

Guillaume Guerard

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RESEARCH INTEREST

Machine Learning, Data Mining, Deep Learning, Multi-Agent System, Cybersecurity

EDUCATION

University of Versailles Saint-Quentin en Yvelines

PhD in Computer Science [7]

September,2011-August,2014

Directed by Ider Tseveendorj and Soufian Ben Amor

With highest honour

University of Versailles Saint-Quentin en Yvelines

MsC in Computer Science and Applied Mathematics

September,2010-August,2011

1st among 35 students

TEACHING EXPERIENCE

ENSTA Paris

Lecturer, Department of Computer Science and Engineering

Institut Polytechnique, France

September 2020 - present

ESILV

Lecturer, Department of Computer Science and Engineering

La Défense, France

September 2015 - present

University of Versailles Saint-Quentin en Yvelines

Teaching assistant, Department of Computer Science

Versailles, France

September 2011 - August 2015

Courses taught: Artificial Intelligence, Machine Learning, Theory of Computation, Algorithm, Computer Fundamentals, Discrete Mathematics, Game Theory, Graph Theory, Complex System.

ACADEMIC EXPERIENCE

ESILV

Head of PhD Track

La Défense, France

September 2019 - present

RESEARCH PROJECTS

H2020 MAESHA

Oct 2020-Oct 2024

- Aiming at decarbonising the energy systems of geographical islands, MAESHA will deploy the necessary flexibility, storage and energy management solutions for a large penetration of Renewable Energies.
- Cutting-edge technical systems will be developed and installed, supported by efficient modelling tools and adapted local markets and business frameworks.
- A community-based approach will be adopted to ensure the constant consideration of local populations' best interests throughout the project.

FUI EPIT2.0

Sept 2011 – Sept 2014

- This project main goal is development and validation of a complete energy management system for the eco-districts and cities of tomorrow.
- The realized system allows a management intelligent energy, in real time, by controlling the production, storage and consumption, using innovative information systems.

RESEARCH ACTIVITIES

Main topic – Smart Grid

Sept 2011 – present

- The goal is to create and apply a systemic method to model and simulate intelligent energy systems.
- This project includes the simulation of smart grid with multi-agents systems, the multi-level optimization, the modelling of the nested and overlapping systems of system.
- References
 1. Optimization: [4, 7, 8, 10, 23]
 2. Context-Free Decision Tool: [1, 2, 3, 5, 6, 9, 11, 12, 16, 27, 32, 34]
 3. Multi-Agent System: [15, 19, 36, 37, 38, 42]
 4. Data Mining, Machine Learning & Deep-Learning: [13, 21, 28, 29, 33, 35, 41]
 5. Blockchain: [14]
 6. Energy Management System In Situ: []
 7. AgriPV: []
 8. Weather Forecasting: []
- In collaboration with
 - Soufian BEN AMOR (LI-PaRAD EA7432), Marc BUI (EPHE-PSL UMR 8546): Subject 1, 2, 3
 - H2020 MAESHA: Subject 1, 2, 3, 4, 6
 - Energisme's Chaire: Subject 1, 2, 3, 4
 - NRLAB, Energy 4 Climate, IP-Paris: Subject 6, 7, 8

Secondary topic – Digital Tourism

Sept 2017 – present

- Social network analysis has become widespread in recent years, especially in digital tourism. Indeed, the vast amount of data that tourists produce during their travels represents an effective source for interpreting their behaviors.
- This project includes the following fields as users profiling, advances network analysis, data mining, social modelling and prediction.
- References
 1. Modelling: [26]
 2. Segmentation: [40]
 3. Data Mining: [17, 18, 20, 31]
 4. Machine Learning & Deep-Learning: [24, 30]
- In collaboration with
 - DVRC, Digital Group

Secondary topic – Cybersecurity

Sept 2020 – present

- A large amount a new threats, technologies and business models have emerged in the cybersecurity area through the COVID-19 pandemic. The remote work involved unplanned cloud migrations and swift procurement of IT products and services the remote landscape. In this context, the role of anti-viruses is crucial for the private life and work.
- The dynamic behavior of systems is slightly disturbed by intrusion and activities of such threats. Our goal is to analyse the dynamic behavior through the prism of deep learning to determine little change in the behavior to determine if the system is infected. Moreover, we propose new algorithms to protect distributed systems.
- References – [25, 39]
- In collaboration with
 - Soufian BEN AMOR (LI-PaRAD EA7432)

Secondary topic – United Sciences of Mankind

Sept 2020 – present

- We propose the creation of a platform dedicated to all international scientific actors whose issues are related to research on humans. This involves proposing the development of a participatory/collaborative virtual platform on which scientific organizations would exchange their study materials, their samples, their tools, their knowledge, their reflections and hypotheses and then the resulting data in order to no longer work in isolation.
- Once the data gathered, a machine learning factory will be deployed to help the scientific research and extract knowledge from the big data.
- References – [22]
- In collaboration with
 - Anais AUGIAS et Philippe CHARLIER (LAAB UR 20202), Soufian BEN AMOR (LI-PaRAD EA7432)

VOLUNTARY ACTIVITIES

- Guest Editor, Energies MDPI
- Guest Editor, Frontiers in Energy Research
- Program Committee, Reviewer: ADMA, ECAI, AAAI, DSAA
- Chairman, Smartgreens Conferences.
- Chairman, ROADEF Conferences.
- Host and facilitator, Smart Energy Expo at Paris, La Défense.

CURRENT WORKS

SUBMITTED.....

- PretopoMD: Pretopology-based Mixed Data Hierarchical Clustering
Energisme's Chair and Sonia Djebali
ECAI 2023
- Complex Data Clustering Methods and Challenges
Energisme's Chair and Sonia Djebali
ECAI 2023
- Mixed Data Clustering Library and Challenges
Energisme's Chair and Sonia Djebali
DSAA 2023
- Anomaly detection algorithm within distributed decentralized networks
Guillaume GUERARD, Soufian BEN AMOR, Walter PERETTI, Jeremy DONADIO
ESORICS 2023

IN PROGRESS.....

- Advances in Smart Grid Modelling
H2020 MAESHA
- Estimation of the state of charge and state of health of a Li-Ion Battery for a Nano-Grid
Collaboration with IP-PARIS, E4C, NRLAB
- Time series forecasting methods benchmark for nanogrid consumption prediction
Collaboration with IP-PARIS, E4C, NRLAB
- GHI Seamless Forecast
Collaboration with IP-PARIS, E4C, NRLAB
- Tourism segmentation through unsupervised mixed data learning
Collaboration with DVRC Digital Group
- Mixed-data clustering benchmarks methods and good practices

Energisme's Chaire

- Survey on Isomorphism Algorithms and Applications to Complex Systems
Guillaume GUERARD, Sonia DJEBALI
- Study of composite polymer degradation for high pressure hydrogen vessel by machine learning approach
Collaboration with DVRC Modelling Group.

PUBLICATIONS

- [1] GUERARD, G., BEN AMOR, S., and BUI, A. Approche système complexe pour la modélisation des smart grids. In *13th Roadef Conference, Angers, France*, pages 263–264. 2012.
- [2] GUERARD, G., BEN AMOR, S., and BUI, A. A complex system approach for smart grid analysis and modeling. In *Advances in Knowledge-Based and Intelligent Information and Engineering Systems, Frontiers in Artificial Intelligence and Applications*, pages 788 – 797. IOS Press, San Sebastian, Espagne, 2012. ISBN 978-1-61499-104-5.
- [3] GUERARD, G., BEN AMOR, S., and BUI, A. Survey on smart grid modelling. *International Journal of Systems, Control and Communications*, 4(4):262–279, 2012.
- [4] AHAT, M., BEN AMOR, S., BUI, M., BUI, A., GUERARD, G., and PETERMANN, C. Smart grid and optimization. *American Journal of Operations Research*, 3:196–206, 2013.
- [5] BEN AMOR, S., BUI, A., and GUERARD, G. Méthode d'analyse d'un système complexe pour la recherche opérationnelle: Smart grid. 2013.
- [6] BEN AMOR, S., BUI, A., and GUERARD, G. A context-free smart grid model using complex system approach. In *2014 IEEE/ACM 18th International Symposium on Distributed Simulation and Real Time Applications*, pages 147–154. IEEE, 2014. ISBN 978-1-4799-6144-3.
- [7] GUERARD, G. *Optimisation de la diffusion de l'énergie dans les smart-grids*. Doctorat, Université de Versailles-Saint Quentin en Yvelines, 2014.
- [8] GUERARD, G. and TSEVEENDORJ, I. Largest inscribed ball and minimal enclosing box for convex maximization problems. In E. M. H. Leocadio G. Casado and I. Garcia, editors, *Global Optimization Workshop*, pages 61–64. Malaga, Espagne, 2014. ISBN 978-84-16027-57-6.
- [9] GUERARD, G., BEN AMOR, S., and BUI, A. A context-free smart grid model using pretopologic structure. In *2015 International Conference on Smart Cities and Green ICT Systems (SMARTGREENS)*, pages 1–7. IEEE, 2015. ISBN 978-9-8975-8134-2.
- [10] GUERARD, G. and TSEVEENDORJ, I. Inscribed ball and enclosing box methods for the convex maximization problem. *Optimization Letters*, 10(2):417–432, 2016.
- [11] CATHELINÉAU, E., LEVY, L.-N., and GUERARD, G. Smart grid: From raw data to a digital model. In *14th International Conference of Young Scientists on Energy Issues*. Kaunas, Latvia, 2017.
- [12] GUERARD, G. and DJEBALI, S. Rendre 'intelligent' le smart grid. In *18ème conférence annuelle de la Société Française de Recherche Opérationnelle et d'Aide à la Décision*. Metz, France, 2017.
- [13] GUERARD, G., PICHON, B., and NEHAI, Z. Demand-response: let the devices take our decisions. In *Proceedings of the 6th International Conference on Smart Cities and Green ICT Systems*, volume volume 1, pages 119–126. Porto, Portugal, 2017. ISBN ISBN: 978-989-758-241-7.

- [14] NEHAI, Z. and GUERARD, G. Integration of the blockchain in a smart grid model. In *14th International Conference of Young Scientists on Energy Issues*. Kaunas, Latvia, 2017.
- [15] GUERARD, G., LEVY, L.-N., and POUSSEUR, H. Multi-agent model for domotics and smart houses. In *Proceedings of the 7th International Conference on Smart Cities and Green ICT Systems*, volume volume 1, pages 223–230. Funcha, Madère, Portugal, 2018. ISBN ISBN: 978-989-758-292-9.
- [16] BEN AMOR, S., GUERARD, G., and LEVY, L.-N. Systemic approach for modeling a generic smart grid. In *Proceedings of the Tenth International Symposium on Information and Communication Technology, SoICT 2018*. Hanoi, Vietnam, 2019.
- [17] BEN BACCAR, L., DJEBALI, S., and GUERARD, G. Prediction de circuit touristique par data mining sequentielle. In *Premier Symposium GDR MaDICS*. Rennes, France, 2019.
- [18] BEN BACCAR, L., DJEBALI, S., and GUERARD, G. Tourist's tour prediction by sequential data mining approach. In *Advanced Data Mining and Applications, 15th International Conference, ADMA 2019*, page pp. 681–695. Dalian, China, 2019. ISBN ISBN 978-3-030-35230-1.
- [19] GUERARD, G. and POUSSEUR, H. Jade modeling for generic microgrids. In *Agents and Multi-agent Systems: Technologies and Applications 2019*, volume 148, pages pp 377–386. Saint Julians, Malta, 2019. ISBN ISBN 978-981-13-8678-7.
- [20] DJEBALI, S. and GUERARD, G. Prediction des comportements touristiques par minage des motifs et des règles sequentielles. In *21ème edition du congrès annuel de la Societe Française de Recherche Operationnelle et d'Aide à la Decision*. Montpellier, France, 2020.
- [21] GUERARD, G., POUSSEUR, H., and RIVOIRE, M. Inference grammaticale pour la prevision de la consommation energetique. In *Plateforme d'Intelligence Artificielle*. Angers, France, 2020.
- [22] AUGIAS, A., BEN AMOR, S., CHARLIER, P., and GUERARD, G. Usom platform. proposal for an international and transdisciplinary interactive tool for centralization and anthropological exchange around human remains. *Ethics, Medicine and Public Health*, 18:100677, 2021.
- [23] DEMAN, L., BOUCHER, Q., DJEBALI, S., GUERARD, G., and CLASTRES, C. Bidding strategy of a seasonal storage hydropower plant in reserve markets. In *Energy, COVID, and Climate Change, 1st IAEE Online Conference, June 7-9, 2021*. International Association for Energy Economics, 2021.
- [24] DEMESSANCE, T., BI, C., DJEBALI, S., and GUERARD, G. Hidden markov model to predict tourists visited places. In *2021 22nd IEEE International Conference on Mobile Data Management (MDM)*, pages 209–216. IEEE, 2021. ISBN 978-1-6654-2845-3.
- [25] DONADIO, J., GUERARD, G., and BEN AMOR, S. Collection of the main anti-virus detection and bypass techniques. In *International Conference on Network and System Security*, pages 222–237. Springer, 2021.
- [26] GUERARD, G. and DJEBALI, S. Tourism management through the big data paradigm. In H. C. David Chavalarias, editor, *French Regional Conference on Complex Systems FRCCS*. Springer - Applied Network Science Journal, virtual, 2021.
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- [28] GUERARD, G., POUSSEUR, H., and TALEB, I. Isolated areas consumption short-term forecasting method. *Energies*, 14(23):7914, 2021.

- [29] LEVY, L.-N., BOSOM, J., GUERARD, G., BEN AMOR, S., BUI, M., and TRAN, H. Application of pretopological hierarchical clustering for buildings portfolio. In *SMARTGREENS*, pages 228–235. 2021. ISBN 978-989-758-512-8.
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- [37] Taleb, I., Guerard, G., Fauberteau, F., and Nguyen, N. Modélisation multi-agent pour les réseaux Énergétique insulaires. In *JFSMA*. 2022.
- [38] Taleb, I., Guerard, G., Fauberteau, F., and Nguyen, N. A holonic smart grid model for isolated areas. In *ECMLPKDD2022 PhD Track*. 2022.
- [39] BICHET, L., GUERARD, G., and BEN AMOR, S. Survey on javascript engines fuzzers. In *The International Symposium on Cyber Security, Cryptology and Machine Learning (CSCML)*. Online, 2023.
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- [42] Taleb, I., Guerard, G., Fauberteau, F., and Nguyen, N. A holonic multi-agent architecture for smart grids. In *ICAART*. Citeseer, 2023.

DISSEMINATION

- [43] GUÉRARD, G. La transition énergétique, un terrain de jeu rêvé pour les ingénieurs. Monde des Grandes Ecoles, 2016.
- [44] GUÉRARD, G. L'évolution du rôle de l'ingénieur pour la transition énergétique. Monde des Grandes Ecoles, 2016.
- [45] GUÉRARD, G. Les consommateurs deviennent producteurs de leur électricité. Up-Magazine : La Grande Question, 2016.
- [46] GUÉRARD, G. La question du changement climatique est devenue un problème mondial. CGE, 2016.
- [47] GUÉRARD, G. Demain, tous producteurs d'électricité ? The Conversation, 2016.
- [48] GUÉRARD, G. Par quoi passe l'efficacité énergétique ? The Conversation, 2016.
- [49] GUÉRARD, G. and NEHAI, Z. Quand la blockchain sert à s'échanger de l'électricité. The Conversation, 2016.
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- [51] GUÉRARD, G. La méthode bim, un atout pour construire plus écolo. The Conversation, 2017.
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- [53] GUÉRARD, G. Smart city : ces métiers qui travaillent à créer la ville de demain. Cadre Emploi, 2017.
- [54] GUÉRARD, G. Le stockage, une nécessité pour notre réseau électrique. (1/5). LinkedIn, 2017.
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- [61] GUÉRARD, G. La face cachée des blockchains. LinkedIn, 2018.
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