:30

Keynote Presentation: Jean-Michel Sanner, Orange

Title: "Multi-objective multi-constrained QoS Routing in large-scale networks: A genetic algorithm approach"

Session Chair: Yassine Hadjadj-Aoul

The growing need for a simplified management of network infrastructures has recently led to the emergence of software-defined networking (SDN), which enables a centralized path calculation. The diversification of services, as well as the need of rapid path deployment, raises, however, challenges in routing algorithms. Moreover, Quality of Service (QoS) requirements and conflicts between them pile up the complexity of the problem. An intuitive method is formulating the problem as an Integer Linear Programming and solving it by an approximation algorithm. This method tends to have a specific design and usually suffers from unacceptable computational delays to provide a sub-optimal solution. Genetic algorithms (GAs) are deemed as a promising solution to cope with highly complex optimization problems. However, the convergence speed and the quality of solutions should be addressed in order to fit into practical implementations. In this paper, we propose a genetic algorithm-based mechanism to address the multi-constrained multi-objective routing problem. Using a repairer to reduce the search space to feasible solutions, results confirm that the proposed mechanism is able to find the Pareto-optimal solutions within a short run-time.

Bio: Jean-Michel Sanner is a research engineer in Orange Labs, in the Orange Lab Network department (OLN). His team is involved in tasks concerning the evolution of the infrastructure of the operator in the context of NFV and SDN paradigms. One of them is model checking usage researches to provide reliable networks services in the future virtualized infrastructure of the operator.

Jean-Michel Sanner is also a contributor of the Institute Research Institute B<>COM, in the networks and security department. His work inside B<>COM is oriented on resources allocation algorithms in virtualized infrastructure. He is currently doing a PHD on SDN architectures and resources allocation algorithms.

Session V: VANET (Tuesday, Oct 30, 09:30-10:50)

Session Chair: Salim Bitam

16 - On-Demand Routing for Urban VANETs using Cooperating UAVs, Omar Sami Oubbati and Nouredine Chaib (University of Laghouat, Algeria); Abderrahmane Lakas (UAE University, United Arab Emirates); Salim Bitam (University of Biskra & LESIA Laboratory, Algeria)

17 - Privacy Preserving Scheme for pseudonym refilling in VANET, Leila Benarous (University of Abou Bekr Belkaid, Tlemcen, Algeria); Benamar Kadri (University of Tlemcen, Algeria)

18 - Cross-layer approach dedicated to HEVC low delay temporal prediction structure streaming over VANETs, Mohamed Aymen Labiod (University Polytechnique Hauts-de-France, IEMN, DOAE, France & LASA, Badji Mokhtar University Annaba, Algeria); Mohamed Gharbi (Iemn/Doae Umr Cnrs, France); François-Xavier Coudoux and Patrick Corlay (University of Valenciennes, France); Doghmane Nouredine (University of Annaba, Algeria)

19 - Opportunistic Data Mules for Short Delay Smart city Applications, Fairouz Chahbour (Boumerdes University, Algeria); Moussaoui Samira and Doukha Zouina (USTHB, Algeria); Guerroumi Mohamed (University of USTHB, Algeria)

Refreshments - Coffee Break: 10:50 – 11:20

Session VI: WSN and Cognitive Radio (Tuesday, Oct 30, 11:20-13:00)

Session Chair: Mustapha Senouci

20 - Beamspace Unitary ESPRIT Parameter Channel Estimation For Pilot Contamination Mitigation, Nessrine Smaili (Communication Systems Laboratory, Institute of Electrical and Electronic, University of Boumerdes, Algeria)

21 - A New k-Coverage Model To Determine RedundantSensors in Wireless Sensor Networks, Chenait Manel (University of Sciences and Technology Houari Boumediene (USTHB), Algeria); Bahia Zebbane (University of Science and Technology Houari Boumedienne (USTHB), Algeria); Nadjib Badache (University of Sciences and Technology Houari Boumediene (USTHB), Algeria)

22 - Placement optimization of wireless mesh routers using firefly optimization algorithm, Lamri Sayad (University of M'sila, Algeria); Aïssani Djamil (LAMOS, university of Bejaia, Algeria); Louiza Bouallouche-Medjkoune (University of Bejaia, France)

23 - Joint Channel Coding and Cooperative Network Coding on PSK Constellations in Wireless Networks, Elias Benamira (LISIC Laboratory, USTHB University, Algeria); Fatiha Merazka (LISIC Laboratory. USTHB University, Algeria); Gunes Karabulut Kurt (Istanbul Technical University, Turkey)

24 - Bootstrap approach for cognitive radio, Toufik Mouchini (Military Polytechnic School, Algeria); Khalida Ghanem (Advanced Technologies Center (CDTA), Algeria); Mustapha Djeddou (Military Polytechnic School, Algeria); Abdelhak M Zoubir (Darmstadt University of Technology, Germany)

Lunch Break: 13:00 – 14:30

Keynote: Tuesday, Oct 30, 14:40-15:20

Keynote Presentation: Rosa Abbou

Title: "Methodology of conception, implementation and validation of an IEC 61850 communication system in smart grids demonstration platform"

Session Chair: Sami Souihi

The international standard of communication IEC 61850 defines a communication protocol for intelligent electronic devices (IEDs) in order to standardize communication in electrical substations. Thus, the interoperability between devices from different manufacturers as well as the insurance of the overall security of substation automation systems (SAS) architecture through its communication network becomes now attainable with this new communication standard. In this context, RTE has modeled their new SAS according to the IEC 61850 standard. A theoretical model has been specified modeling the overall functions and equipment. However, this data model is theoretical and has not been validated yet. Hence, the aim of this study that consists in the validation and the implementation of this RTE IEC 61850 model on a demonstration platform. The performance analysis on the 61850 communication system is discussed.

Bio: Rosa ABBOU is an associate professor at IUT/ University of Nantes, and the head of QLIO department (Quality, Industrial Logistics and Organization), FRANCE. She graduated in Electronic and Automatic Engineering from the Electronic Institute, Tizi-Ouzou University, ALGERIA, and the double competence Engineer-Manager from ENSIMAG at Grenoble. She received her Ph.D. Thesis in Automatic and Production Engineering from LAG (Automatic Laboratory at Grenoble). Her research area deals, in a global way, with the modeling and the study of the resilience of dynamical systems under uncertainties. Dynamical systems englobe various fields of application area (aeronautic field, agri-food sector, production and transport systems, hospital field,...). The main objective is to guarantee the stability and the robustness of dynamical systems subject to specific constraints. She is an active member at CNU (National Council of Universities) from 61th Section (Computer Engineering, Automation and Signal Processing).

Extended oral session (Tuesday, Oct 30, 15:20-16:20)

Session Chair: Abdelhamid Mellouk

EoS1 - Partial Contention-Free D2D Discovery for Proximity-Based Services in Cellular Network, Leila Nasraoui (University of Manouba, Tunisia)

EoS2 - Flow/Interface Association for Multihomed Mobile Terminals in Heterogeneous Wireless Networks, Mohamed Abdelkrim Senouci (UPEC, France); Hadj Senouci (Moulay Tahar University, Algeria); Hoceni Said (University Paris Est, France); Abdelhamid Mellouk (UPEC, University Paris-Est Creteil Val de Marne, France)

EoS3 - The Flooding Attack in Low Power and Lossy Networks: A Case Study, Nguyen Tanh, Tri Ngo, Duc Tran, Hai Anh Tran and Trong Tung Bui (Hanoi University of Science and Technology, Vietnam)

EoS4 - Network troubleshooting: Survey, Taxonomy and Challenges, Van Tong (University of Paris Est Creteil, France); Hai Anh Tran (Hanoi University of Science and Technology, Vietnam); Sami Souihi (University Paris Est UPEC, France); Abdelhamid Mellouk (UPEC, University Paris-Est Creteil Val de Marne, France)

EoS5 - Hardware implementation of multi-scroll chaos based architecture for securing biometric templates, Mohamed Salah Azzaz (EMP, Algeria); Tanougast Camel (University de Lorraine, France); Abdelmadjid Maali (EMP, Algeria); Mustapha Benssalah (Ecole Militaire Polytechnique, Algeria)

EoS6 - Using LOD and Fuzzy Ontology to Annotate Industrial Schemas, Assia Brek (University of Constantine 2 Abdelhamid Mehri & Constantine, Algeria)

EoS7 - Linked Open Data for New Item Problem Solving in Collaborative Recommender Systems, Hanane Zitouni (University Constantine 2 : Abdelhamid Mehri, Algeria); Souham Meshoul (University Constantine 2 & NTIC College, Algeria); Anfal Kadi (University Constantine 2 : Abdelhamid Mehri, Algeria)

EoS8 - Virtual Reality Collaborative System equipped with Low-cost Force Feedback, Samir Benbelkacem (Centre de Développement des Technologies Avancées & Polytechnic National School, El-Harrach, Algiers, Algeria)

EoS9 - Fuzzy clustering for misbehavior detection in VANET, Hanane Amirat (Ouargla univ, Algeria); Nasreddine Lagraa (Amar Thelidji University, Laghouat & LIM Laboratory, Algeria); Chaker abdelaziz Kerrache (University of Ghardaia, Algeria); Youcef Ouinten (University of Laghouat, Algeria)

EoS10 - Medical Images Eryption Based on Elliptic Curve Cryptography and Chaos Theory, Mustapha Benssalah and Yasser Rhaskali (Ecole Militaire Polytechnique, Algeria); Mohamed Salah Azzaz (EMP, Algeria)

EoS11 - MAAC Protocol: Mobile Agents based Address Auto-Configuration Protocol for MANET, Afaf Korichi (University of Science and Technology Houari Boumediene, Algeria); Youcef Zafoune (USTHB, University of Algiers, Algeria)

EoS12 - A Tree Decision Based Approach for Selecting Software Development Methodology, Abdelghani Bakhtouchi and Riadh Rahmouni (Ecole Militaire Polytechniques, Algeria)

EoS13 - Automatic removal of ocular artifacts in EEG signals for driver's drowsiness detection: A survey, Mohamed Mohammedi (Unité de Recherches LaMOS, Faculté des Sciences Exactes, Université de Bejaia, Algeria); Mawloud Omar (Laboratoire LIMED, Faculté des Sciences Exactes, Université de Bejaia, Algeria); Abdelmadjid Bouabdallah (Universite de Technologie - Compiegne, France)

EoS14 - Smart Control of Mobile Robot Based on Deep Learning, Khaled Khnissi (21 Charles de Gaulle 1000 tunis & Tunisia, Tunisia)

Refreshments - Coffee Break: 16:20 – 16:40

Session VII: Cloud Computing & SDN (Tuesday, Oct 30, 16:40-18:20)

Session Chair: Sami Souihi

25 - Essentiality of Resource and Service-Task Characterization in the Coordinated Fog-to-Cloud Paradigm, Souvik Sengupta (Universitat Politcnica de Catalunya & CRAAX, Spain); Jordi Garcia and Xavier Masip-Bruin (Universitat Politècnica de Catalunya (UPC) & Advanced Network Architectures Lab (CRAAX), Spain)

26 - Distributed Inter-Domain Multi-Constrained Routing, Mohand Yazid Saidi (University of Paris 13, France)

28 - Semantic Networks Based Approach for SaaS management in Cloud Computing, Lynda Ouchaou (University of Science and Technology Houari Boumediene, Algeria); Hassina Nacer (University of Science and Technology HouariBoumediene (USTHB), Algeria); Hachem Slimani (University of Abderrahmane Mira, Bejaia, Algeria); Sarra Boukria (University of Science and Technology Houari Boumediene, Algeria)

29 - An extended and flexible SDN control plane, Jean-Michel Sanner (Orange Labs, France); Pierrick Louin (ORANGE, France); Yassine Hadjadj-Aoul (University of Rennes 1, France); Meryem Ouzzif (Orange Labs, France)

30 - Formalizing UML/OCL Multiple Inheritance with FoCaLiZe, Messaoud Abbas (El Oued University & LABTHOP, Algeria); Ben-Yelles Choukri-Bey (University Grenoble Alpes, LCIS, France); Renaud Rioboo (ENSIIE, SAMOVAR, France)

Gala Dinner: 19:30 – 01:00

Day 3: Wednesday October 31 - Location: La Gazelle Hotel, El Oued

Keynote: Wednesday, Oct 31, 09:45-10:20

Keynote Presentation: Denis Genon-Catalot
Title: “News challenges and protocols for DC bus for Smart Building”
Session Chair: Nouredine Zerhouni

This invited speaker will present news trends for electric DC microgrids for Smart Homes and Smart Cities. With the emergence of the renewable energy, the DC bus could optimize electricity power efficiency for smart homes (green home). Since the initial choice for alternative current transportation in 1880, the electrical architecture distribution haven't been change with one direction distribution to the consumers through high voltage lines. But AC power distribution therefore is so wasteful due to number of converters AC/AC and AC/DC with consequent energy losses (15% energy per converter). Nowadays most of renewable energy sources as solar panel are DC and all modern appliances are also DC powered (LED lighting, IT, electric car ..) so we propose a smart DC grid distribution architecture for smart homes based on 2 levels voltages 48 VDC (Power over Ethernet) and 400 HVDC bus for improve electrical efficiency.

We proposed a microgrid DC bus with distributed control command for optimal energy resources management based on self-consumption and peak shaving for the grid.

Session VIII: Conceptual Modelling and applications (Wednesday, Oct 31, 10:20-11:20)

Session Chair: Nouredine Zerhouni

31 - Ontological Colored Petri Nets ++(OCPN++): Application in the biologic domain, Lynda Dib (Lase-laboratory, Algeria)

32 - Complex event processing distributed architecture for Massive Open Online Courses, Sakina Benarbia (Université Internationale de Rabat & Ecole Mohammadia des Ingénieurs, Morocco); Nabih Alaoui (Université Internationale de Rabat, Morocco); Samir Bennani (Mohammadia Engineering School, Morocco)

Refreshments - Coffee Break: 11:20 – 11:40

Session IX: Security (Wednesday, Oct 31, 11:20-13:00)

Session Chair: Jean-Marc Thiriet

33 - Deep Learning for Fault Diagnosis based on short-time Fourier transform, Tarak Benkedjough (EMP BP 17 Bordj Elbahri Algiers Algeria, Algeria); Nouredine Zerhouni (UMR CNRS 6174 - UBFC / UFC / ENSMM / UTBM, FC-LAB Research, France); Said Rechak (Ecole Nationale Polytechnique, Algeria)

34 - A New Chaos-based Text Encryption to Secure GPS Data, Mohamed Salah Azzaz and Mohamed Abdel kader Krimil (EMP, Algeria)

35 - A Novel approach for bootkit detection in Android Platform, Tayeb Kenaza (Ecole Militaire Polytechnique, Algeria); Khireddine Garri (Université des Sciences Technologie Houari Boumediene & Institut National de Criminalistique et de Criminologie, Algeria); Mohamed Aissani (Ecole Militaire Polytechnique, Algeria)

36 - A practical implementation of key management scheme based on CL-PKC to secure D2D communications, Othmane Nait Hamoud (Ecole Nationale Supérieur d'Informatique, Algeria); Tayeb Kenaza (Ecole Militaire Polytechnique, Algeria); Yacine Challal (University of Technology of Compiègne & Heudiasyc lab. UMR CNRS, France)

Lunch Break: 13:00 – 14:30

Session X: Networks and Applications (Wednesday, Oct 31, 14:40-15:30)

Session Chair: Mohamed Gharbi

37 - Virtualized Dynamic transcoding service for adaptive streaming video over HTTP in 5G systems, Einar Meyerson (i2Cat, Spain); Daniel Guija (I2CAT, Spain); Muhammad Shuaib Siddiqui (Fundació i2CAT, Internet i Innovació Digital a Catalunya, Spain); David Gómez Micó (I2cat, Spain); Isaac Fraile (Fundacio i2CAT, Spain)

38 - Enhancing cost performance using Symbiotic Organism Search based algorithm in Cloud, Ali Belgacem (Ecole Military Polytechnic, Algeria); Kadda Beghdad Bey (Military Polytechnic School Algiers, Algeria); Hassina Nacer (University of Science and Technology HouariBoumediene (USTHB), Algeria)

39 - An Optimized Relative Coordinates Rumor Routing (ORCRR) for Wireless Sensor Networks, Leila Kheroua (USTHB Algiers, Algeria); Samira Moussaoui (USTHB University, Algeria); Nour el houda Baroud and Ouanassa Chaib (USTHB, Algeria)

40 - Flexible WSN Data Gathering through Energy-aware Adaptive Sensing, Paulo Carvalho (Centro Algoritmi, Universidade do Minho, Portugal); João Marco C. Silva (HASLab, INESC TEC & Universidade do Minho, Portugal); Kalil A Bispo (Federal University of Sergipe, Brazil); Solange Rito Lima (Centro Algoritmi, University of Minho, Portugal)

Refreshments - Coffee Break: 15:30 – 15:50

End of the conference: 16h00

Day 3: Wednesday, October 31th- Location: the surroundings landscape of El Oued

**Tourist trip (Zaouia, Café Désert, Souk): Wednesday, October 31th,
16h15-19h30.**



Conference abstracts

Session 1: Cell Network

1 - Joint Optimization of Communication Latency and Resource Allocation in Cloud Radio Access Networks

Niezi Mharsi (IRT SystemX, France); Makhlouf Hadji (IRT System X, France)

This paper addresses a constrained resource allocation problem in Cloud Radio Access Networks (C-RAN). This problem consists in determining the best strategies to assign antennas (Remote Radio Head - RRH) demands to available edge data centers (pool of BaseBand Units - BBU) when jointly optimizing communication latency and resource consumption. Telecommunications Service Providers (TSPs) need new algorithms that enable to jointly reduce their OPEX and CAPEX when embracing C-RAN technology. This paper proposes a mathematical model based on an integer linear programming formulation, to optimally solve the constrained resource allocation problem. To scale and handle much larger number of antennas and edge data centers in acceptable times, a faster and more efficient algorithm based on matroid theory is provided. Simulation results show the scalability of our algorithms and quantify the potential benefits of the discussed approaches in the context of C-RAN.

2 - An Accurate Computational Algorithm for Call Admission Control in Small Cell Networks

Ahmed Alioua (University of Sciences and Technology, USTHB Algiers & RIIMA Laboratory, Algeria); Samira Moussaoui (USTHB, Algeria); Ihen Ben M'Hamed (Constantine 2 University, Algeria)

Small cell networks (SCNs) are the recent evolution of the cellular mobile networks. Based on the small-cell concept, SCNs aim to increase the data capacity and the subscriber's population. Call admission control (CAC) is used in SCNs to prevent the system congestion and the service degradation for in-progress calls by restricting the access to the network. In the literature, almost all the existing works on CAC in cellular mobile networks with guard channels and repeated blocked calls propose a multi-server retrial queue model, which is generally represented by a two-dimensional continuous time Markov chain (CTMC). For which, no analytical solution is available and only numerical approximation can be studied. In this paper, we propose a novel efficient analytical approach based on a semi-recursive algorithm for the numerical computation of the CTMC steady state probabilities resulted from a finite population CAC retrial queuing model. We represent using the retrial queue model a CAC scheme with multiple guard channels that consider repeated attempts of fresh blocked calls and impatience handover calls. In our model, the small-cells population is considered finite. In addition, we develop the principal stationary performance indices. The numerical results show that the proposed algorithm is substantially more accurate and achieves efficient computation. Also, demonstrates that the consideration of cells with small size can achieve better performances in term of the call blocking probability.

3 - Improved Spectral Efficiency of Spatial Modulation

Mokrane Hamitouche (Ecole Militaire Polytechnique, Algeria); Mustapha Djeddou (Military Polytechnic School, Algeria); Mustapha Benssalah (Ecole Militaire Polytechnique, Algeria)

In this paper, we deal with Spatial Modulation (SM) communication system. One of the drawbacks of SM is its limitation in increasing the data rates. Hence, we propose a Modified Spatial Modulation Multiple-Input-Multiple-Output scheme (MSM-MIMO) to enhance the spectral efficiency compared to the conventional scheme. In this proposal, we add a new source of information carrying which consists in using a battery of predefined orthogonal waveforms. Obtained results are promising and outperform the ones of conventional SM in terms of bit error rate (BER) and spectral efficiency. Furthermore, an analytical lower bound of the new system's capacity has been derived.

4 - Simplified ANN for 256 QAM Symbol Equalization Over OFDM Rayleigh Channel

Fateh Bouguerra and Lamir Saidi (University of Batna 2, Algeria)

Increasing the specter efficiency has been an object for many studies. In this paper, we investigate the higher modulation 256 QAM using Artificial Neural Networks (ANN) as an equalization model. Multilayer perceptron (MLP) and Radial Basis Function (RBF) are considered as non-linear equalizer based on back-propagation and Euclidian norm respectively. They are designed in a simplified architecture and employing some performing strategies for a better learning, and an increased processing speed. ANNs are presented and applied with Orthogonal Frequency Division Multiplexing (OFDM) over Rayleigh fading channel in order to optimize the modulation scheme's processing and performances despite its sensitivity to noise. The models will be compared to the theoretical BER simulation in terms of BER, and also in term of MSE to show performance and efficiency; by that, this work will show the supremacy of MLP in decision making with this 256 QAM.

Session 2: Internet of Things

5 - *A Semantic Model for Service Description in the Internet of Things*

Samir Berrani (Military Polytechnic School (EMP), Algeria); Ali Yachir (Paris-Est University (France), EMP School and USTHB University (Algeria), Algeria); Badis Djamaa and Mohamed Aissani (Ecole Militaire Polytechnique, Algeria)

Internet of Things (IoT) applications are seen as complex eco-systems regarding their features such as the high diversity of entities and the open, heterogeneous, and dynamic nature of the IoT environments. As a consequence, data interpretation and processing capacity, the scalability, the reuse, and the autonomous making decisions are strongly restricted and compromised for the top level systems. To tackle these issues, Semantic Technologies are considered as a solution due to the tools and techniques they provide to address this diversity. In this work, we present an abstract and complete semantic model for an IoT service based application. It takes into account the high variety of IoT systems, the specific IoT environment characteristics, and the user interaction with whole IoT platforms. We put forward a modular and generic knowledge model that allows semantic definition and representation of applications, entities (spaces and/or objects), IoT devices, IoT services, domain ontologies, user requests, etc. This ontological model improves semantic searching and querying capabilities by hiding the heterogeneity of entities and their produced data. It allows a designer to choose without any restriction the appropriate public and/or private ontologies. The use-case scenarios test shows clearly the interest, feasibility, and suitability of the proposed knowledge model for the IoT applications.

6 - *Privacy-preserving Schemes for Fog-based IoT Applications: Threat models, Solutions, and Challenges*

Mohamed Amine Ferrag (Guelma University, Algeria); Abdelouahid Derhab (King Saud University, Saudi Arabia); Leandros A. Maglaras (De Montfort University, United Kingdom (Great Britain)); Mithun Mukherjee (Guangdong University of Petrochemical Technology, Maoming, China); Helge Janicke (De Montfort University, United Kingdom (Great Britain))

In this paper we present a survey of existing privacy-preserving schemes for fog-based Internet of Things (IoT) applications. We start by describing fundamentals of fog computing architecture and presenting an overview of the fog-based IoT applications. Then we discuss major attacks in fog-based IoT applications and we provide a taxonomy and a side-by-side comparison of the state-of-the-art methods towards secure and privacy-preserving fog-based IoT applications with respect to network model, specific security goals, performance, limitations, and complexity. Based on the existing security models, we classify privacy-preserving models for fog-based IoT applications in eight categories, including, holistic privacy, privacy-preserving aggregation, trajectory privacy, conditional privacy preservation, differential privacy, data privacy, user's privacy, and location privacy. In addition, we highlight open research challenges and discuss possible future research directions in the privacy-preserving for fog-based IoT applications.

7 - *Efficient lightweight chaotic secure communication system for WSNs and IoT*

Akila Zirem and Mustapha Reda Senouci (EMP, Algeria)

Interconnected embedded devices are the key building block for wireless sensor networks (WSNs) and the Internet of Things (IoT). Many real-life WSNs and IoT applications require cryptographic security mechanisms to ensure data confidentiality during transmission. This paper presents the design of an efficient chaos-based secure communication system and its optimized implementation on an 8-bit microcontroller. The proposed cryptosystem performs one confusion-diffusion round at the byte level by combining the centrifuge operation and the XOR operator. Confusion and diffusion layers are endowed with chaotic sequences from two discrete one-dimensional logistic maps. The efficiency and effectiveness of the proposed cryptosystem are validated at both statistical and implementation levels.

8 - Flexible WSN Data Gathering through Energy-aware Adaptive Sensing

Paulo Carvalho; João Marco C. Silva; Kalil A Bispo; Solange Rito Lima

The multitude of Wireless Sensor Networks (WSNs) environments, being typically resource-constrained, clearly benefit from properties such as adaptiveness and energy-awareness, in particular, in presence of demanding data gathering applications. This paper proposes a self-adaptive, energy-aware sensing scheme for WSNs (e-LiteSense), which aims at self-adjusting the data gathering process to each specific WSN context, capturing accurately the behaviour of physical parameters of interest yet reducing the sensing overhead. The adaptive scheme relies on a set of low-complexity rules capable of auto-regulate the sensing frequency according to the parameters variability and energy levels. The proof-of-concept resorts to real-world datasets to provide evidence of e-LiteSense ability to optimise the data gathering process according to energy levels, improving the trade-off between accuracy and WSN lifetime.

Session 3: Multimedia Services

9 - Performance evaluation of TCP and UDP based video streaming in vehicular ad-hoc networks

Sofiane Zaidi (University of Souk Ahras, Algeria); Salim Bitam (University of Biskra & LESIA Laboratory, Algeria); Abdelhamid Mellouk (UPEC, University Paris-Est Creteil Val de Marne, France); Atef Ghanam (University of Souk Ahras Algeria, Algeria); Sahraoui Yesin (Souk Ahras University, Algeria)

Video streaming over vehicular ad-hoc network (VANET) is emerged as an important research area to increase communication intent for drivers. Many video streaming applications in VANET are used to improve safety issues and help to have a more comfortable ride. However, there are some important challenges; including high VANET dynamic topology, links disconnection and transmission video errors which decrease the video quality in such networks. The transport layer protocols serve as a link between the application layer protocols and the services provided by the network layer. The two most popular transport layer protocols are User Datagram Protocol (UDP) and Transmission Control Protocol (TCP). In this paper, we propose an adaptation of UDP and TCP protocols for video streaming in VANET. In addition, an evaluation and comparison between these protocols are performed in order to choose the better transmission protocol at transport layer level for video streaming in VANET. Some objective metrics are considered in this study namely throughput, packet delivery ratio, end-to-end delay and PSNR.

10 - Hardware and Software Implementation of H.265 CABAC Encoder/Decoder

Ouahiba Menasri (USTHB, Algeria); Skoudarli Abdellah, A. (USTHB Alger Algeria, Algeria); Aichouche Belhadj Aissa (USTHB, Algeria); Mohamed Salah Azzaz (EMP, Algeria)

Video compression is an essential operation in Ultra High Definition (UHD) real time applications. Several techniques for video compression exist nowadays, but the H.265 standard is latest one. High Efficiency Video Coding (HEVC) or H.265 codec is becoming the most important consumer application platforms in the current days. Compared with its predecessor AVC (Advanced Video Codec) standard, it can support the UHD picture at 120 fps. HEVC adopt many advanced techniques such as SAO filter, intra and inter prediction and Context-based Adaptive Binary Arithmetic Coding (CABAC). CABAC is considered as sole entropy coding used in H.265 codec. In this work, we propose hardware and software implementation of HEVC CABAC encoder. First the algorithm is implemented on MATLAB software for controlling the encoding process. Second, in hardware implementation the storage and resources cost can be reduced by running multiple arithmetic encoding engines at the low level (coding block) and enabling the pipeline within the arithmetic coding engine. FPGA Synthesis results demonstrate that our proposed architecture can process 2 regular and 5 bypassed bins per cycle to provide the tradeoff between the throughput and the resources cost.

11 - Towards the Virtualization of Transport-level Functions and Protocols

El-Fadel Bonfoh (LAAS-CNRS of France, France); Samir Medjiah (LAAS-CNRS & Université Paul Sabatier, France); Christophe Chassot (LAAS-CNRS, Université de Toulouse & INSA Toulouse, France); Jose Aguilar (Universidad de Los Andes & PROMETEO Resarcher, Universidad Tecnica Particular de Loja, Venezuela)

The Transport layer of OSI and TCP/IP models provides all necessary services for end-to-end communication between application processes. There are a huge amount of works and propositions of Transport level protocols and services to satisfy applications requirements. Unfortunately, the vast majority of applications refer only to TCP for reliable and ordered services or to UDP for unreliable and low latency services. This is due to the fact that the deployment of all new Transport protocol proposal is mainly hampered by (1) the poor socket API exposed by the Transport layer to applications, (2) the introduction of middleboxes within the Internet and (3) the tedious work required to modified Operating System kernel. At the same time, the development of network functions virtualization opportunities is growing in the world of carrier networks and more generally. In this paper, after a survey on Transport protocols deployment issues, we present a novel approach to realize the effective deployment of Transport protocols and services by leveraging virtualization principles. At last, we present a new way to efficiently manage Transport functions and to dynamically build Transport services through a graph-based protocol model.

12 - Compressed Sensing Investigation in an End-to-End Rayleigh Communication System: Speech Compression

Houria Haneche (University of Sciences and Technology Houari Boumediene, Algeria); Bachir Boudraa (USTHB University of Science & Technology, Algeria); Abdeldjalil Ouahabi (PolytechTours, France)

In this paper, the compressed sensing (CS) technique is investigated in an end-to-end mobile communication system. The purpose is to reduce the transmission chain by performing simultaneously the acquisition and the compression and to reduce the amount of data for transmission through a Rayleigh channel. Orthogonal frequency division multiplexing, receive antenna diversity, and maximum ratio combining technique are used to mitigate the multipath fading effects due to the channel. In addition, l_1 minimization method is used to perform the recovery. Perceptual evaluation of speech quality and root mean square error measures are used to evaluate the performances of the proposed system. CS allows improving the communication system by saving resources when reducing processing and transmission rate, ensures reliability and robustness against noise, and secures the communications. These results can be investigated in many applications where the rapidity is the most important constraint such in the case of military mobile communication.

Session 4: Wireless Sensor Network & Routing

13 - Smart Ring Search for Reactive Routing Protocols in the Internet of Things

Badis Djamaa (Ecole Militaire Polytechnique, Algeria); Mustapha Reda Senouci (EMP, Algeria)

This paper tackles the issue of efficient route request (RREQ) dissemination in reactive routing protocols targeting low-power and lossy wireless networks. It provides a novel mechanism to achieve expanding ring propagation of route requests in an efficient manner by propagating an RREQ the highest distance possible and trying to stop its propagation when a route is found. It is designed to be stateless, local, and effective. The idea is to slightly delay request propagation in order to provide objective functions that locally decide on what to do next. If a route is discovered, aware nodes collaborate locally to disseminate such information and stop RREQ propagation. Smart ring is implemented and integrated to a LOADng implementation in Contiki. Simulation results showed the capacity of such a technique to minimize the cost of propagating route requests and hence minimizes the effects of the broadcast storm problem at the expense of an additional route discovery time. The trade-offs between these two parameters is to be tailored depending on the application needs.

14 - A routing approach based on (N,p) -equitable b -coloring of graphs for Wireless Sensor Networks

Samiha Ait Taleb (Bejaia University & LIMED Laboratory, Algeria); Hachem Slimani (LIMED Laboratory, University of Bejaia, Algeria); Mohamed Essaid Khanouche (Medical Computing Laboratory (LIMED) - University of Bejaia, Algeria)

The main purpose of Wireless Sensor Networks (WSNs) is to route the data collected by the nodes to a particular node called base station (sink). Due to the constraints characterizing this type of network, especially in terms of energy, data routing with minimization of the consumed energy is one of the most important challenges. In this paper, we propose an (N,p) -equitable b -Coloring based Semi-Hierarchical Routing Protocol (eb-CSHiRoP) for wireless sensor networks. The (N,p) -equitable b -coloring of graphs is used to elect cluster-heads and also to set up a semi-hierarchical data routing scheme. An analytical comparison between eb-CSHiRoP and another competing protocol in the literature is performed, in order to evaluate the performances of the proposed protocol. The comparison results show the efficiency of the eb-CHiRoP protocol in terms of energy consumption and transmission delay of collected data to the sink.

15 - Towards A Multi-Objective Reinforcement Learning Based Routing Protocol for Cognitive Radio Networks

Chouaib Messikh and Necereddine Zarour (Université Constantine 2, Algeria)

Cognitive radio is a technology created to address the limits found in traditional technologies used nowadays, as we go towards more heterogeneous and autonomous ecosystems. In this work, we propose a robust and efficient interaction model for Cognitive Radio Networks. This model is based on the Multi-Objective Reinforcement Learning approach while taking into consideration the multiple application requirements that may differ from one node to another in the same network.

Session 5: VANET

16 - On-Demand Routing for Urban VANETs using Cooperating UAVs

Omar Sami Oubbati and Nouredine Chaib (University of Laghouat, Algeria); Abderrahmane Lakas (UAE University, United Arab Emirates); Salim Bitam (University of Biskra & LESIA Laboratory, Algeria)

Vehicular ad hoc networks (VANETs) are characterized by frequent routing path failures due to the high mobility caused by the sudden changes of the direction of vehicles. The routing paths between two different vehicles should be established with this challenge in mind. Stability and connectedness are a mandatory condition to ensure a robust and reliable data delivery. The idea behind this work is to exploit a new reactive routing technique to provide regulated and well-connected routing paths. Unmanned Aerial Vehicles (UAVs) or what are referred to as drones can be both involved in the discovery process and be full members in these discovered paths in order to avoid possible disconnections on the ground when the network is sparsely connected. The evaluation of this technique is performed using NS-2 simulator and its performances are compared with on-demand routing protocols dedicated for VANETs. Interesting outcomes are distinguished showing a reduced end-to-end delay and a high delivery ratio, which proving that this heterogeneous communication between vehicles and UAVs is able to extend the network connectivity.

17 - Privacy Preserving Scheme for pseudonym refilling in VANET

Leila Benarous (University of Abou Bekr Belkaid, Tlemcen, Algeria); Benamar Kadri (University of Tlemcen, Algeria)

The privacy in VANET is an essential issue because the identity and the real-time location of the user can threaten his safety if misused. To address this problem, many researchers focused on the use of certified pseudonyms and their change strategies to ensure the unlinkability and anonymity. IEEE 1609.2 Standard defined the certificates formats and pseudonym certifying process. However, it did not precise the communication procedure between the certifying authority and the requesting vehicle. In this paper, we propose a new privacy preserving scheme for pseudonym on-demand refilling, in which the vehicle authenticates itself anonymously to the Regional authority subsidiaries of central trusted authority to request new set of pseudonyms. Our proposal is formulated using Burrows, Abadi and Needham (BAN) logic to prove its correctness, it is also specified and verified using SPAN (Security Protocol ANimator) and AVISPA (Automated Validation of Internet Security Protocols and Applications) tools. The logical demonstration showed that the authentication can be achieved while the privacy is preserved. The SPAN and AVISPA tools proved that it is secure against reply attack and session hijacking.

18 - Cross-layer approach dedicated to HEVC low delay temporal prediction structure streaming over VANETs

Mohamed Aymen Labiod (University Polytechnique Hauts-de-France, IEMN, DOAE., France & LASA, Badji Mokhtar University Annaba, Algeria); Mohamed Gharbi (Iemn/Doae Umr Cnrs, France); François-Xavier Coudoux and Patrick Corlay (University of Valenciennes, France); Doghmane Nouredine (University of Annaba, Algeria)

High-quality delivery of compressed video over vehicular networks is a very challenging task. In this paper, we propose a cross-layer mechanism dedicated to high-efficiency video coding (HEVC) low delay temporal prediction structure in order to improve the video transmission through vehicular ad hoc networks (VANETs). Compressed video is obtained thanks to the state-of-the-art HEVC video coder which exploits new efficient coding tools and structures. Then, a mechanism is proposed which accounts for the type of each frame as well as the network traffic load state. Furthermore, the proposed mechanism guarantees better resources exploitation of the VANET oriented IEEE 802.11p standard. Indeed, the proposed system exploits the medium access control (MAC) layer access categories (ACs) that are not dedicated to video transmission. The results obtained from realistic VANET simulations demonstrate that the proposed cross-layer mechanism achieves significant improvements compared to the actual standard in terms of packet delivery rate as well as PSNR gains at the reception.

19 - Opportunistic Data Mules for Short Delay Smart city Applications

Fairouz Chahbour (Boumerdes University, Algeria); Moussaoui Samira and Doukha Zouina (USTHB, Algeria); Guerroumi Mohamed (University of USTHB, Algeria)

Collecting data from sensors integrated in objects spread across smart city streets, and delivering them to central controllers is a challenging issue in realizing smart cities. Using vehicles as data mules has proved its effectiveness in addressing this issue. However, the urban mobility constraints lead to high data collection latency which does not suite all kinds of smart city scenarios. We propose a data collection scheme that leverages opportunistic inter-vehicular communications to provide each road segment of an area of interest by a data mule in charge of collecting its sensory data. This allows to increase the distribution degree of the collection process and thus to reduce the collection latency. The simulation in realistic mobility settings shows that our proposed scheme insures adequate distribution of data mules in the area of interest within bounded delay.

Session 6: WSN and Cognitive Radio

20 - Beamspace Unitary ESPRIT Parameter Channel Estimation For Pilot Contamination Mitigation

Nessrine Smaili (Communication Systems Laboratory, Institute of Electrical and Electronic, University of Boumerdes, Algeria)

Pilot contamination (PC) is significant problem in multicell Massive MIMO systems caused by lack of orthogonality of pilots. To address this constrained problem, we propose a new approach based on beamspace unitary (BU) estimation of signal parameters via rotational invariance technique (ESPRIT) for parameter channel estimation. Indeed, the PC mitigation is based on two steps, channels parameter estimation and then reconstruction of desired channel by exploiting the path gains magnitude. The simulation results demonstrate the effectiveness of the proposed approach.

21 - A New k -Coverage Model To Determine Redundant Sensors in Wireless Sensor Networks

Chenait Manel (University of Sciences and Technology Houari Boumediene (USTHB), Algeria); Bahia Zebbane (University of Science and Technology Houari Boumediene (USTHB), Algeria); Nadjib Badache (University of Sciences and Technology Houari Boumediene (USTHB), Algeria)

Maintaining k -coverage in wireless sensor networks (WSNs) requires the simultaneous activation of a large number of sensors. Indeed, each location in the sensing field should be covered by at least k nodes, ($k > 1$). Sensors, in most k -coverage scenarios, may be redundant because of overlaps in their sensing disks. We propose a new k -coverage model able to accurately determine redundant sensors with a linear running time complexity. We prove that a sensor is redundant, if its neighbors belong to particular sub-regions within its sensing disk. Simulation results confirm that the proposed algorithm outperforms well-known k -coverage protocols, in terms of energy conservation, network lifetime and coverage performance

22 - Placement optimization of wireless mesh routers using firefly optimization algorithm

Lamri Sayad (University of M'sila, Algeria); Aïssani Djamil (LAMOS, university of Bejaia, Algeria); Louiza Bouallouche-Medjkoune (University of Bejaia, France)

This paper addresses the problem of optimal routers nodes placement (RNP) in a wireless mesh network. This issue consists to determine the optimal positions of mesh routers that allow the optimization of the network performance with regards to client coverage and network connectivity. To solve this issue, we have applied a bio-inspired algorithm, called Firefly optimization algorithm, since it is an NP-hard issue. The obtained results demonstrate the effectiveness of our proposed approach when compared to the existing genetic algorithm.

23 - Joint Channel Coding and Cooperative Network Coding on PSK Constellations in Wireless Networks

Elias Benamira (LISIC Laboratory, USTHB University, Algeria); Fatiha Merazka (LISIC Laboratory. USTHB University, Algeria); Gunes Karabulut Kurt (Istanbul Technical University, Turkey)

In this paper, we consider the application of Reed-Solomon (RS) channel coding for joint error correction and cooperative network coding on non-binary phase shift keying (PSK) modulated signals. The relay first decodes the RS channel coded messages received each in a time slot from all sources before applying network coding (NC) by the use of bit-level exclusive OR (XOR) operation. The network coded resulting message is then channel encoded before its transmission to the next relay or to the destination according to the network configuration. This scenario shows superior performances in comparison with the case where the relay does not perform channel coding/decoding. For different orders of PSK modulation and different wireless configurations, simulation results demonstrate the improvements resulting from the use of RS channel codes in terms of symbol error rate (SER) versus signal-to-noise ratio (SNR).

24 - Bootstrap approach for cognitive radio

Toufik Mouchini (Military Polytechnic School, Algeria); Khalida Ghanem (Advanced Technologies Center (CDTA), Algeria); Mustapha Djeddou (Military Polytechnic School, Algeria); Abdelhak M Zoubir (Darmstadt University of Technology, Germany)

In this paper, a detection method was proposed by combining goodness of fit test and bootstrap resampling methods in a case of a small samples size, which leads to a shorter sensing step, where the asymptotic methods do not perform well. It is shown that the proposed method in the case of single secondary user outperforms the energy detection method and the one which use only the goodness of fit test.

Extended Oral Session

EoS1 - Partial Contention-Free D2D Discovery for Proximity-Based Services in Cellular Network

Leila Nasraoui

In this paper, we design a beacon-based Device-to-Device (D2D) neighbor discovery scheme as a key enabler for proximity-based services in the Long-Term Evolution-Advanced (LTE-A) system. The proposed scheme is based on the random access procedure of the LTE-A system and it opts for contention-free access to enable the connection of D2D receivers while contention-based strategy is used to connect D2D transmitters. To allow neighbor discovery, D2D users first listen to peer uplink signals in order to detect beacons sent by D2D transmitters within their neighborhood. Then, the received beacons are forwarded by D2D receivers to the base station to verify their unicity and to ensure the feasibility of establishing a D2D link, based on the location of involved users. At the successful D2D receiver side, new beacons will be assigned by the base station, while the initial beacons are kept to be used for D2D transmitters. This strategy allows to greatly reduce the collision probability for the whole network by avoiding collisions at the receiver side. It is worth noting that as the proposed scheme is based on almost the same principle of the random access procedure in the LTE-A system, it can readily be applied to the current architecture without significant modification. By means of simulations, we show that nearby user equipments can be found with low collision probability while achieving a high discovery rate proportional to the total number of users willing to initiate direct links with their neighbors.

EoS2 - Flow/Interface Association for Multihomed Mobile Terminals in Heterogeneous Wireless Networks

Mohamed Abdelkrim Senouci; Hadj Senouci; Hoceini Said; Abdelhamid Mellouk

Wireless access networks (e.g., Wi-Fi, UMTS, and LTE) have different characteristics in terms of coverage area, cost, and different capacities to cater for diverse service needs. These networks may cover the same region forming a heterogeneous wireless environment. Mobile users run different kinds of service over the Internet (e.g., video streaming, interactive video gaming, etc.). These services lead to diverse flows with different requirements in terms of Quality of Service (QoS). Current terminals (e.g., laptops and cell phones) are increasingly being provided with multiple wireless access network interfaces (e.g., UMTS, LTE, Wi-Fi) for users to not be tied to any one access network, but instead be free to switch among available networks. In this multi-technology, multi-application and multi-user environment, it would be advantageous for multi-interfaces terminals to simultaneously use multiple networks instead of switching from one interface to another. This involves the association of each flow with a network that meets its specific requirements in a way that best maximizes the global terminal utility. Associating each flow with a suitable interface is considered as a particular case of network interface selection and is called flow/interface association throughout this paper. The main target of the flow/interface association is to satisfy individual flow's requirements while maximizing the global system performance. The flow/interface association is an optimization problem, and more specifically is related to stochastic optimization problems. This paper proposes a new flow/interface association scheme for multi-interface mobile terminals in heterogeneous environment. We provide analytical studies and simulation experiments to demonstrate the efficiency of the proposed approach.

EoS3 - The Flooding Attack in Low Power and Lossy Networks: A Case Study

Nguyen Thanh; Tri Ngo; Duc Tran; Hai Anh Tran; Trong Tung Bui

Routing Protocol for Low Power and Lossy Networks (RPL) has been specially designed to support the interconnection between resource-constrained devices. It has been well-known that the RPL is exposed to various internal attacks. One of the most effective attacks seems to be the flooding. This paper assesses the impact that the flooding has on the RPL network. This attack is observed to significantly decrease the packet delivery rate, while increasing the end-to-end packet delay. We also investigate the overhearing and show that such mechanism can be used as a primary indicator to detect and eliminate the flooding attack from the network.

EoS4 - Network troubleshooting: Survey, Taxonomy and Challenges

Van Tong; Hai Anh Tran; Sami Souihi; Abdelhamid Mellouk

With the robust improvement of the Internet, there are lots of network issues existing in the network systems. Many research works proposed different approaches to resolve the network issues in order to enhance the performance of network management and guarantee the user's QoE (Quality of Experience). However, it is not easy to have the global views about the network issues and the troubleshooting approaches. This paper presents a survey on troubleshooting with a special concentration on network issues. The main contribution of this survey is a detailed analysis of state-of-the-art related to network issues troubleshooting which evaluates their benefits and drawbacks. Moreover, these research work are classified into some categories to provide the useful guideline for troubleshooting research. Open issues and challenges in this field are also discussed. To the best of my knowledge, this is the first survey on troubleshooting of network issues

EoS5 - Hardware implementation of multi-scroll chaos based architecture for securing biometric templates

Mohamed Salah Azzaz; Tanougast Camel; Abdelmadjid Maali; Mustapha Bessalah

In spite of numerous advantages of biometrics based personal authentication systems over traditional security systems based on token or knowledge, they are vulnerable to attacks that can decrease their security considerably. In this paper, we propose a new hardware solution to protect biometric templates such as fingerprint. The proposed scheme is based on chaotic NxN grid multi-scroll system and it is implemented on Xilinx FPGA. The hardware implementation is achieved by applying numerical solution methods in our study, we use EM (Euler Method). Simulation and experimental results show that the proposed scheme allows a low cost image encryption for embedded systems while still providing a good trade-off between performance and hardware resources. Indeed, security analysis performed to the our scheme, is strong against known different attacks, such as: brute force, statistical, differential, and entropy. Therefore, the proposed chaos-based multi-scroll encryption algorithm is suitable for use in securing embedded biometric systems.

EoS6 - Using LOD and Fuzzy Ontology to Annotate Industrial Schemas

Assia Brek

Human use texts, images, tables or schemas to present their data, which is difficult for the machine to understand. In the industrial domain, using schemas to present the information is more useful to describe the structure of the components and the mechanism of work. In this paper, we propose an automatic process to annotate industrial schemas, using both of a fuzzy ontology that describes the industrial domain knowledge and linked open data (LOD) as a semantic reference. The schemas have been represented in an XML file, we used the linked open data and Bohring rules to link XML elements to the fuzzy ontology elements. At the end, we represent the annotation in a classic/fuzzy RDF file, and we used an online environment to test the file structure.

EoS7 - Linked Open Data for New Item Problem Solving in Collaborative Recommender Systems

Hanane Zitouni; Souham Meshoul; Anfal Kadi

Data on the web has grown insanely large to the point that humans can't treat all of this amount by themselves with traditional tools. Hence the need for adequate tools to filter such enormous size of information and extract only the useful part has risen. Collaborative Recommender Systems (CRS) based on Collaborative Filtering (CF) are one of the de facto tools for such purpose. Their primary goal is to suggest the suitable items for the appropriate users. However, due to the lack of information about either entities, mainly the new ones, these systems may suffer from what is known as the cold start problem. In this work, we propose a solution to overcome the main case of cold start problem, namely new item problem. For that, we propose to use the Linked Open Data (LOD), a publicly available set of interlinked data and documents, in the hope to find enough information about new items, thus fill the gap between the recommender system and available data. We report on some promising experiments of the proposed solution performed on MovieLens data sets.

EoS8 - Fuzzy clustering for misbehavior detection in VANET

Hanane Amirat; Nasreddine Lagraa; Chaker abdelaziz Kerrache; Youcef Ouinten

Security in Vehicular Ad Hoc Networks (VANETs) has become a hot research area due its life saving characteristic. It mainly depends on the reliability of data exchanged (sent, received, forwarded) by vehicles including crucial information such as direction, position, etc. However, some security threats might affect the reception of data itself by dropping, altering or delaying the exchanged messages. In this paper, we address the problem of detecting selective forwarding attack with geographic routing protocol (GPSR). According to this attack, malicious vehicles behave like normal nodes, but selectively drop messages. Identifying such attacks is very hard and sometimes impossible. As a solution, we propose to detect misbehaving vehicle by applying fuzzy clustering algorithm (C-Means) to get two classes of vehicles (legitimate and malicious). A set of features is initially estimated for each vehicle and then used afterward to perform clustering for clustering. To reduce the false positive rate and increase the detection rate, a decision threshold is tuned to identify the misbehaving vehicles. The efficiency of a Misbehavior Detection Scheme (MDS) is judged can be measured by high detection rate and low false positive. Thus, a decision threshold is suggested we suggest a decision threshold to be determined by user for well definition of is tuned to identify the misbehaving vehicles. Our preliminary simulation results and analysis show 95% accuracy with low false positive rate under attack's intensity of 25% of the total number of nodes.

EoS9 - Medical Images Ecrption Based on Elliptic Curve Cryptography and Chaos Theory

Mustapha Benssalah; Yasser Rhaskali; Mohamed Salah Azzaz

Telecare Medical Information Systems (TMIS) is one of the most important remote technics used for diagnostic and treatment of patients. In this context, the importance of a safe exchange of medical data, comprising signals, images, etc. has received a special attention these recent years. Indeed, as the Digital Imaging and Communications in Medicine (DICOM) objects contain images and linked medical information about the patient, there security and privacy must be addressed seriously. In this framework, many encryption techniques are proposed in the literature to resolve this issue using numerous cryptographic solutions such chaos based theory, elliptic curves cryptography (ECC) and other lightweight solutions. In this paper, we present a comparison study between two encryption approaches namely the ECC and chaos. Therefore, the performance of the two considered crypto-systems is evaluated in terms of security analysis and execution time. The obtained results are promising and can be used to look further into the exploration of this axis of research.

EoS10 - MAAC Protocol: Mobile Agents based Address Auto-Configuration Protocol for MANET

Afaf Korichi; Youcef Zafoune

This paper present a new mechanism of auto-configuration in MANET (Mobile Ad-hoc Network), based on mobile multi-agent systems. Our solution allows to make a virtual server as an alternative to the lack of a basic fixed or centralized infrastructure network which is organized in clusters managed by mobile multi-agent system that are required to configure the nodes.

EoS11 - A Tree Decision Based Approach for Selecting Software Development Methodology

Abdelghani Bakhtouchi; Riadh Rahmouni

We live in world in which software is everywhere, it is a part of everything we do. Using software our everyday work becomes easier and our daily lives become simpler. Many big companies are factory for software and most universities teach students how to make software well. So many software development methodologies exist today and deciding which methodology to use in a software project becomes one of the challenges faced by software engineers. In this paper, we define a big number of criteria which can characterize a software project in all its aspects including project features, development team, software characteristics, development tools, requirement, business model and provided documentation. We present, then, the mathematical formalization of our proposed selecting method based on tree decision. The aim of this method is to select the right software mythology for a given software project starting from the values of the defined criteria. Finally, we illustrate the developed software tool called SDMSelector providing to a project manager the right methodology to be followed in his development project.

EoS12 - Automatic removal of ocular artifacts in EEG signals for driver's drowsiness detection: A survey

Mohamed Mohammedi; Mawloud Omar; Abdelmadjid Bouabdallah

Nowadays, there are many causes of daily traffic accidents, one of them is the loss of concentration while driving due to drowsiness, followed by sleep while driving. Sleeping means the nap; no more than a few seconds, but it is enough to create a traffic accident, in which the driver and the clashes may lose their lives. In this context, there is a host and considerable research efforts made in designing driver monitoring systems with the aim to reduce the vehicular accidents posing a challenging issue for the society. Several drowsiness detection techniques have been proposed in the literature, including artificial neural network, image processing, and physiological measurement techniques. Among the proposed solutions, the electroencephalographic (EEG) measurement is one of the reliable techniques. Nevertheless, the neuronal signals can be easily contaminated by many artifact types arising from cardiac (ECG), muscles (EMG), and ocular activities (EOG). From these physiological artifacts, ocular activities are one of the most eminent over other noise sources. In this paper, we provide a comprehensive survey, which covers the vast existing techniques of removing ocular artifacts from EEG recordings for driver's drowsiness detection systems. We propose a novel taxonomy of solutions and we compare them with respect to relevant criteria.

EoS13 - Smart Control of Mobile Robot Based on Deep Learning

Khaled Khnissi

The field of autonomous navigation mobile robot is developing so fast especially with the development of machine learning algorithms. This study aims to introduce a neural network controller that controls the trajectory and the obstacle avoidance of a non-holonomic mobile robot. We train the robot in environment containing multiple obstacles of different places. This paper includes both a kinematic part and a dynamic study of the mathematical model of mobile robot. Different training schemes have been studied that tackle the learning objectives differently. The trained controller is producing the Pulse Width Modulation (PWM) signals that could be implemented in a microprocessor and validated by simulations. Unlike some other recent approaches, this work was validated by a 3D simulation which is close to the real model.

Session 7: Cloud Computing & SDN

25 - Essentiality of Resource and Service-Task Characterization in the Coordinated Fog-to-Cloud Paradigm

Souvik Sengupta; Jordi Garcia; Xavier Masip-Bruin

Fog-to-Cloud (F2C) computing is an emerging computational platform. By combining three existing computing platform layers (i.e., cloud, fog, and IoT), F2C provides an excellent framework for managing and coordinating the various participating resources in a smart environment scenario. Efficient management of these kinds of diverse resources is one of the critical tasks in a F2C system. Also, it must be considered that different types of services are offered by any smart environmental system. So, before managing these diverse resources and providing the various types of services, it is essential to have some catalogue for knowing the characteristics of system resources that matches the different service requirements. Hence, in this paper, our main aim is to understand how resources and service-task characterization helps building a proper resource management schema in a coordinated F2C platform.

26 - Distributed Inter-Domain Multi-Constrained Routing

Mohand Yazid Saidi

With recent advances in the communication technologies (5G, LTE, optical fiber, etc.), we are witnessing a deployment of a wide range of network real-time applications like telemedicine, VoIP, remote control applications for drones and cars, e-health, etc. These applications often require the verification or optimization of various quality of service (QoS) parameters, such as the delay, the error rate, the failure probability, the energy, etc.

Though several algorithms have been developed to provide QoS in intra-domain networks, there are few works which are devoted to the multi-constrained (or multi-criteria) inter-domain routing. This is essentially due to the difficulty to deal with the two inter-domain major issues which are: scalability and confidentiality.

In this paper, we propose an efficient and distributed multi-constrained routing algorithm for multi-operator or inter-domain networks. Our algorithm guarantees the determination of paths (ϵ) -close to the optimums. It is fully polynomial time and it respects the inter-domain constraints. Besides, it reduces the message exchanges by aggregating the path weights.

27 - Semantic Networks Based Approach for SaaS management in Cloud Computing

Lynda Ouchaou; Hassina Nacer; Hachem Slimani; Sarra Boukria

Nowadays, Cloud Computing has emerged as a new model for hosting, managing and delivering services (IaaS, PaaS, SaaS) over Internet. Enterprises and vendors are continuously migrating their services to the Cloud, this resulted in an exponential amount of data, services and resources stored in the data centers and since there's no standard about Cloud service description or service publication, therefore a key requirement that every Cloud provider needs to take into consideration is efficient management of resources and services by providing automated solutions for a better service publication and discovery. The proposed approach aims to manage Cloud SaaS services for an efficient publication by classifying them into sets according to their domain to reduce the search space then inter-connect the SaaS services of the same domain in a Semantic Network using the similarity measure (Input/Output similarity) between concepts. The proposed solution takes advantages from multidimensional index framework, WordNet Domain Ontology and semantic Web. A guided publication process and an implemented prototype is introduced validating the system using a real data set corpus.

28 - An extended and flexible SDN control plane

Jean-Michel Sanner; Pierrick Louin; Yassine Hadjadj-Aoul; Meryem Ouzzif

In this paper we demonstrate the feasibility of an extended and flexible SDN control plane that allows to overcome the limitations of the Openflow protocol by achieving distributed and intelligent network services in SDN networks. This extended control plane is designed according to the following reference guidelines: (1) the concept of generic and programmable network nodes usually known as "white boxes". They integrates a generic engine to execute the service and a library of elementary components as basic building blocks of any services; (2) a fine grained decomposition logic of network services into elementary components, which allows the services to be designed and customized on the fly using these building blocks available on each network node in libraries; (3) a mechanism for re-configuring or redefinition on the fly of the network services on generic nodes without service interruption; (4) some smart elementary agents called SDN controllers elements to provide and distribute the intelligence necessary to interact with the data plane at different levels of locality. This SDN control plane is illustrated in a proof of concept with the implementation of a distributed monitoring service use case. The monitoring service can act and evolve in a differentiated manner in the network depending on traffic requirements and monitoring usage.

Session 8: Conceptual Modelling and applications

29 - Formalizing UML/OCL Multiple Inheritance with FoCaLiZe

Messaoud Abbas; Ben-Yelles Choukri-Bey; Renaud Rioboo

Multiple Inheritance is an Object Oriented feature that is widely adopted by the Unified Modeling Language (UML). To generate software from a UML model, programming languages that supports multiple inheritance (such as C++, Eiffel or POOL) are available. But, when it is necessary to check and analyze model properties, it is relevant to use formal methods (environments) that help developers to specify and check such properties. In this paper, we propose a formal transformation of UML multiple inheritance into FoCaLiZe, a formal programming environment using a proof-based approach. The transformation naturally captures multiple inheritance of classes attributes, methods and OCL constraints with methods overriding and late binding mechanisms. This transformation enables to specify theoretical and critical systems properties. In addition, it is possible to check and prove such properties using the automatic theorem prover of FoCaLiZe.

30 - Ontological Colored Petri Nets ++(OCPN++): Application in the biologic domain

Lynda Dib

The context of our work consists to formalize ontologies using Colored Petri nets. In this paper, we present a new formalism called Ontological Colored Petri Net (OCPN). It combines the best aspects of Colored Petri Net (CPN) formalism and Ontology domain. OCPN can represent and formalize processes, structural components that participate in those processes, and the roles that they play. Also, it maps to Petri Nets, which allow verification of formal properties and qualitative simulation. We validated and tested "OCPN" in biology domain, when we formalize a new ontology (which represent the Oestrogen effect on mammary epithelial cells), and when we compose queries to discover relations among processes (that support method for qualitative and quantitative reasoning) and structural components. It is also validated in "OPN-Ont" system [3] which is advanced to the general tool "OPN-OntEd [2] that allows the creation and exploration of Ontologies.

31 - Complex event processing distributed architecture for Massive Open Online Courses

Sakina Benarbia; Nabih Alaoui; Samir Bennani

Big data technologies are becoming widely used, not only for recording but also for analyzing human generated data. Indeed, the quick technological evolutions of the recent years have reached many fields especially education where the use of connected computing devices (e.g. smart devices, computers, servers, etc.) is continuously growing. The generated data in the education field is becoming extremely voluminous, especially in eLearning, (e.g. Massive Open Online Courses (Moocs)). In this regard, real time data processing has become one of the main challenges in Moocs, as data coming from diversified sources must be processed with respect to semantics. As such, this paper investigates the use of Semantic Complex Event processing in the analysis of the data generated through Moocs. This paper also presents a distributed complex event processing system for learning activities in Moocs

Session 9: Security

46 - Deep Learning for Fault Diagnosis based on short-time Fourier transform

Tarak Benkedjough; Nouredine Zerhouni; Said Rechak

The rapid advancements of the Internet of Things (IoT) enables maintenance strategies to be applied everyday to all sectors, IoT based health management plays an important role For producing quickly, with high quality while decreasing the risk of production break due to a machine stop, it is necessary to maintain the equipment in a good operational condition. This requirement can be satisfied by the implementation of maintenance strategies for faults detection . In this paper, a novel method called deep learning based on Short-Time Fourier Transform (STFT) is developed for fault diagnosis. An experimental analysis is carried out using a dataset under different operating conditions of speed and loading to substantiate the utility of the proposed strategy. Also a multi-fault deep learning classifier based on STFT is constructed for different faults in this paper. Hence, the purpose is to design an automatic detection system for mechanical components defects based on supervised classification. The diagnosis accuracy assessment is carried out by conducting various experiments on acceleration signals collected from a rotating machinery under different operating conditions.

47 - A New Chaos-based Text Encryption to Secure GPS Data

Mohamed Salah Azzaz; Mohamed Abdel kader Krimil

This paper, proposes a new chaos based cryptosystem for ciphering text which is used to ensure the confidentiality of data and the privacy in different applications such as: sending Short Message System (SMS) in Global System for Mobile Communication (GSM) networks, text messages exchanged in social networks, Global Position System (GPS) tracker, etc. In our work, we are interested to GPS tracker, this embedded system consists of a GPS receiver, a microcontroller and secured wireless communication. The GPS receiver and wireless communication are both in the same module (SIM808), the microcontroller is the Mbed NXP LPC1768 board. In order to meet both the security requirements and the strong constraints of embedded systems, the proposed crypto-system is designed using the secret key cryptography technique based on chaos theory which is more suitable than the public key cryptography technique in many embedded applications. Our proposed keystream generator is based on Lorenz chaotic system. To ensure that the proposed crypto-system is robust and satisfy the Shannon requirements in terms of confusion and diffusion, we have used bitwise operation to ensure the confusion propriety while the diffusion propriety is achieved by the permutation technique using the Arnold's cat map.

48 - A Novel approach for bootkit detection in Android Platform

Tayeb Kenaza; Khireddine Garri; Mohamed Aissani

Detection of Malware in Android is already a challenging task, even worse Bootkits add more complexity and because it shifts the infection to the early stage of system's booting, it makes it more stealthy and by far more persistent. In this paper, we discuss the challenge of malware analysis and detection in Android mobile phones platforms, especially at the boot and Kernel levels. To deal with this problem, we present a new approach for Bootkit detection based on malicious behaviour characterisation. Firstly, we identify and extract files from both the boot and the system partition from 3897 different firmwares, then we establish a correlation mechanism for each sample. Secondly, we define the main characteristics vector of a normal booting stage behaviours, then a second characterisation vector for malicious boot behaviour. The experiment is performed on 7794 boot files from 87 different vendors and we show that our approach can successfully detect malicious data manipulation. Also, we highlight and give details about several key challenges that need to be addressed in future research.

49 - A practical implementation of key management scheme based on CL-PKC to secure D2D communications

Othmane Nait Hamoud; Tayeb Kenaza; Yacine Challal

The standardization of Device-to-Device (D2D) communication is underway by the Third Generation Partnership Project (3GPP) under the proposal Proximity Services (ProSe) which allows enabling direct communication between proximate devices [1]. Security of D2D communications must be assured in both scenarios: in coverage and out of coverage according to whether communication control is ensured by the Evolved Packet System (EPS) or the devices themselves. CertificateLess Public Key Cryptography (CL-PKC) [2] gives a serious solution for securing D2D communications. In this paper we propose a practical implementation of key management scheme based on CL-PKC which overcomes security issues in all scenarios related to D2D communications.

Session 10: Networks and applications

50 - Virtualized Dynamic transcoding service for adaptive streaming video over HTTP in 5G systems

Einar Meyerson; Daniel Guija; Muhammad Shuaib Siddiqui; David Gómez Micó; Isaac Fraile

SDN and NFV technologies promise to enable the flexibility and programmability of networks in 5G infrastructures to ensure lower cost of network and service provisioning and operation and to reduce the time to market for new services. This paper focuses on showcasing and assessing a virtualized dynamic transcoding service using the capabilities of a 5G system, the NFV-based SONATA

framework, an EC funded project inside Horizon 2020 and 5G- PPP programs, while enhancing a virtual Content Delivery

Network (CDN) service with features like elasticity and programmability. The business case of CDNs is well established where a series of business relationships are affected by various deployment scenarios that are possible within the current setting. SONATA framework allows to develop and deploy enhanced virtual services, through its Network Service Development Kit and Service Platform using a continuous integration and delivery DevOps methodology that allow high levels of programmability and flexibility to orchestrate and manage Network Services. In this way, performed experiments will demonstrate how online transcoding services deployed through the SONATA Service Platform results in a huge amount of resource saving comparing it with the commonly used offline transcoding service.

51 - Enhancing cost performance using Symbiotic Organism Search based algorithm in Cloud

Ali Belgacem; Kadda Beghdad Bey; Hassina Nacer

In these last years, cloud computing is getting more and more popular due to the height development in telecommunication technology. Which resulted the importance of the resource allocation topic for effectively enhancing the quality of the service (QoS) given to the consumer. Hence, provisioning of services at reasonable prices is the main challenge facing cloud computing today. This, led cloud service providers to integrate a new scheduling techniques to meet this objective. In this paper, we highlight in particular the problem of resource reservation cost. So that, we Improve a metaheuristic approach based on Symbiotic Organism Search Algorithm (ISOS). It is a newly developed approach for solving numerical optimization problems. We specifically designed ISOS to minimize the Cost of running tasks on virtual machines (VMs). Simulation results revealed that ISOS gave a better result compared to MAX-min, FCFS and PSO methods.

52 - An Optimized Relative Coordinates Rumor Routing (ORCRR) for Wireless Sensor Networks

Leila Kheroua; Samira Moussaoui; Nour el houda Baroud; Ouanassa Chaib

In environments where position information is not assumed, an efficient data access is a very challenging issue. Few years back, a new relative coordinate's concept was introduced in the Relative Coordinates Rumor Routing protocol (RCRR). RCRR speeds up the crossover between event-agents and query-agents in the network. However, when facing network scalability, it suffers from its non-optimal generated paths. Consequently, more consumed energy and delay are generated. The main contribution of this work consists on enhancing event and query-agents trajectories with the same energy cost needed when implementing the relative coordinates system in RCRR. We have conducted several simulation tests under different scenarios to compare and evaluate the proposed Optimized RCRR (O-RCRR) protocol performances. Results show that O-RCRR enhance the query delay up to 54.56 % and the consumed energy is reduced by 5.28 %.

Usefull Informations

Cheap Hotels in El-oued

Hotel name	Address	Price (DZD)			Breakfast included	Telephone numbers
		Single room	Double room	Triple room		
Elforsan	May 8th 1945	1500	2800	4000	Yes	+213(0)32123163 +213(0)660309788 +213(0)555088445
Hatem	May 8th 1945	1600	3000	4300	Yes	+213(0)32123431 +213(0)660436273
Eljanoub	May 8th 1945	1700	3100	4500	Yes	+213(0)32123329 +213(0)32123424 +213(0)560080441
Elmassa Dahabia	November 1st 1954, Echott	2200	3000	3900	Yes	+213(0)32120339 +213(0)676972477
Lalmi	Sidi Abdellah	2500	3500	4500	Yes	+213(0)550846725 +213(0)662828214

Good Restaurants

Restaurant name	Neighborhood/Address	
Ennakhil	University road, Echott	+213(0)551 26 49 29
Dar eldihaifa	Ennakhil	+213(0)660 71 72 17
Sidi Bousaid	Dar essalam	+213(0)696 28 90 30
Chef	Echott	+213(0)32 22 42 42
Elkheima	Echott	+213(0)555 31 87 39
Andalous	Elmoujahidine	+213(0)770 88 10 11

Touristic places

Name	Address
La gazelle d'Or Complex	Touggourt road
Firm Daouia	Touggourt road
Gouri Park	February 18th, the west road.
Souk Lacheche	Lacheche
Zaouia Tijania	Guemar
Museum Elmoujahed	El-oued
The dunes	March 19th The west road

Emergency phone numbers

Civil protection	14
Police	1548
National Gendarme	1055

