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ÉCOLE SUPÉRIEURE PRIVÉE D'INGÉNIERIE ET DE TECHNOLOGIES

RDI
Research
Development
Innovation

Catalog

2019-2020

“ESPRIT has taken steadfast strides towards quality Research, Development & Innovation (RDI), engaging students in the process of scientific inquiry and capacity building, while striving to contribute to the socio-economic development of the region.”

Professor Tahar Ben Lakhdar, ESPRIT CEO and Co-founder

Contents

ESPRIT-Tech

The Research, Development, and Innovation Office

Welcome

Research, Development, and Innovation (RDI) have been among the strategic priorities at ESPRIT since its inception. In 2010, the university established ESPRIT-Tech (the RDI office) to oversee the various RDI activities and to work actively with concerned stakeholders to outline the research policies, strategies, and priorities.

ESPRIT puts a special focus on applied research and innovation by promoting RDI activities whose outputs have practical socio-economic impacts, without undermining pure academic research.

ESPRIT-Tech is the focal point where RDI teams, across various disciplines and research areas, come together to collaborate on various interdisciplinary research projects and benefit from the many services availed by the RDI office: Financing, research grants and awards, training and capacity building, partnership agreements, contract negotiations, outreach opportunities, promotion of RDI projects, etc.

Faculty members associated with these RDI teams are constantly engaged in various projects in collaboration with other faculty members at ESPRIT, senior students (in the context of capstone graduation projects) or other reputed researchers outside the university.

We look forward to establishing new collaborative RDI partnerships with the local community, the private as well as the public sectors. These strategic collaborations will lay the foundations for a more active role of ESPRIT in the socio-economic development of Tunisia.

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Research Teams

#	Name	Domain	Coordinator	Contact Email address
Information & Communications Technologies (ICT)				
1	ESPRIT-Cloud	Cloud Computing & Security	Manel Madhioub	Manel.madhioub@esprit.tn
2	Wireless Com	Wireless communications	Jihene Ben Abderrazek	Jihene.benabderrazek@esprit.tn
3	MINOS	Networks and Internet of the future	Khaled Hfaiedh	Khaled.hfaiedh@esprit.tn
4	M2M	Ambient & embedded systems	Feten Teber	Feten.teber@esprit.tn
5	WSN-RFID	Wireless sensor networks and RFID	Abderrazak Hachani	Abderrazak.hachani@esprit.tn
6	ESPRIT-Mobile	Mobile applications	Imed Amri	Imed.amri@esprit.tn
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8	Imagin	Computer vision / image processing	Naouel Boughattas	Naouel.boughattas@esprit.tn
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	Electromechanical & Industrial Engineering			
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11	EVIS	Electric vehicle innovation systems	Taoufik Chaouachi	Taoufik.chaouach@esprit.tn
12	ESPRIT-LEAN	Lean & Industry 4.0	Nacef Sifi	Nacef.sifi@esprit.tn
13	INOBI	Industrial engineering for a better life	Salah Bousbia	Salah.bousbia@esprit.tn
Civil & Building Engineering				
14	REEE	Renewable energy & energy efficiency	Imen Guebebia	Imen.guebebia@esprit.tn
15	SBM	Smart Building management	Asma Karaoui	Asma.karoui@esprit.tn
Applied Mathematics				
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17	MMSN	Mathematical modeling and numerical simulations	Mohamed Hedi Riahi	Mohamedhedi.riahi@esprit.tn
Management & Pedagogical Innovation				
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19	ALEER	Engineering Education Research	Lamjed Bettaieb	Lamjed.bettaieb@esprit.tn

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Research Themes

#	Research Team	Research Domain	Research Themes
1	ESPRIT-Cloud	Cloud Computing & Security	⇒ Infrastructure as a service ⇒ Virtualization technologies ⇒ Cloud security ⇒ Cloud federations ⇒ Platform as a service ⇒ Learning-based Cloud
2	Wireless Com	Wireless communications	⇒ Future Wireless Networks ⇒ UAV-based Aerial Networks ⇒ Smart agriculture (UAVs & AI) ⇒ Wireless communication for Public Safety ⇒ E-health
3	MINOS	Networks and Internet of the future	⇒ Cyber Security ⇒ Web Services ⇒ Blockchains ⇒ Web Crawling ⇒ SDN & NFV
4	M2M	Ambient & embedded systems	⇒ Healthcare ⇒ Smart homes ⇒ Smart agriculture
5	WSN-RFID	Wireless sensor networks and RFID	⇒ Design of interconnected objects ⇒ Digital Transformation ⇒ Localization and tracking ⇒ Logistic management ⇒ IoT applications
6	ESPRIT-Mobile	Mobile applications	⇒ IoT ⇒ Blockchain ⇒ M-Health ⇒ Augmented Reality / AR ⇒ Virtual Reality / VR ⇒ Mixed Reality / MR
7	DASC	Data Science & AI	⇒ Machine Learning & AI applications ⇒ Social media data analytics ⇒ Education 4.0 ⇒ Risk Cartography
8	ImageIn	Computer vision / image processing	⇒ Machine learning for computer vision ⇒ Medical imaging ⇒ Shape recognition ⇒ Image processing
9	I2S	Intelligent Information Systems	⇒ Intelligent Information Systems (IIS) architectures ⇒ IIS security ⇒ Decision-support systems ⇒ Big data & AI for IIS ⇒ DevOps for IIS
10	ICAR	Robotics	⇒ Automation ⇒ Robotics ⇒ MEMS and IoT applied for mechatronics

#	Research Team	Research Domain	Research Themes
11	EVIS	Electric vehicle innovation systems	⇒ Vehicle's mechanical structures ⇒ Vehicle's aerodynamics ⇒ Electric power converters ⇒ Battery charging and management systems ⇒ Motors' design and development
12	ESPRIT-LEAN	Lean & Industry 4.0	⇒ Industry 4.0 tools and applications ⇒ Pedagogical innovation for Lean education ⇒ Lean Agriculture
13	INOBI	Industrial engineering for a better life	⇒ Innovative pedagogical approaches for industrial engineering education ⇒ Industrial engineering solutions for social innovation and better life
14	REEE	Renewable energy & energy efficiency	⇒ Energy audit ⇒ Energy management and optimization ⇒ Sustainable development ⇒ Smart cities
15	SBM	Smart Building management	⇒ Methods to improve occupant comfort ⇒ Smart building applications ⇒ Building Information Modelling (BIM)
16	GRAFICS	Risk management	⇒ Data Mining, Scoring and Big data tools for decision support and actuarial applications ⇒ Efficient algorithms for stochastic control, numerical and statistical processing ⇒ Sensitivity analysis, quantification of uncertainty, and uncertainty modeling ⇒ Rare events analysis for optimal decision making and risk management
17	MMSN	Mathematical modeling and numerical simulations	Applications of mathematical models and simulation techniques: ⇒ Finance: Inverse problem of estimating volatility in the Black and Scholes model ⇒ Environment: Parametric estimation in hydrogeology ⇒ Oil and Gas: Numerical modeling of the impact of rock mechanics in oil reservoirs on flow in porous media ⇒ Biology: modeling electrical activities of the hearts ⇒ Civil engineering: Mixed 3D-1D formulation for the analysis of composite beams
18	MAIN'Team	Management & Innovation	⇒ Digital Marketing & Data Marketing ⇒ Innovation management ⇒ Development economics ⇒ Business Finance ⇒ Human resources ⇒ Entrepreneurship
19	ALEER	Engineering Education Research	⇒ Active learning in engineering education ⇒ Collaborative project approaches in Engineering education ⇒ Case studies in Engineering education & lessons-learned ⇒ Learning outcome assessment ⇒ Digital technologies in Engineering education

RDI publications at a glance

2019-2020 Academic Year (AY)

40 publications

26 peer-reviewed conference papers

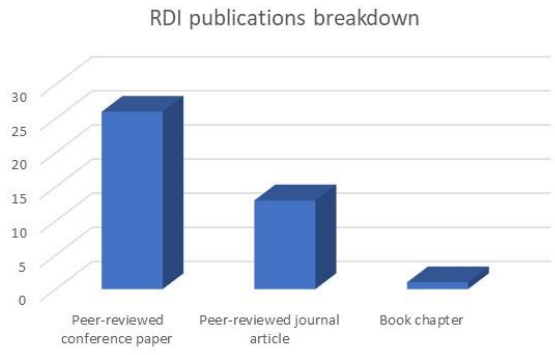
- **14** Information & Communications Technologies (ICT)
- **8** Electromechanical Engineering
- **3** Pedagogical Innovation
- **1** Civil & Building Engineering

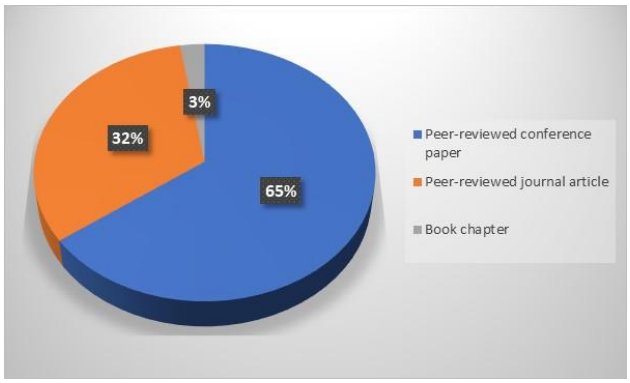
13 peer-reviewed journal articles

- **6** Information & Communications Technologies (ICT)
- **4** Applied Mathematics
- **3** Electromechanical Engineering

1 book chapter

- **1** Electromechanical Engineering





Information

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Communications Technologies

ICT RDI Publications (2019-2020 AY)

#	RDI publication	Type[1]	Abstract on Page #
1	**Faouzi Kamoun**, Mai El Barachi, Russell Hamilton, **Ahmed Ben Hadj Khalifa**, The IASO Self-Reporting System: A Persuasive Clinical Mood Tracking and Management Application for Hospital Patients, International Journal of Applied Research on Public Health Management (IJARPHM), Vol 5, Issue 2, 2020, pp. 1-13. IGI Global. DOI: 10.4018/IJARPHM.2020070104	**JA**	**23**
2	**Hana Bouafif**, **Faouzi Kamoun**, Farkhund Iqbal, Towards a Better Understanding of Drone Forensics: A Case Study of Parrot AR Drone 2.0. The International Journal of Digital Crime and Forensics (IJDCF), IGI Global, VOL 12, N0. 1, pp. 23-57, 2020	**JA**	**24**
3	Fatma Outay, Bilal Taha, **Hazar Chaabani**, **Faouzi Kamoun**, Naoufel Werghi , Ansar -Ul-Haque Yasar, Estimating Ambient Visibility in the Presence of Fog: A Deep Convolutional Neural Network Approach, Personal and Ubiquitous Computing, Springer. pp. 1-12. November 2019. https://doi.org/10.1007/s00779-019-01334-w	**JA**	**25**
4	Mohamed Aissa, **Badia Bouhdid**, Adel Ben Mnaouer ,Abdelfettah Belghith , Saad AlAhmadi, SOFCluster: Safety-oriented, fuzzy logic-based clustering scheme for vehicular ad hoc networks, Transactions on Emerging Telecommunications Technologies, April 2020, e3951John Wiley & Sons. **https://doi.org/10.1002/ett.3951**	**JA**	**26**
5	**Manel Medhioub**, Mohamed Hamdi, An identity-based cryptographic scheme for cloud storage applications, International Journal of Grid and Utility Computing, Indersience Publishing, Vol. 10, Issue 2, 2019, pp. 93-104. DOI: 10.1504/IJGUC.2019.098210	**JA**	**27**
6	**Faouzi Jaïdi**, Faten Labbene Ayachi and Adel Bouhoula, Advanced Analysis of the Integrity of Access Control Policies: The Specific Case of Databases. International Arab Journal of Information Technology (IAJIT), 17(5): 808-815, 2020	**JA**	**28**
7	**Jabnoun H**., Hashish M.A., Benzarti F. Mobile Assistive Application for Blind People in Indoor Navigation. In: Jmaiel M., Mokhtari M., Abdulrazak B., Aloulou H., Kallel S. (eds) The Impact of Digital Technologies on Public Health in Developed and Developing Countries. International Conference on Smart Homes and Health Telematics ICOST 2020. Lecture Notes in Computer Science, vol 12157. Springer, Cham. https://doi.org/10.1007/978-3-030-51517-1_36	**CP**	**29**
8	**Adel Jebali**, Salma Sassi, Abderrazak Jemai, Inference Control in Distributed Environment: A Comparison Study. In: Kallel S., Cuppens F., Cuppens-Boulahia N., Hadj Kacem A. (eds) Risks and Security of Internet and Systems. International Conference on Risks and Security of Internet and Systems (CRiSIS 2019). Lecture Notes in Computer Science, vol 12026. Springer, Cham. https://doi.org/10.1007/978-3-030-41568-6_5	**CP**	**30**

[1] **JA** : Peer-reviewed journal article; **CP**: Peer-reviewed conference paper ; **BC**: peer-reviewed book chapter

#	RDI publication	Type[1]	Abstract on Page #
9	Liza Ahmad, Salam Khanji, Farkhund Iqbal, **Faouzi Kamoun**, Blockchain-based Chain of Custody: Towards Real-time Tamper-proof Evidence Management, The 13th International Workshop on Digital Forensics, 15th International Conference on Availability, Reliability and Security (ARES2020), ACM, August 25 – August 28, 2020. Dublin, Ireland, pp. 1-11. DOI: https://doi.org/10.1145/3407023.3409199	**CP**	**31**
10	**Faouzi Kamoun**, May El Barachi, **Abderrazak Hachani**, Fatna Belqasmi, **Amir Ben Said** and **Imed Amri**, A geolocation-aware mobile crowdsourcing solution for the emergency supply of oxygen cylinders, The 11th International Conference on Ambient Systems, Networks and Technologies (ANT-2020), April 6 - 9, 2020, Warsaw, Poland. Procedia Computer Science 170 (2020), Elsevier, pp. 153–160. April 2020	**CP**	**32**
11	May El Barachi, **Faouzi Kamoun**, Jannatul Ferdaos , **Mouna Makni**, **Imed Amri**, An artificial intelligence based crowdsensing solution for on-demand accident scene monitoring, The 11th International Conference on Ambient Systems, Networks and Technologies (ANT-2020), April 6 - 9, 2020, Warsaw, Poland. Procedia Computer Science 170 (2020), Elsevier, pp. 303-310. April 2020.	**CP**	**33**
12	Fatma Outay, **Hichem Bargaoui**, **Anouar Chemek**, **Faouzi Kamoun** , Ansar Yasar, The COVCRAV project: Architecture and design of a cooperative V2V crash avoidance system, The 3rd International Workshop on Connected & Intelligent Mobility (CIM 2019) . EUSPN-2019 Conference . November 4-7, 2019, Coimbra, Portugal. Procedia Computer Science 160 (2019). Elsevier. 473–478. DOI: https://doi.org/10.1016/j.procs.2019.11.062.	**CP**	**34**
13	**Radhouene Massoudi**, Monia Najjar, Nikhildeep Gupta and Vijay Janyani. Low crosstalk and small size 12-channel WDM demultiplexer based on 2D photonic crystal. 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 2020, pp. 1353-1358. doi: 10.1109/IWCMC48107.2020.9148490.	**CP**	**35**
14	**Radhouene Massoudi** , Monia Najjar and Vijay Janyani. Tunable C and L Bands Demultiplexer Based on Photonic Crystal Ring Resonator. 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 2020, pp. 1427-1430. doi: 10.1109/IWCMC48107.2020.9148534.	**CP**	**36**
15	**Radhouene Massoudi** , Monia Najjar and Vijay Janyani. Novel design superelliptic photonic crystal ring resonator based on channel drop filter. 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 2020, pp. 1359-1363. doi: 10.1109/IWCMC48107.2020.9148535.	**CP**	**37**
16	**Sonia Sbissi**, M. Mahfoudh and S. Gattoufi, "A medical decision support system for cardiovacsular disease based on ontology learning," 2020 International Multi-Conference on Organization of Knowledge and Advanced Technologies (OCTA), Tunis, Tunisia, February 6-8, 2020, pp. 1-9	**CP**	**38**
17	**Louay Boukhris**, **Jihene Ben Abderrazak** and Hichem Besbes, "Tailored Deep Learning based Architecture for Smart Agriculture," 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 15-19 June 2020, pp. 964-969, doi: 10.1109/IWCMC48107.2020.9148182.	**CP**	**39**
18	**Feten Teber** and Halim Kacem, "Self Data Transfer Configuration to Enhance Power Efficiency in IoT application," 2019 4th International Conference on Power Electronics and their Applications (ICPEA), Elazig, Turkey, 25-27 Sept. 2019, pp. 1-5. doi: 10.1109/ICPEA1.2019.8911164.	**CP**	**40**
19	Pierrette Annie Evina , **Faouzi Jaidi** , Faten Labbene Ayachi , Adel Bouhoula, "Enforcing Risk-Awareness in Access Control Systems: Synthesis, Discussion and Guidelines," 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 15-19 June 2020, pp. 433-438. doi: 10.1109/IWCMC48107.2020.9148340.	**CP**	**41**

#	RDI publication	Type[1]	Abstract on Page #
20	Ahmed Ben Ayed, Pedro Taveras, **Tarek BenYounes**, Blockchain and IoT: A Proposed Security Framework. In: Latifi S. (eds) 17th International Conference on Information Technology–New Generations (ITNG 2020). April 5-8, 2020, Advances in Intelligent Systems and Computing, vol 1134. Springer, Cham. https://doi.org/10.1007/978-3-030-43020-7_17	**CP**	**42**

Electromechanical Engineering

Electromechanical Engineering RDI Publications (2019-2020 AY)

#	RDI publication	Type[2]	Abstract on Page #
1	Yosr Garbouj , Thach Ngoc Dinh , Tarek Raissi , **Talel Zouari** , Moufida Ksouri, Optimal interval observer for switched Takagi-Sugeno systems: an application to interval fault estimation, in IEEE Transactions on Fuzzy Systems, Mai 2020. doi: 10.1109/TFUZZ.2020.2997333	**JA**	**43**
2	**M. Merai**, M.W. Naouar, I. Slama-Belkhodja and E. Monmasson, "A systematic design methodology for DC-LINK voltage control of single phase grid-tied PV Systems", Mathematics And Computers in Simulation (MATCOM), Elsevier, pp. 1-13, Mai 2020. https://doi.org/10.1016/j.matcom.2020.05.007	**JA**	**44**
3	**Nahla Touati**, Imen Saidi, Ahmed Dhahri & Dhaou Soudani, "Internal multimodel control for nonlinear overactuated systems", Arabian Journal for Science and Engineering, Springer, vol.44, no.3, 2019. pp. 2369-2377. https://doi.org/10.1007/s13369-018-3515-5	**JA**	**45**
4	**Adel Brik**, Mohamed Goddi, Nabil Ben Fredj, Evaluating the capability index of a process integrating sampling plan and the measurement system number of distinct categories NDC, In: Kharrat M., Baccar M., Dammak F. (eds) Advances in Mechanical Engineering, Materials and Mechanics. International Conference on Advances in Mechanical Engineering and Mechanics, ICAMEM 2019. Lecture Notes in Mechanical Engineering. Springer, Cham. https://doi.org/10.1007/978-3-030-52071-7_17	**CP**	**46**
5	**Adel Brik**, Mohamed Goddi, Nabil Ben Fredj, Evaluation of the process capability index integrating sampling plan and the number of distinct categories NDC of the measurement system, Proceedings of the 7th International Conference on Advances in Mechanical Engineering and Mechanics, 16-18 December, 2019, Hammamet, Tunisia, pp. 1-6.	**CP**	**47**
6	**Samir Toumi**, Rhouma Mlayeh and Lotfi Beji, Torsional Vibration Suppression with Boundary Impulsive Conditions in Rotary Drilling System, 2019 IEEE 58th Conference on Decision and Control (CDC) Palais des Congrès et des Expositions Nice Acropolis Nice, France, December 11-13, 2019 pp. 995-1000, doi: 10.1109/CDC40024.2019.9029411	**CP**	**48**
7	Yosr Garbouj, Thach Ngoc Dinh, Zhenhua Wang, **Talel Zouari**, Moufida Ksouri, Tarek Raissi. Robust Fault Detection for switched Takagi-Sugeno systems with unmeasurable premise variables: Interval-Observer-based approach. 21st IFAC World Congress, July 2020, Berlin, Germany. hal-02516094f	**CP**	**49**
8	**Taoufik Chaouachi** and Lasssad Sbita, "The use of the filters and their effect on the electrical performance of electric vehicle's BLDC motor," 2019 4th International Conference on Power Electronics and their Applications (ICPEA), Elazig, Turkey, 25-27 Sept. 2019, pp. 1-6, doi: 10.1109/ICPEA1.2019.8911133.	**CP**	**50**

[2] **JA** : Peer-reviewed journal article; **CP**: Peer-reviewed conference paper ; **BC**: peer-reviewed book chapter

#	RDI publication	Type[2]	Abstract on Page #
9	**Taoufik Chaouachi** and Lasssad Sbita, "The impact of hall effect sensor filtered signals on the in-wheel motor tire of an electric vehicle," 2019 4th International Conference on Power Electronics and their Applications (ICPEA), Elazig, Turkey, 25-27 Sept. 2019, pp. 1-4. doi: 10.1109/ICPEA1.2019.8911151.	**CP**	**51**
10	**M. Merai**, M. W. Naouar, I. Slama-Belkhodja and E. Monmasson, "An enhanced DC-link voltage controller for single phase AC/DC converters," 2019 21st European Conference on Power Electronics and Applications (EPE '19 ECCE Europe), Genova, Italy, 2019, pp. 1-8, doi: 10.23919/EPE.2019.8915083.	**CP**	**52**
11	**Mkhinini Maher , Asma Naffeti and Mohamed Hedi Riahi**, Contribution à l'amélioration d'un robot omnidirectionnel, 2ème Journées des Jeunes Chercheurs en Génie Electrique, JCGE'2019, Tunis, December 26-28, 2019.	**CP**	**53**
12	**Meriem MERAI**, Mohamed Wissem NAOUAR, Ilhem SLAMA-BELKHODJA, Éric MONMASSON, "Compensation des courants harmoniques et réactifs par des convertisseurs multifonctions", Techniques de l'Ingénieur, D4268 v1, Septembre 2019.	**BC**	**54**

Applied Mathematics

Applied Mathematics RDI Publications (2019-2020 AY)

#	RDI publication	Type[3]	Abstract on Page #
1	Soumaya Gheryani, Fumio Hiroshima, Jozsef Lorinczi, **Achref Majid**, Habib Ouerdiane, Functional Central Limit Theorems and P(ϕ)1-Processes for the Relativistic and Non-Relativistic Nelson Models, Journal of Math Phys Anal Geom (2020) 23:18, 2020, pp. 1-30, Springer. https://doi.org/10.1007/s11040-020-09345-3	**JA**	**55**
2	Anis Theljani, **Hamdi Houichet**, and Anis Mohamed, An adaptive Cahn-Hilliard equation for enhanced edges in binary image inpainting, Journal of Algorithms & Computational Technology Volume 14: 1–10, 2020. https://doi.org/10.1177/1748302620941430	**JA**	**56**
3	Mondher Damak, Brice Franke, **Nejib Yaakoubi**, Accelerating Planar Ornstein-Uhlenbeck, Diffusion with Suitable Drift, Discrete And Continuous Dynamical Systems, Volume 40, Number 7, July 2020. 4093-4112. American Institute of Mathematical Science, doi: 10.3934/dcds.2020173	**JA**	**57**
4	**Noureddine Jilani Ben Naouara**, Faouzi Trabelsi, Optimal multiple stopping under catastrophic event, Int. J. Mathematical Modelling and Numerical Optimisation, Vol. 10, No. 2, 2020, pp. 214-327. Inderscience Publishers. DOI: 10.1504/IJMMNO.2020.106536	**JA**	**57**

[3] **JA** : Peer-reviewed journal article; **CP**: Peer-reviewed conference paper ; **BC**: peer-reviewed book chapter

Civil & Building Engineering

Civil & Building Engineering

RDI Publications (2019-2020 AY)

#	RDI publication	Type[4]	Abstract on Page #
1	Karim Miled, **Rahma Zouaoui**, Oualid Limam, Modélisation analytique de l'effet du squelette granulaire sur le retrait endogène du béton, 5th Franco-Maghrebian Scientific Research Days: Characterization of Complex Materials, JSFM-CMC 2019, 17-18 Novembre 2019, Algeria, pp. 1-5.	**CP**	**59**

[4] **JA** : Peer-reviewed journal article; **CP**: Peer-reviewed conference paper ; **BC**: peer-reviewed book chapter

Engineering Education & Pedagogical Innovation

Engineering Education & Pedagogical Innovation

RDI Publications (2019-2020 AY)

#	RDI publication	Type[5]	Abstract on Page #
1	**Maroua Douiri**, The impact of the Self- Assessment and Peer-Assessment on an integrated project, Proceedings of the PAEE/ALE'2020, 12th International Symposium on Project Approaches in Engineering Education (PAEE) and 17th Active Learning in Engineering Education Workshop (ALE), 26-28 August 2020, Pattaya, Thailand. pp. 13-20.	**CP**	**60**
2	Simone B. S. Monteiro, **Khaled B. Hafaiedh**,João M. da Silva,Ana C. F. Lima,Everaldo S. Júnior,Mateus H.Torres,**Mohamed Boufaied**, **Adem B. Zarb**,Mohamed **A. B. Rekaya, Iheb Zouaghi**, Dianne Magalhães Viana, Peer-Assessment for Holistic Student Development (PAHSD): Implementing a Digital Application on a PBL Platform, Proceedings of the PAEE/ALE'2020, 12th International Symposium on Project Approaches in Engineering Education (PAEE) and 17th Active Learning in Engineering Education Workshop (ALE), 26-28 August 2020, Pattaya, Thailand. pp. 253-261	**CP**	**61**
3	**Khaled B. Hafaiedh**, Simone B. S. Monteiro, João M. da Silva, Everaldo S. Júnior, Mateus H. Torres, **Mejri Nizar**, **Nader Abdellaoui**, **Zied Kouki, Amine Ayari**, Ari M. Mariano, Paulo Celso Reis, Team Building through Student's Preferences and Competences (TBSPC): implementation on a PBL platform, Proceedings of the PAEE/ALE'2020, 12th International Symposium on Project Approaches in Engineering Education (PAEE) and 17th Active Learning in Engineering Education Workshop (ALE), 26-28 August 2020, Pattaya, Thailand, pp. 262-270	**CP**	**62**

[5] **JA** : Peer-reviewed journal article; **CP**: Peer-reviewed conference paper ; **BC**: peer-reviewed book chapter

Appendix: Paper Abstracts

The IASO Self-Reporting System: A Persuasive Clinical Mood Tracking and Management Application for Hospital Patients

Faouzi Kamoun, Mai El Barachi, Russell Hamilton, **Ahmed Ben Hadj Khalifa**

ABSTRACT

Mood swings are commonly observed phenomena among hospitalized patients. As a result, there has been a growing interest in developing solutions that can assist caregivers in acquiring a better understanding of patient mood states and behaviors. A key challenge resides in the need to not only monitor patients' mood state but also to try to influence it and regulate it. This article presents the IASO self-reporting system, a persuasive clinical mood tracking, and a management application for hospital patients. We describe the design process of the system, its technical implementation details, and key features. Unlike most earlier related studies, IASO incorporates the concept of mood-based adaptive art (MBAA) that triggers animated digital art clips with background sounds in response to patients' self-reported mood states, thus offering a tool for creative healing and mood enhancement. Our proposed solution empowers patients to gain more control over their wellbeing, regulates their moods and enables caregivers to receive timely feedback about potential mood swings and dangerous mood conditions.

Keywords: Art Therapy, Design for Well-Being, Electronic Monitoring, M-Health, Mood Management, Mood Regulation, Mood Tracking, Self-Assessment

Faouzi Kamoun, Mai El Barachi, Russell Hamilton, **Ahmed Ben Hadj Khalifa**, The IASO Self-Reporting System: A Persuasive Clinical Mood Tracking and Management Application for Hospital Patients, International Journal of Applied Research on Public Health Management (IJARPHM), Vol 5, Issue 2, 2020, pp. 1-13. IGI Global. DOI: 10.4018/IJARPHM.2020070104

Towards a Better Understanding of Drone Forensics: A Case Study of Parrot AR Drone 2.0

Hana Bouafif, **Faouzi Kamoun**, Farkhund Iqbal

Abstract:

Unmanned aerial vehicles (drones) have gained increased popularity as their innovative uses continue to expand across various fields. Despite their numerous beneficial uses, drones have unfortunately been misused, through many reported cases, to launch illegal and sometimes criminal activities that pose direct threats to individuals, organizations, public safety and national security. These threats have recently led law enforcement agencies and digital forensic investigators to pay special attention to the forensic aspects of drones. This important research topic, however, remains underexplored. This study aims to further explore drone forensics in terms of challenges, forensic investigation procedures and experimental results through a forensic investigation study performed on a Parrot AR drone 2.0. In this study, the authors present new insights on drone forensics in terms of forensic approaches, access to drone's digital containers and the retrieval of key information that can assist digital forensic investigators establish ownership, recuperate flight data and gain access to media files.

Keywords: Drone, Drone Forensics, Forensic Investigation, UAV, Unmanned Aerial Vehicle, Unmanned Aerial System

Hana Bouafif, **Faouzi Kamoun**, Farkhund Iqbal, Towards a Better Understanding of Drone Forensics: A Case Study of Parrot AR Drone 2.0. The International Journal of Digital Crime and Forensics (IJDCF), IGI Global, VOL 12, N0. 1, pp. 23-57, 2020

Estimating Ambient Visibility in the Presence of Fog: A Deep Convolutional Neural Network Approach

Fatma Outay, Bilal Taha, **Hazar Chaabani**, **Faouzi Kamoun**, Naoufel Werghi , Ansar -Ul-Haque Yasar

Abstract:

Next-generation intelligent transportation systems are based on the acquisition of ambient data that influence traffic flow and safety. Among these, is the ambient visibility range whose estimation, in the presence of fog, is extremely useful for next-generation intelligent transportation systems. However, existing camera-based approaches are based on "engineered features" extraction methods that use computer algorithms and procedures from the image processing field. In this contribution, a novel approach to estimate visibility range under foggy weather conditions is proposed which is based on "learned features" instead. More precisely, we use AlexNet deep convolutional neural network (DCNN), trained with raw image data, for feature extraction and a support vector machine (SVM) for visibility range estimation. Our quantitative analysis showed that the proposed approach is very promising in estimating the visibility range with very good accuracy. The proposed solution can pave the way towards intelligent driveway assistance systems to enhance awareness of driving weather conditions and hence mitigate the safety risks emanating from fog-induced low visibility conditions.

Keywords: Intelligent transportation systems, Ubiquitous technologies, Atmospheric visibility, Road safety, Deep convolutional neural networks, Ambient intelligence

Fatma Outay, Bilal Taha, **Hazar Chaabani**, **Faouzi Kamoun**, Naoufel Werghi , Ansar -Ul-Haque Yasar, Estimating Ambient Visibility in the Presence of Fog: A Deep Convolutional Neural Network Approach, Personal and Ubiquitous Computing, Springer. pp. 1-12. November 2019. https://doi.org/10.1007/s00779-019-01334-w

SOFCluster: Safety-oriented, fuzzy logic-based clustering scheme for vehicular ad hoc networks

Mohamed Aissa, **Badia Bouhdid**, Adel Ben Mnaouer ,Abdelfettah Belghith , Saad AlAhmadi

Abstract:

Vehicular ad hoc network (VANET) nodes are characterized by their high mobility and by exhibiting different mobility patterns. Therefore, VANET clustering schemes are required to account for the mobility parameters among neighboring nodes to produce relatively stable clustering schemes. In this article, we propose a novel cluster-head (CH) selection scheme for VANETs. This scheme is based on a fuzzy logic-powered, k-hop distributed clustering algorithm. It deals efficiently with scalability and stability issues of VANETs and is able to achieve highly stable clustering topologies as compared with other schemes. Our proposed clustering scheme strives to maintain a safe intervehicle distance as a one prime metric for CH selection. Moreover, a major contribution of our work is the proposal of a novel strategy for constructing fuzzy logic-based clustering algorithms useful for VANETs. This proposed solution is useful in an Internet of things-based setting that involves controlled vehicle-to-vehicle communication. We first derive mathematically, a new average distance estimation formula that is used as a metric for selecting CHs, leading to safer clusters that avoid collisions with front and rear vehicles. Furthermore, the new proposed scheme creates stable clusters by reducing reclustering overhead and prolonging clusters' lifetimes.

Keywords: VANET, clustering, fuzzy logic, V2V

Mohamed Aissa, **Badia Bouhdid**, Adel Ben Mnaouer ,Abdelfettah Belghith , Saad AlAhmadi, SOFCluster: Safety-oriented, fuzzy logic-based clustering scheme for vehicular ad hoc networks, Transactions on Emerging Telecommunications Technologies, April 2020, e3951John Wiley & Sons. **https://doi.org/10.1002/ett.3951**

An identity-based cryptographic scheme for cloud storage applications

Manel Medhioub, Mohamed Hamdi

Abstract:

The use of remote storage systems is gaining an expanding interest, namely the cloud storage-based services. In fact, one of the factors that led to the popularity of cloud computing is the availability of storage resources provided at a reduced cost. However, when outsourcing the data to a third party, security issues become critical concerns, especially confidentiality, integrity, authentication, anonymity and resiliency. Based on this challenge, this work provides a new approach to ensure authentication in cloud storage applications. ID-Based Cryptosystems (IBC) have many advantages over certificate-based systems, such as simplification of key management. This paper proposes an original ID-based authentication approach in which the cloud tenant is assigned the IBC-Private Key Generator (PKG) function. Consequently, it can issue public elements for its users, and can keep confidential resulting IBC secrets. Moreover, in our scheme, the public key infrastructure is still in usage to establish trust relationships between the PKGs.

Keywords: Cloud storage; authentication; IBC; identity-based cryptography; security; Dropbox

Manel Medhioub, Mohamed Hamdi, An identity-based cryptographic scheme for cloud storage applications, International Journal of Grid and Utility Computing, Indersience Publishing, Vol. 10, Issue 2, 2019, pp. 93-104. DOI: 10.1504/IJGUC.2019.098210

Advanced Analysis of the Integrity of Access Control Policies: The Specific Case of Databases

Faouzi Jaïdi, Faten Labbene Ayachi and Adel Bouhoula

Abstract:

Databases are considered as one of the most compromised assets according to 2014-2016 Verizon Data Breach Reports. The reason is that databases are at the heart of Information Systems (IS) and store confidential business or private records. Ensuring the integrity of sensitive records is highly required and even vital in critical systems (e-health, clouds, egovernment, big data, e-commerce, etc.,). The access control is a key mechanism for ensuring the integrity and preserving the privacy in large scale and critical infrastructures. Nonetheless, excessive, unused and abused access privileges are identified as most critical threats in the top ten database security threats according to 2013-2015 Imperva Application Defense Center reports. To address this issue, we focus in this paper on the analysis of the integrity of access control policies within relational databases. We propose a rigorous and complete solution to help security architects verifying the correspondence between the security planning and its concrete implementation. We define a formal framework for detecting non-compliance anomalies in concrete Role Based Access Control (RBAC) policies.

We rely on an example to illustrate the relevance of our contribution.

Keywords: Access Control, Databases Security, Formal Validation, Integrity Analysis, Conformity Verification

Faouzi Jaïdi, Faten Labbene Ayachi and Adel Bouhoula, Advanced Analysis of the Integrity of Access Control Policies: The Specific Case of Databases. International Arab Journal of Information Technology (IAJIT), 17(5): 808-815, 2020

Mobile Assistive Application for Blind People in Indoor Navigation

H. Jabnoun, M. Abouhashish and F. Benzarti

Abstract:

Navigation is an important human task that needs the human sense of vision. In this context, recent technologies developments provide technical assistance to support the visually impaired in their daily tasks and improve their quality of life. In this paper, we present a mobile assistive application called “GuiderMoi” that retrieves information about directions using color targets and identifies the next orientation for the visually impaired. In order to avoid the failure in detection and the inaccurate tracking caused by the mobile camera, the proposed method based on the CamShift algorithm aims to introduce better location and identification of color targets. Tests were conduct in natural indoor scene. The results depending on the distance and the angle of view, defined the accurate values to have a highest rate of target recognition. This work has perspectives for this such as implicating the augmented reality and the intelligent navigation based on machine learning and real-time processing.

Keywords: Assistive application Color targets Camshift algorithm Android application

Jabnoun H., Hashish M.A., Benzarti F. Mobile Assistive Application for Blind People in Indoor Navigation. In: Jmaiel M., Mokhtari M., Abdulrazak B., Aloulou H., Kallel S. (eds) The Impact of Digital Technologies on Public Health in Developed and Developing Countries. International Conference on Smart Homes and Health Telematics ICOST 2020. Lecture Notes in Computer Science, vol 12157. Springer, Cham.
https://doi.org/10.1007/978-3-030-51517-1_36

Inference Control in Distributed Environment: A Comparison Study

Adel Jebali, Salma Sassi, Abderrazak Jemai,

Abstract:

Traditional access control models aim to prevent data leakage via direct accesses. A direct access occurs when a requester performs his query directly into the desired object, however these models fail to protect sensitive data from being accessed with inference channels. An inference channel is produced by the combination of a legitimate response which the user receives from the system and metadata. Detecting and removing inference in database systems guarantee a high-quality design in terms of data secrecy and privacy. Parting from the fact that data distribution exacerbates inference problem, we give in this paper a survey of the current and emerging research on the inference problem in both centralized and distributed database systems and highlighting research directions in this field.

Keywords: Access control Inference control External knowledge Data distribution Secrecy and privacy

Adel Jebali, Salma Sassi, Abderrazak Jemai, Inference Control in Distributed Environment: A Comparison Study. In: Kallel S., Cuppens F., Cuppens-Boulahia N., Hadj Kacem A. (eds) Risks and Security of Internet and Systems. International Conference on Risks and Security of Internet and Systems (CRiSIS 2019). Lecture Notes in Computer Science, vol 12026. Springer, Cham. https://doi.org/10.1007/978-3-030-41568-6_5

Blockchain-based Chain of Custody: Towards Real-time Tamper-proof Evidence Management

Liza Ahmad, Salam Khanji, Farkhund Iqbal, **Faouzi Kamoun**

Abstract:

Evidence is a tangible demonstrative artifact that proves a fact and shapes the investigation of various misconduct cases involving for instance corruption, misbehavior, or violation. It is imperative to maintain proper evidence management to guarantee the admissibility of an evidence in a court of law. Chain of custody forms the forensic link of evidence sequence of control, transfer, and analysis to preserve evidence's integrity and to prevent its contamination. Blockchain, a distributed tamper-resistant ledger can be leveraged to offer a decentralized secure digital evidence system. In this paper, we propose a secure chain of custody framework by utilizing the blockchain technology to store evidence metadata while the evidence is stored in a reliable storage medium. The framework is built on top of a private Ethereum blockchain to document every transmission from the moment the evidence is seized, thus ensuring that evidence can only be accessed or possessed by authorized parties. The framework is integrated with the digital evidence system where evidence is physically stored and locked using smart locks. To secure the sequence of evidence submission and retrieval, only an authorized party can possess the key to unlock the evidence. Our proposed framework offers a secure solution that maintains evidence integrity and admissibility among multiple stakeholders such as law enforcement agencies, lawyers, and forensic professionals. The research findings shed light on hidden opportunities for the efficient usage of blockchain in other realms beyond finance and cryptocurrencies

Keywords: Digital forensics, Chain of custody, Blockchain, Distributed ledger, Security and privacy

Liza Ahmad, Salam Khanji, Farkhund Iqbal, **Faouzi Kamoun**, Blockchain-based Chain of Custody: Towards Real-time Tamper-proof Evidence Management, The 13th International Workshop on Digital Forensics, 15th International Conference on Availability, Reliability and Security (ARES2020), ACM, August 25 – August 28, 2020. Dublin, Ireland, pp. 1-11. DOI: https://doi.org/10.1145/3407023.3409199

A geolocation-aware mobile crowdsourcing solution for the emergency supply of oxygen cylinders

Faouzi Kamoun, May El Barachi, **Abderrazak Hachani**, Fatna Belqasmi, **Amir Ben Said** and **Imed Amri**

Abstract

Emergency medical oxygen cylinders are commonly used as first aid kits to prevent strokes during chronic obstructive pulmonary disease (COPD) / asthma attacks. In this paper, we propose a geolocation-aware mobile crowdsourcing solution for the emergency supply of oxygen cylinders to patients suffering from sudden breathing difficulties. The proposed crowdsourcing solution leverages the proliferation of mobile devices to connect requestors of emergency oxygen cylinders with potential suppliers from the crowd during crises. We describe the design process of the system, its technical implementation details, and key features. We also discuss some of the encountered challenges and summarize the actions taken to address them.

Keywords: Smart healthcare; crowdsourcing; collaborative systems; mobile health information systems; crisis management

Faouzi Kamoun, May El Barachi, **Abderrazak Hachani**, Fatna Belqasmi, **Amir Ben Said** and **Imed Amri**, A geolocation-aware mobile crowdsourcing solution for the emergency supply of oxygen cylinders, The 11th International Conference on Ambient Systems, Networks and Technologies (ANT-2020), April 6 - 9, 2020, Warsaw, Poland. Procedia Computer Science 170 (2020), Elsevier, pp. 153–160. April 2020

An artificial intelligence based crowdsensing solution for on-demand accident scene monitoring

May El Barachi, **Faouzi Kamoun**, Jannatul Ferdaos , **Mouna Makni**, **Imed Amri**,

Abstract

Road traffic crashes have a devastating impact on societies by claiming more than 1.35 million lives each year and causing up to 50 million injuries. Improving the efficiency of emergency management systems constitutes a key measure to reduce road traffic deaths and injuries. In this work, we propose a comprehensive crowdsensing-based solution for the real-time collection and the analysis of accident scene intelligence as a means to improve the efficiency of the emergency response process and help reduce road fatalities. The solution leverages sensory, mobile, and web technologies for the real-time monitoring of accident scenes, and employs Artificial Intelligence for the automatic analysis of the accident scene data, to allow the automatic generation of accident intelligence reports. Police officers and rescue teams can use those reports for fast and accurate situational assessment and effective response to emergencies. The proposed system was fully implemented and its operation was successfully tested using a variety of scenarios. This work gives interesting insights into the possibility of leveraging crowdsensing and artificial intelligence for offering emergency situational awareness and improving the efficiency of emergency response operations.

Keywords: Crowdsensing; collaborative systems; artificial intelligence; accident scene monitoring; emergency management

May El Barachi, **Faouzi Kamoun**, Jannatul Ferdaos , **Mouna Makni**, **Imed Amri**, An artificial intelligence based crowdsensing solution for on-demand accident scene monitoring, The 11th International Conference on Ambient Systems, Networks and Technologies (ANT-2020), April 6 - 9, 2020, Warsaw, Poland. Procedia Computer Science 170 (2020), Elsevier, pp. 303-310. April 2020.

The COVCRAV project: Architecture and design of a cooperative V2V crash avoidance system

Fatma Outay, **Hichem Bargaoui, Anouar Chemek, Faouzi Kamoun** , Ansar Yasar

Abstract:

Systems capable of warning motorists against hazardous driving conditions are extremely useful for next-generation cooperative situational awareness and collision avoidance systems. In this paper, we present some preliminary results related to the COVCRAV project which aims to develop an on-board Road Hazard Signaling (RHS) system based on a crowd-apprising model. Unlike other approaches that rely on the automatic detection of dangerous situations via onboard sensors or warning messages received from roadside units, our approach enables drivers to interact directly with a touchscreen Driver Vehicle Interface (DVI) to notify nearby vehicles about the presence of a hazardous driving situation based on many high-value safety use-cases. We describe our RHS application and highlight the key functions provided by the originating and the receiving ITS applications. We also provide some details regarding the design aspects and system architecture of the proposed system.

Keywords: Intelligent transportation systems; road hazard signaling; crowd-apprising; V2V applications; road safety; cooperative systems

Fatma Outay, **Hichem Bargaoui**, **Anouar Chemek**, **Faouzi Kamoun** , Ansar Yasar, The COVCRAV project: Architecture and design of a cooperative V2V crash avoidance system, The 3rd International Workshop on Connected & Intelligent Mobility (CIM 2019) . EUSPN-2019 Conference . November 4-7, 2019, Coimbra, Portugal. Procedia Computer Science 160 (2019). Elsevier. 473–478. DOI: https://doi.org/10.1016/j.procs.2019.11.062.

Low crosstalk and small size 12-channel WDM demultiplexer based on 2D photonic crystal

Radhouene Massoudi, Monia Najjar, Nikhildeep Gupta and Vijay Janyani

Abstract:

In this work, we designed an optical demultiplexer based on 2D photonic crystal filters to separate six and twelve wavelengths. As the resonance wavelength depends of the radius of filters, therefore, six and twelve filters with different values of radii are used to select channel's wavelength. When the radius of filters increases the wavelength at resonance is shifted to the higher values. In this work, many parameters are used to evaluate the performances of optical multiplexers such as: quality factor, crosstalk, structure size and the number of channels. The maximum values of quality factor, the average crosstalk and footprint are 3583.95, -28.06 dB and 370 µm 2 , respectively. The finite difference time domain (FDTD) and plane wave expansion (PWE) methods are used to calculate the output spectrums and band gap, respectively.

Keywords: Q-factor, Crosstalk, Wavelength division multiplexing, Photonic crystals, Optical fiber filters, Optical fibers

Radhouene Massoudi, Monia Najjar, Nikhildeep Gupta and Vijay Janyani. Low crosstalk and small size 12-channel WDM demultiplexer based on 2D photonic crystal. 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 2020, pp. 1353-1358. doi: 10.1109/IWCMC48107.2020.9148490.

Tunable C and L Bands Demultiplexer Based on Photonic Crystal Ring Resonator

Radhouene Massoudi , Monia Najjar and Vijay Janyani.

Abstract:
In this paper, we propose two dimensional photonic crystal demultiplexer based on circular ring resonator. This device permits to separate two wavelengths in C and L bands, which consist of a bus waveguide and drop waveguide. The proposed design integrate in PON system, in which the device tuned by an external effect (thermal effect). The simulation results show that our proposed structure outperforms in compared to the reported results with quality factor, transmission efficiency and crosstalk equal 722, 96% and -36 dB, respectively. Furthermore, these performances are obtained with a size around 107 µm ^{2} smaller than that mentioned in related works. Thus, it can be recommended for using in photonic integrated circuits. Furthermore, simulation results are realized by using finite difference time domain (FDTD) and plane wave expansion (PWE) methods.

Keywords: Optical ring resonators, Photonic crystals, Optical filters, Refractive index, Q-factor, Optical sensors, Photonics

Radhouene Massoudi , Monia Najjar and Vijay Janyani. Tunable C and L Bands Demultiplexer Based on Photonic Crystal Ring Resonator. 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 2020, pp. 1427-1430. doi: 10.1109/IWCMC48107.2020.9148534.

Novel design superelliptic photonic crystal ring resonator based on channel drop filter

Radhouene Massoudi , Monia Najjar and Vijay Janyani.

Abstract:
In this paper, we propose a novel shape of ring resonator used for optical channel drop filter (CDF). The proposed structure consists of In 0.53 Al 0.16Ga0.31 AS rods with refractive index n=3.19 surrounded by air nair=1. The most convenient photonic band gap obtains for a square lattice with rod radius r=0.185*a nm and lattice constant a=546 nm. The two dimensional band gap map of photonic structure is plotted using plan wave expansion (PWE) method and the filters transmission spectrum is calculated using finite time domain (FDTD) method. The simulation results show high dropping efficiency and an important quality factor at 1582 nm equal to 100% and 1977.5, respectively, with device dimension is around 277 μm^2 . The main structure parameters such as radius is investigated to optimize the transmission spectra of the CDF filter.

Keywords: Optical ring resonators, Optical filters, Photonic crystals, Resonator filters, Shape, Q-factor, Photonics

Radhouene Massoudi , Monia Najjar and Vijay Janyani. Novel design superelliptic photonic crystal ring resonator based on channel drop filter. 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 2020, pp. 1359-1363. doi: 10.1109/IWCMC48107.2020.9148535.

A medical decision support system for cardiovacsular disease based on ontology learning

Sonia Sbissi, M. Mahfoudh and S. Gattoufi

Abstract

This paper presents our decision support system ”CardioSAD” that aims to assist cardiologists to make relevant decisions for patients who are at risk cardiovascular disease. The main idea is to analyse clinical practice guidelines (there are a documents that contain a set of recommendations and medical knowledge) to enrich and exploit an existing ontology. The process of enrichment is driven by the task of ontology learning. We start by pre-processing the text and extracting the relevant concepts. Then, the OWL DL axioms and SWRL rules will be used to enrich our ontology. These rules will be inferred for suggesting appropriate recommendations to the doctors

Keywords: Ontology, Decision support system, cardiovacsular disease, NLP

Sonia Sbissi, M. Mahfoudh and S. Gattoufi, "A medical decision support system for cardiovacsular disease based on ontology learning," 2020 International Multi-Conference on Organization of Knowledge and Advanced Technologies (OCTA), Tunis, Tunisia, February 6-8, 2020, pp. 1-9

Tailored Deep Learning based Architecture for Smart Agriculture

Louay Boukhris, **Jihene Ben Abderrazak** and Hichem Besbes

Abstract

Disease detection in a plant or tree using traditional ways such as the farmers expert naked eyes is both time and resource consuming and may engender tremendous crop losses. Thus, the early diagnosis and treatment of these diseases can minimize the losses in the whole crop and can improve quality and diversity for the consumer later. With the recent advances in Deep Learning, powerful approaches are developed for both detection and classification that can cope with complex environments. In this paper, we propose an efficient deep learning-based architecture for object detection in the context of Smart Agriculture. The proposed solution combines deep learning and tweaked transfer learning models for object detection with balanced data for every class of images. It can operate in a more complex environment and takes into consideration the state of the input. Its aim is to automatically detect damages in leaves and fruits, locate them, classify their severity levels, and visualize them by contouring their exact locations. Numerical results reveal that the proposed solution, based on Mask-RCNN achieves higher performances in features extraction and damage detection/localization compared to other pre-trained models such as VGG16 and VGG19.

Keywords: Diseases, Feature extraction, Agriculture, Object detection, Machine learning, Data models, Task analysis

Louay Boukhris, **Jihene Ben Abderrazak** and Hichem Besbes, "Tailored Deep Learning based Architecture for Smart Agriculture," 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 15-19 June 2020, pp. 964-969, doi: 10.1109/IWCMC48107.2020.9148182.

Self Data Transfer Configuration to Enhance Power Efficiency in IoT application

Feten Teber and Halim Kacem

Abstract:
Reducing energy consumption is always a goal in any IoT application, specially for its low level layer which is wireless sensor network (WSN), since the nodes are not rechargeable. In this paper we propose a self-configuration mechanism of a sensor node, based on the transferred data, making it possible to reduce the active processing time and to increase the duration in which the processor can remain in the low power modes. Our new approach consists in developing a new decision algorithm allowing choosing in real-time the most efficient method of data transfer by a sensor node. This algorithm makes it possible to minimize the power consumed by the processing unit and this through a self-configuring mechanism of the sensor node. The solution shows that under specific transfer conditions there is a switching point for each node that favors either the use of direct memory access (DMA) or the use of the interrupt (IT).

Keywords: Power demand, Data transfer, Wireless sensor networks, Energy consumption, Microcontrollers, Power electronics, Internet of Things

Feten Teber and Halim Kacem, "Self Data Transfer Configuration to Enhance Power Efficiency in IoT application," 2019 4th International Conference on Power Electronics and their Applications (ICPEA), Elazig, Turkey, 25-27 Sept. 2019, pp. 1-5. doi: 10.1109/ICPEA1.2019.8911164.

Enforcing Risk-Awareness in Access Control Systems: Synthesis, Discussion and Guidelines

Pierrette Annie Evina , **Faouzi Jaidi** , Faten Labbene Ayachi , Adel Bouhoula

Abstract:
Access control is a main security measure for the prevention of loss, disclosure or degradation of sensitive information in business. As such, it has become a source of inspiration for many researchers who have undertaken to conduct studies related to that subject. More specifically, risk management in access control is a topic that captivates information and communication technology scientists. Several approaches are defined in literature that can be classified into two main trends: some researchers discuss risk management based on user access, while some other consider policies expression when assessing the risk. In this paper, we study the thematic of enforcing risk awareness/management in access control systems. We review, classify and present a comprehensive synthesis of scientific articles that deal specifically with risk management in access control. We mainly discuss risk management approaches that deal with access control policy expressions and conformity.

Keywords: Access control, Risk management, Organizations, Standards organizations, Market research, Information systems

Pierrette Annie Evina , **Faouzi Jaidi** , Faten Labbene Ayachi , Adel Bouhoula, "Enforcing Risk-Awareness in Access Control Systems: Synthesis, Discussion and Guidelines," 2020 International Wireless Communications and Mobile Computing (IWCMC), Limassol, Cyprus, 15-19 June 2020, pp. 433-438. doi: 10.1109/IWCMC48107.2020.9148340.

Blockchain and IoT: A Proposed Security Framework

Ahmed Ben Ayed, Pedro Taveras, **Tarek BenYounes**

Abstract

With the improvement of technology and the widespread use of smart devices, smart homes, smart cars, and almost smart everything, IoT has become a significant player that influences everyone's daily life. Most of these IoT devices are limited in computing capacities, which make them an easy target for hackers. This problem has been in the research scope for a while, and securing IoT devices without limiting their usage has become a challenge for the scientific community. In this paper, we will be discussing existing IoT attacks, and a state of the art of the proposed solutions will also be given. We will as well discuss how blockchain technology could provide a solution to IoT security problems.

Keywords: Blockchain, IoT security, Internet of things

Ahmed Ben Ayed, Pedro Taveras, **Tarek BenYounes**, Blockchain and IoT: A Proposed Security Framework. In: Latifi S. (eds) 17th International Conference on Information Technology–New Generations (ITNG 2020). April 5-8, 2020, Advances in Intelligent Systems and Computing, vol 1134. Springer, Cham. https://doi.org/10.1007/978-3-030-43020-7_17

Optimal interval observer for switched Takagi-Sugeno systems: an application to interval fault estimation

Yosr Garbouj , Thach Ngoc Dinh , Tarek Raissi , **Talel Zouari** , Moufida Ksouri

Abstract:

The main goal of this paper is to design interval observers for continuous nonlinear switched systems. The nonlinear modes are described by the multimodel approach of Takagi-Sugeno (T-S) fuzzy systems where premise variables depending on the state vector which is unmeasurable. In this paper, we propose T-S interval observers that consider the unmeasurable premise variables as bounded uncertainties under common assumptions that additive disturbances as well as measurement noises are unknown but bounded. The stability and the nonnegativity conditions are given in terms of Linear Matrix Inequality (LMI) to ensure simultaneously the convergence and the nonnegativity of error dynamics. Furthermore, in the absence of measurement noises, optimal gains attenuating the effect of additive disturbances are computed using H∞ approach to improve the accuracy of the present interval observers. Theoretical results are finally applied to a numerical example to highlight the performance of the proposed method.

Keywords: Nonlinear switched systems,T-S interval observer,unmeasurable premise variable,stability, H∞ formalism

Yosr Garbouj , Thach Ngoc Dinh , Tarek Raissi , **Talel Zouari** , Moufida Ksouri, Optimal interval observer for switched Takagi-Sugeno systems: an application to interval fault estimation, in IEEE Transactions on Fuzzy Systems, Mai 2020. doi: 10.1109/TFUZZ.2020.2997333

A systematic design methodology for DC-LINK voltage control of single phase grid-tied PV Systems

M. Merai, M.W. Naouar, I. Slama-Belkhodja and E. Monmasson

Abstract:

PI controllers are commonly used for the DC-link voltage control of single phase grid-tied inverters. This DC-link voltage is characterized by double-line frequency ripples, which are natural by-product of single phase AC systems. These ripples, if not controlled properly, can adverse the performances of the grid-tied PV system at the AC side, particularly the grid current THD. On the other hand, random and sudden changes of the active power produced by PV panels, during sudden shadow or lighting of PV panels, can lead to high DC-link voltage fluctuations. This paper presents a systematic design methodology to tune the gains of the PI-based DC-link voltage controller so that the DC-link voltage fluctuations as well as the grid current THD are reduced to tolerable limits. Several simulation results are presented and discussed to show the effectiveness of the proposed design methodology.

Keywords: DC-link voltage control, Single phase grid tied PV systems, Modelling and control of grid tied PV systems

M. Merai, M.W. Naouar, I. Slama-Belkhodja and E. Monmasson, “A systematic design methodology for DC-LINK voltage control of single phase grid-tied PV Systems”, Mathematics And Computers in Simulation (MATCOM), Elsevier, pp. 1-13, Mai 2020.
https://doi.org/10.1016/j.matcom.2020.05.007

Internal multimodel control for nonlinear overactuated systems

Nahla Touati, Imen Saidi, Ahmed Dhahri, Dhaou Soudani

Abstract :

This paper deals with the synthesis of a novel internal multimodel control designed for nonlinear overactuated systems. The multimodel approach is proposed to deal with system nonlinearity. A base of linear models is considered to describe the nonlinear system in the whole operating domain and then squared by adding virtual outputs. An internal model controller, obtained by a specific inversion method, is proposed for each model of the base. Thus, the global system control parameters are deduced through fusion of the elementary controller parameters by means of two techniques: commutation or residual approach. The case of three inputs/two outputs system is studied to illustrate the ability of both techniques to satisfy a tolerance interval for position error values, overshoot, settling time specifications and robustness requirement

Keywords: Internal multimodel control · Nonlinear overactuated systems · Multimodel approach · Linear models · Virtual outputs · Internal model controller · Commutation or residual approach

Nahla Touati, Imen Saidi, Ahmed Dhahri & Dhaou Soudani, "Internal multimodel control for nonlinear overactuated systems", Arabian Journal for Science and Engineering, Springer, vol.44, no.3, 2019. pp. 2369-2377. https://doi.org/10.1007/s13369-018-3515-5

Evaluating the Capability Index of a Process Integrating Sampling Plan and the Measurement System Number of Distinct Categories NDC

Adel Brik, Mohamed Goddi, Nabil Ben Fredj

Abstract

To assess the capability of a process, the collected data are influenced by the errors of the used measurement system. This study aims to integrate these errors in determining the acceptance threshold value of the capability index Cp that is referred as in this work. An expression of that depends on the Number of Distinct Categories (NDC), type I and type II errors, the index of the capability process corresponding to both rejectable and acceptable quality levels (CpRQL) and (CpAQL), respectively, was developed. These parameters effects and their existing interactions on the variability in the defective parts per million ppm (Δppm) were examined using a response surface experimental design with a total of 81 runs. Analysis of the results of this experimental design showed that it is possible to propose a technique for overcoming the inaccuracy of the used measurement system by targeting higher CpAQL values as the same value of can be obtained by several combinations of CpAQL and NDC.

Keywords : Cp index of process capability, Errors of measurement syste, NDC, threshold value of capability index.

Adel Brik, Mohamed Goddi, Nabil Ben Fredj, Evaluating the capability index of a process integrating sampling plan and the measurement system number of distinct categories NDC, In: Kharrat M., Baccar M., Dammak F. (eds) Advances in Mechanical Engineering, Materials and Mechanics. International Conference on Advances in Mechanical Engineering and

Mechanics, ICAMEM 2019. Lecture Notes in Mechanical Engineering. Springer, Cham. https://doi.org/10.1007/978-3-030-52071-7_17

Evaluation of the process capability index integrating sampling plan and the number of distinct categories NDC of the measurement system

Adel Brik, Mohamed Goddi, Nabil Ben Fredj

Abstract

Measurement system errors impact the collected data used to evaluate the process capability. This work aims to integrate the measurement system errors in the calculation of the threshold value of used for making the decision about the process capability . An expression of that depends on the Number of Distinct Categories (NDC), errors type I and type II, the capability index corresponding to the rejectable quality level (CpRQL) and to the acceptable quality level (CpAQL) was developed. Using a response surface design, effects of these parameters and their relative interactions on the variability in the parts per million of defects ppm (Δppm) were assessed. It was found that it's possible to propose a method for overcoming the inaccuracy of the measurement system by targeting high values of CpAQL.

Keywords: Process capability index , Measurement system error, NDC, Threshold value of capability index

Adel Brik, Mohamed Goddi, Nabil Ben Fredj, Evaluation of the process capability index integrating sampling plan and the number of distinct categories NDC of the measurement system, Proceedings of the 7th International Conference on Advances in Mechanical Engineering and Mechanics, 16-18 December, 2019, Hammamet, Tunisia, pp. 1-6.

Torsional Vibration Suppression with Boundary Impulsive Conditions in Rotary Drilling System

Samir Toumi, Rhouma Mlayeh and Lotfi Beji

Abstract:

This paper presents a nonlinear control scheme to stabilize the problem of torsional vibration suppression with boundary impulsive conditions. A new nonlinear dynamical system is developed. Based on semi-group theory, we prove the well-posednes of the proposed system. In the model development, nonlinearities that arise due to dry friction and loss of contact is considered. Therefore, the impulsive system stability analysis is carried out by using Lyapunov theory and a comparison method. Numerical simulations show the relevance of our result for impulsive system.

Keywords: Vibrations, Mathematical model, Control systems, Friction, Biological system modeling, Differential equations, Oils

Samir Toumi, Rhouma Mlayeh and Lotfi Beji, Torsional Vibration Suppression with Boundary Impulsive Conditions in Rotary Drilling System, 2019 IEEE 58th Conference on Decision and Control (CDC) Palais des Congrès et des Expositions Nice Acropolis Nice, France, December 11-13, 2019 pp. 995-1000, doi: 10.1109/CDC40024.2019.9029411

Robust Fault Detection for switched Takagi-Sugeno systems with unmeasurable premise variables: Interval-Observer-based approach.

Yosr Garbouj, Thach Ngoc Dinh, Zhenhua Wang, **Talel Zouari**, Moufida Ksouri, Tarek Raissi

Abstract:

This paper deals with the problem of robust fault detection for continuous-time switched Takagi-Sugeno (T-S) fuzzy models. A procedure based on interval observers is proposed. First, an interval observer is designed under the assumption that the disturbances as well as the uncertainties are unknown but bounded. Stability and nonnegativity properties are given in terms of Linear Matrix Inequalities (LMIs) taking into account disturbances attenuation. Next, residual intervals generated by the interval observer are used for fault detection decision. Finally, a numerical example is provided to show the usefulness of this approach.

Keywords: Nonlinear switched system, interval observer design, Takagi-Sugeno models, unmeasurable premise variables, stability, robustness.

Yosr Garbouj, Thach Ngoc Dinh, Zhenhua Wang, **Talel Zouari**, Moufida Ksouri, Tarek Raissi. Robust Fault Detection for switched Takagi-Sugeno systems with unmeasurable premise variables: Interval-Observer-based approach. 21st IFAC World Congress, July 2020, Berlin, Germany. hal-02516094f

The use of the filters and their effect on the electrical performance of electric vehicle's BLDC motor

Taoufik Chaouachi and Lasssad Sbita

Abstract:

This paper presents the negative effect of low pass filter of in-wheel motor sensored control. This filter is communally used in PCBs to avoid disturbance and noise signals into the input pins o controller. The negative effect is due to the miss communication between the PCBs designer and implementation algorithm teams of project. Thus, it produces degradation of performance of the BLDC motor and thus, of the vehicle. The negative effect appears especially when applying filter on the sensor used to survey the position of the rotor which impact the feature of the EVs motor. This paper present, simulate and practically validate the impacts of filters.

Keywords: Low pass filters, Electric vehicles, Hall effect, Power harmonic filters, Brushless motors, Permanent magnet motors, Torque

Taoufik Chaouachi and Lasssad Sbita, "The use of the filters and their effect on the electrical performance of electric vehicle's BLDC motor," 2019 4th International Conference on Power Electronics and their Applications (ICPEA), Elazig, Turkey, 25-27 Sept. 2019, pp. 1-6, doi: 10.1109/ICPEA1.2019.8911133.

The impact of hall effect sensor filtered signals on the in-wheel motor tire of an electric vehicle

Taoufik Chaouachi and Lasssad Sbita

Abstract:
This paper presents the impact of hall effect sensor filtered signals on the wheel motor of an electric vehicle. This filtered sensor is used to avoid disturbance which are intensely present in vehicles. Despite the fact that the filter allows reliable electrical operation it can cause mechanical constraint. This paper presents, simulates and practically validates those impacts.

Keywords: Tires, Wheels, Brushless DC motors, Windings, Power harmonic filters, Fluctuations

Taoufik Chaouachi and Lasssad Sbita, "The impact of hall effect sensor filtered signals on the in-wheel motor tire of an electric vehicle," 2019 4th International Conference on Power Electronics and their Applications (ICPEA), Elazig, Turkey, 25-27 Sept. 2019, pp. 1-4. doi: 10.1109/ICPEA1.2019.8911151.

An Enhanced DC-link voltage controller for single AC/DC Converters

Mariem Merai, M.W. Naouar, I. Slama-Belkhodja and E. Monmasson

Abstract:

This paper presents a simple and efficient design methodology for the DC-link voltage control of a single-phase AC/DC converter. The DC-link voltage controller is made of a standard PI controller associated to a feed-forward control. The aim of the designed controller is to ensure three main objectives: i) the average value of the DC-link voltage must track with good accuracy a predefined reference value; ii) the DC-link voltage fluctuations must be minimized during transients and; iii) The grid current THD must be minimized during steady state operation.

Keywords: Voltage control, AC-DC power converters, Fluctuations, Voltage fluctuations, Voltage measurement, Reactive power

M. Merai, M. W. Naouar, I. Slama-Belkhodja and E. Monmasson, "An enhanced DC-link voltage controller for single phase AC/DC converters," 2019 21st European Conference on Power Electronics and Applications (EPE '19 ECCE Europe), Genova, Italy, 2019, pp. 1-8, doi: 10.23919/EPE.2019.8915083.

Contribution à l'amélioration d'un robot omnidirectionnel

Mkhinini Maher , Asma Naffeti and **Mohamed Hedi Riahi**,

Abstract/ Résumé :

La conception et la réalisation de robot omnidirectionnel sont issues d'une contrainte majeure : obtenir une structure omnidirectionnelle suffisamment robuste pour être commandable facilement et sans glissement sur le sol. L'élimination de l'astreinte de non déplacement latéral d'une roue classique en utilisant des roues multidirectionnels, il faut aboutir à un modèle cinématique inverse et linéaire, ce qui permit d'extraire le modèle cinématique direct. Le saut de roues sur chaque essieu à amener une nouvelle contrainte qui a dû être prise en compte dans le modèle cinématique direct MCD. Lors d'expérimentations, ce système a montré sa robustesse et sa simplicité d'utilisation. La prise en compte des effets dynamiques et donc l'élaboration d'un modèle dynamique valide, ainsi que la commande en boucle fermée, devrait à permettre de disposer d'un robot suffisamment agile pour se déplacer avec précision dans un environnement très encombré. De plus l'adjonction de capteurs extéroceptifs, notamment des télémètres.

Keywords / Mots clés : robot, omnidirectionnel, modélisation, non holonome, dynamique

Mkhinini Maher , Asma Naffeti and Mohamed Hedi Riahi, Contribution à l'amélioration d'un robot omnidirectionnel, 2ème Journées des Jeunes Chercheurs en Génie Electrique, JCGE'2019, Tunis, December 26-28, 2019.

Compensation des courants harmoniques et réactifs par des convertisseurs multifonctions

Meriem Merai, Mohamed Wissem Naouar, Ilhem Slama-Belkhodja, Éric Monmasson

Abstract

La problématique traitée dans cet article porte sur l'amélioration de l'efficacité énergétique dans un microréseau AC triphasé. Elle est motivée par le fait que, de manière générale, les charges ne bénéficient que de la partie « active » de l'énergie fournie alors qu'ils consomment aussi une partie « réactive » et « harmonique » de l'énergie, ce qui surcharge le microréseau. C'est pour cela qu'il est avantageux de compenser les parties réactive et harmonique de l'énergie via des solutions appropriées. Les solutions classiques utilisées à cette fin peuvent être classées en deux catégories, à savoir les solutions passives telles que les batteries de condensateurs ou de filtres passifs et les solutions actives telles que les filtres actifs de puissance. Cela étant dit, de récents travaux de recherche ont montré que la compensation des énergies réactives et harmoniques peut être effectuée avec des convertisseurs multifonctions (CMF). Ces convertisseurs sont utilisés à la base pour faire l'interface entre des sources d'énergie renouvelables (SER) et les lignes de transport d'énergie électrique d'un microréseau. Leur fonctionnalité peut être étendue pour réaliser des fonctions auxiliaires qui assurent la compensation de la partie harmonique et réactive de l'énergie consommée par des charges locales se trouvant à proximité des CMF. L'article proposé a pour principal objectif de faire prendre conscience, aux lecteurs, de l'évolution future des solutions d'amélioration de la qualité d'énergie électrique, notamment l'intérêt de faire contribuer les CMF, intégrés dans des générations distribuées à base de SER, dans la compensation dynamique des courants harmoniques et réactifs. Bien que ces solutions soient en phase de décollage industriel, les technologies actuelles sont assez matures pour les intégrer dans les filières de production et maîtrise de l'énergie électrique

Keywords : Efficacité énergétique, convertisseurs multifonctions, énergie renouvelable, courants harmoniques

Meriem MERAI, Mohamed Wissem NAOUAR, Ilhem SLAMA-BELKHODJA, Éric MONMASSON, "Compensation des courants harmoniques et réactifs par des convertisseurs multifonctions", Techniques de l'Ingénieur, D4268 v1, Septembre 2019.

Functional Central Limit Theorems and P(ϕ)1-Processes for the Relativistic and Non-Relativistic Nelson Models

Soumaya Gheryani, Fumio Hiroshima, Jozsef Lorinczi, **Achref Majid**, Habib Ouerdiane

Abstract:

We construct P(φ)1-processes indexed by the full time-line, separately derived from the functional integral representations of the relativistic and non-relativistic Nelson models in quantum field theory. These two cases differ essentially by sample path regularity. Associated with these processes we define a martingale which, under an appropriate scaling, allows to obtain a central limit theorem for additive functionals of these processes. We discuss a number of examples by choosing specific functionals related to particle-field operators.

Keywords: Relativistic and non-relativistic Nelson models · Relativistic Schrodinger ¨ operators · Ground states · Feynman-Kac representations · Jump processes and diffusions · Functional central limit theorems

Soumaya Gheryani, Fumio Hiroshima, Jozsef Lorinczi, **Achref Majid**, Habib Ouerdiane, Functional Central Limit Theorems and P(ϕ)1-Processes for the Relativistic and Non-Relativistic Nelson Models, Journal of Math Phys Anal Geom (2020) 23:18, 2020, pp. 1-30, Springer. https://doi.org/10.1007/s11040-020-09345-3

An adaptive Cahn-Hilliard equation for enhanced edges in binary image inpainting

Anis Theljani, **Hamdi Houichet**, and Anis Mohamed

Abstract

We consider the Cahn-Hilliard equation for solving the binary image inpainting problem with emphasis on the recovery of low-order sets (edges, corners) and enhanced edges. The model consists in solving a modified Cahn-Hilliard equation by weighting the diffusion operator with a function which will be selected locally and adaptively. The diffusivity selection is dynamically adopted at the discrete level using the residual error indicator. We combine the adaptive approach with a standard mesh adaptation technique in order to well approximate and recover the singular set of the solution. We give some numerical examples and comparisons with the classical Cahn-Hillard equation for different scenarios. The numerical results illustrate the effectiveness of the proposed model.

Keywords: Image inpainting, Cahn-Hilliard equation, splitting convexity method, inverse problems, adaptive strategy, mixed finite elements

Anis Theljani, **Hamdi Houichet**, and Anis Mohamed, An adaptive Cahn-Hilliard equation for enhanced edges in binary image inpainting, Journal of Algorithms & Computational Technology Volume 14: 1–10, 2020. https://doi.org/10.1177/1748302620941430

Accelerating Planar Ornstein-Uhlenbeck, Diffusion with Suitable Drift

Mondher Damak, Brice Franke, **Nejib Yaakoubi**

Abstract:

The principal aim of this paper is to construct an explicit sequence of weighted divergence free vector fields which accelerates the rate of convergence of planar Ornstein-Uhlenbeck diffusion to its equilibrium state. The rate of convergence is expressed in terms of the spectral gap of the diffusion generator. We construct an explicit sequence of vector fields which pushes the spectral gap to infinity. The acceleration of the diffusion results from the strong oscillation of the flow lines generated by the vector field.

Keywords: Non-reversible diffusion, non-self adjoint generator, spectral gap, Faber-Krahn type inequality, measure preserving flow.

Mondher Damak, Brice Franke, **Nejib Yaakoubi**, Accelerating Planar Ornstein-Uhlenbeck, Diffusion with Suitable Drift, Discrete And Continuous Dynamical Systems, Volume 40, Number 7, July 2020. 4093-4112. American Institute of Mathematical Science, doi: 10.3934/dcds.2020173

Optimal multiple stopping under catastrophic event

Noureddine Jilani Ben Naouara, Faouzi Trabelsi

Abstract:

In this paper, we introduce a new optimal multiple stopping times problem, where we assume each exercise right happens before the date of release of a catastrophic event modelled by a random variable and this catastrophe can be natural (e.g., earthquake, tsunami) or technological (e.g., nuclear event). Since a sudden catastrophe will have a direct influence on prices variation, especially those of underlying as well as option's prime, eventual catastrophic event will be modelled by the first time the underlying's price exceeds some large barrier. The originality of this paper comes from a mathematical model taking account of a nonlinear criteria of sum of the underlying stopped at stopping times of the holder's filtration information as well as a random number of exercise rights at sopping times involving prior to a catastrophic event. This will generalises the concept of swing contracts, where the exercise rights number is only deterministic and finite.

Keywords: optimal multiple stopping; stopping times; catastrophic event; dynamic programming; RCLL process; diffusion process; Markov process; Snell's envelope.

Noureddine Jilani Ben Naouara, Faouzi Trabelsi, Optimal multiple stopping under catastrophic event, Int. J. Mathematical Modelling and Numerical Optimisation, Vol. 10, No. 2, 2020, pp. 214-327. Inderscience Publishers. DOI: 10.1504/IJMMNO.2020.106536

Modélisation analytique de l'effet du squelette granulaire sur le retrait endogène du béton

Karim Miled, **Rahma Zouaoui**, Oualid Limam

Abstract:

En conditions isothermes et en l'absence à la fois d'échange d'humidité avec le milieu environnant et de chargement mécanique, le béton développe des déformations différées de retrait endogène. Afin de prédire l'effet du squelette granulaire et de l'auréole de transition du béton sur ce retrait endogène, un schéma d'homogénéisation quadrisphère a été utilisé. Ce dernier constitue une extension du modèle trisphère proposé initialement pour le béton par Le Roy et de Larrard (1995) et permet de prendre en compte la phase "auréole de transition" dont la fraction volumique a été évaluée par le modèle analytique proposé par Zouaoui et al. (2016). En effet, la démarche consiste à évaluer analytiquement la réponse en déformation d'une sphère composite libre sur sa frontière extérieure mais soumise au retrait endogène de la partie viscoélastique formée par la pâte de ciment et l'auréole de transition. Ensuite, une étude de sensibilité du retrait endogène aux différents paramètres microstructuraux du béton a montré que cette déformation est gouvernée principalement par le retrait endogène de la pâte de ciment et par le volume granulaire et que tous les autres paramètres liés au squelette granulaire (compacité granulaire, distribution de taille des granulats et leur diamètre maximal) et à l'auréole de transition (son épaisseur, sa fraction volumique, son module, etc.) ont des effets très faibles voire négligeables sur le retrait endogène du béton. Enfin, la validité du modèle proposé est discutée en confrontant ses prédictions à des résultats expérimentaux issus de la littérature et relatifs à des bétons ordinaires (BO) et à des bétons à hautes performances (BHP).

Keywords : Béton, Microstructure, Auréole de transition, Fluage propre, Viscoélasticité, Modélisation analytique

Karim Miled, **Rahma Zouaoui**, Oualid Limam, Modélisation analytique de l'effet du squelette granulaire sur le retrait endogène du béton, 5th Franco-Maghrebian Scientific Research Days: Characterization of Complex Materials, JSFM-CMC 2019, 17-18 Novembre 2019, Algeria, pp. 1-5.

The impact of the Self- Assessment and Peer-Assessment on an integrated project

Maroua Douiri

Abstract:

"Peer assessment" and "self-assessment" are both active evaluation methods used in a C ++ Object-Oriented Programming integrated project, a module taught to second year computer science students at ESPRIT - School of Engineering. These approaches are used to evaluate projects in which work is divided into phases, each phase is followed by a regulatory validation. We opted for peer and self-assessment methods in order to calculate the continuous monitoring average of this module.

In this paper, we will discuss the implementation of these approaches, their impacts on the learner and some recommendations to improve limitations and have better results in the future.

Keywords: Peer Assessment, Moodle Workshop, Object-Oriented Programming C ++, Self Assessment, Instructor Assessment, Teamwork, Project, Evaluation methods, Engineering Education, Active Learning, Student assessment

Maroua Douiri, The impact of the Self- Assessment and Peer-Assessment on an integrated project, Proceedings of the PAEE/ALE'2020, 12th International Symposium on Project Approaches in Engineering Education (PAEE) and 17th Active Learning in Engineering Education Workshop (ALE), 26-28 August 2020, Pattaya, Thailand. pp. 13-20.

Peer-Assessment for Holistic Student Development (PAHSD): Implementing a Digital Application on a PBL Platform

Simone B. S. Monteiro, **Khaled B. Hafaiedh**,João M. da Silva,Ana C. F. Lima,Everaldo S. Júnior,Mateus H.Torres,**Mohamed Boufaied**, **Adem B. Zarb**,Mohamed **A. B. Rekaya, Iheb Zouaghi**, Dianne Magalhães Viana

Abstract

The traditional education in which the teacher introduces the concepts to be studied and students passively try to absorb the knowledge has been questioned. At the same time, the collaborative and inductive students-centred approaches, such as the Project-Based Learning (PBL), are gaining importance as students are increasingly concerned with obtaining competencies to deal with real-life situations, proposing solutions to problems and/or getting the most of the opportunities, by working in teams. In this context, a structured peer evaluation process is required to measure students´ competences and create a solid feedback flow. However, the teachers have difficulties to effectively detect the student's strengths and weaknesses, making it challenging for them to help their students to develop the required competences. In this paper, it is presented the development of a digital solution for a structured, methodological and continuous process of Peer Assessment for students. This tool, denominated Peer-Assessment for Holistic Student Development (PAHSD), will be a module of the Platform for Unifying Methodologies of Active learning (PUMA), which is a platform for centralization and automation of PBL processes for university courses. With the PAHSD module, historical data from peer evaluation are used to identify which student's competences need to be improved and to measure which were already improved during his academic journey. The PAHSD indicates the specific training for personal improvement and allows students to compare themselves and also for the professor to make a complete analysis on students results. The PAHSD will be tested on PBL engineering projects in Brazil and Tunisia and could be extended to any education institution that adopt the PBL methodology in any area.

Keywords: Peer-Assessment; PBL Methodology; Machine Learning; Training via PBL.

Simone B. S. Monteiro, **Khaled B. Hafaiedh**,João M. da Silva,Ana C. F. Lima,Everaldo S. Júnior,Mateus H.Torres,**Mohamed Boufaied**, **Adem B. Zarb**,Mohamed **A. B. Rekaya, Iheb Zouaghi**, Dianne Magalhães Viana, Peer-Assessment for Holistic Student Development (PAHSD): Implementing a Digital Application on a PBL Platform, Proceedings of the PAEE/ALE'2020, 12th International Symposium on Project Approaches in Engineering Education (PAEE) and 17th Active Learning in Engineering Education Workshop (ALE), 26-28 August 2020, Pattaya, Thailand. pp. 253-261

Team Building through Student's Preferences and Competences (TBSPC): implementation on a PBL platform

Khaled B. Hafaiedh, Simone B. S. Monteiro, João M. da Silva, Everaldo S. Júnior, Mateus H. Torres, **Mejri Nizar**, **Nader Abdellaoui**, **Zied Kouki, Amine Ayari**, Ari M. Mariano, Paulo Celso Reis

Abstract

Project-Based Learning (PBL) has been widely used in education, helping students to develop technical knowledge within a critical thinking, collaboration, creativity and communication environment. Thus, PBL has the students as the main object, enabling them to decide on real-life focus situations, proposing, through teamwork, solutions to problems and/or getting the most of the opportunities. PBL promotes enjoyable learning, allowing the direct mandatory participation of students, teachers and the owners of the real-life situations under consideration, as well as the eventual participation of other relevant stakeholders. However, in most cases, the choice of teams is made manually by the teacher, through criteria that many times result in lack of coherence and equity between the project teams. This undesirably affects the overall group performance due to conflicts, communication gaps and lack of transparency. In this paper, a flexible module is proposed to digitize and automate team-building processes, based on students' preferences and competences. This module, called Team Building through Student's Preferences and Competences (TBSPC), may be applied to any type of PBL project and offers to students the possibility to contribute in the PBL team pre-creation phase, allowing their decision-making based within some settings previously established by teachers. This makes PBL teams coherent, complementary and congruent with the project. The effectiveness of the mechanisms for creating teams and their impact on the teams' performance in PBL courses are a focus for the TBSPC module development in the context of the Brazil and Tunisia partnership. This module will be part of the Platform for Unifying Methodologies of Active learning (PUMA) which is a platform for centralization and automation of PBL processes for university courses.

Keywords: Team Building; Student´s Preferences and Competences; PBL Methodology; PUMA

Khaled B. Hafaiedh, Simone B. S. Monteiro, João M. da Silva, Everaldo S. Júnior, Mateus H. Torres, **Mejri Nizar**, **Nader Abdellaoui**, **Zied Kouki, Amine Ayari**, Ari M. Mariano, Paulo Celso Reis, Team Building through Student's Preferences and Competences (TBSPC): implementation on a PBL platform, Proceedings of the PAEE/ALE'2020, 12th International Symposium on Project Approaches in Engineering Education (PAEE) and 17th Active Learning in Engineering Education Workshop (ALE), 26-28 August 2020, Pattaya, Thailand, pp. 262-270

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