

Yehia Elrakaiby

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Research Scientist

Highly motivated, self-driven, detail-oriented Scientist with 10 years of experience executing data-driven solutions to increase data and systems efficiency, quality, and security. Well-rounded at software engineering, predictive data modeling, and data mining to deliver insights and implement action-oriented solutions to complex business problems. Resourceful problem solver with proven expertise and comprehensive knowledge in building and evaluating advanced models and tools. Excellent verbal and written communication and presentation skills and highly refined self-learning skills. Fluent in English, French and Arabic language.

- Data Analysis
- Data Mining
- Data Security
- SQL
- Bayesian Networks
- Project Management
- Telecommunications
- Software Engineering
- Security Policies
- Front End Design
- Regulatory Compliance
- Model Driven Engineering
- Requirements Engineering
- Algorithms
- Data and Quantitative Analysis
- Decision Analytics
- Predictive Modeling
- Business Intelligence (BI)

Career Experience

Research Associate SnT, University Of Luxembourg, Luxembourg January 2019 - Current
Introduced programs and techniques to identify, resolve, and control data quality for Relational Databases. This included development and execution of algorithms in Python for extraction of data dependencies information using Skicit-learn ML libraries and provision of actionable information to relevant stakeholders.

- Applied Decision Trees, Data Dependency Extraction Algorithms, and Association Rule Mining to provide actionable information to the Chief Data Office and support their Data Quality Activities.
- Utilized Bayesian networks that supports the features of probabilistic learning and inference to provide anomaly detection and auto-completion support at the front-end.
- Developed front-end data entry support techniques to substantially improve data quality through the reduction of the probability of data entry errors.

Research Fellow University of Limerick, Limerick, Ireland April 2016 - October 2018
Highly engaged in research and development of models and optimized controllers for autonomous systems that meet all of their business requirements.

- Designed and developed a Domain Specific Language (DSL) to model autonomous systems and all their business requirements using the Eclipse Modeling Framework.
- Extended Markov Decision Processes (MDP) to synthesize optimal reflex controllers for autonomous systems that are faster and more efficient than traditional approaches (up to 2x improvement in the rate of satisfaction of requirements) and implemented a tool prototype utilizing Java and Matlab.
- Planned and delivered a university-level Computer Science module to 100 students in China.
- Introduced a formal calculus to support the requirements engineering activities of requirements elicitation, negotiation, and refinement and developed an associated prototype tool in Java.

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Scientist Fraunhofer IESE, Kaiserslautern, Germany

May 2014 - December 2015

Inspected and controlled data for more secure businesses and more efficient operations, through developing and implementing policies required to guarantee the aspects of security, confidentiality, and regulatory compliance of data, whether public or private, in the context of the EU FP7 project RESCUER.

- Lead the Data Usage Control package of the EU FP7 project RESCUER.
- Studied and enforced data usage, compliance and security requirements through development of a stateless cloud-based Policy Decision Point utilizing Java and Prolog.
- Selected to serve as key contributor in developing and writing of H2020 project proposals.

Research Associate SnT, University Of Luxembourg, Luxembourg

August 2011 - January 2014

Developed new systems and models to secure Java-based business applications and to support formal modeling and verification of security properties using model-checking.

- Defined and developed Security@Runtime, a Model-Driven Engineering (MDE) application-independent approach and tool for the runtime enforcement of fine-grained stateful security policies in Java applications by combining AspectJ for application monitoring and Java/Prolog for decision-making.
- Identified, formalized, and verified crucial security properties of data usage control policies using Model Checking.

Education & Credentials

Ph.D.: Computer Science - Security IMT Atlantique

TELECOM Bretagne, France, 2010

Master of Science: Telecommunications IMT Atlantique

TELECOM Bretagne, France, 2005

Bachelor of Science: Electrical, Electronics and Communications Engineering

Cairo University, Egypt, 2003

Awards and Honors

Brittany Region Ph.D. Scholarship, AFR Postdoc Grant, Funded by European Research Council Advanced Grant (ASAP), Invited Talks at Reputable Venues (e.g., CNR Pisa, Technical University of Munich), Reviewer at Prestigious Journals and Conferences (e.g. IEEE TSNM, ACM TAAS)

Technical Skills

Java, Python, C#, Prolog, Scikit-learn, Pandas, SQL, Matlab, PRISM, Eclipse Modeling Framework, Xtext, Git

Management Skills

Supervision of Bachelor and Master and co-supervision of PhD Students, Guest lecturer at Shandong University of Technology (SDUT), Lead the Data Usage Control package of the EU FP7 project RESCUER

Publications¹

1. Yehia Elrakaiby, Paola Spoletini and Bashar Nuseibeh: ***Optimal by Design: Model-Driven Synthesis of Adaptation Strategies for Autonomous Systems***. [arXiv:2001.08525](#).
2. Yehia Elrakaiby, Alessio Ferrari, Alex Borgida, and John Mylopoulos: ***Don't Satisfy, Argue! A Refinement Calculus for Requirement Engineering based on Argumentation Theory***. (To Be Submitted)
3. Yehia Elrakaiby, Alessio Ferrari and John Mylopoulos: ***CaRE: A Refinement Calculus for Requirements Engineering Based on Argumentation Semantics***. [RE 2018](#).
4. Yehia Elrakaiby, Alessio Ferrari, Paola Spoletini, Stefania Gnesi and Bashar Nuseibeh: ***Using Argumentation to Explain Ambiguity in Requirements Elicitation Interviews***. [RE 2017](#).
5. Yehia Elrakaiby and Jun Pang: ***Dynamic Analysis of Usage Control Policies***. [SECRYPT 2014](#): 88-100.
6. Yehia Elrakaiby, Moussa Amrani and Yves Le Traon: ***Security@Runtime: A Flexible MDE approach to Enforce Fine-grained Security Policies***. [ESSoS 2014](#): 19-34.
7. Pouyan Ziafati, Yehia Elrakaiby, Mehdi Dastani, Leendert van der Torre, Marc Van Zee, Jon-Jules Meyer and Holger Voos: ***Reasoning on Robot Knowledge from Discrete and Asynchronous Observations***. [Knowledge Representation and Reasoning in Robotics Symposium at AAAI Spring Symposium Series 2014](#).
8. Donia ElKateb, Yehia Elrakaiby, Tejeddine Mouelhi, Iram Rubab and Yves Le Traon: ***Towards a Full Support of Obligations in XACML***. [CRISIS 2014](#).
9. Frédéric Cuppens, Nora Cuppens-Boulahia, Yehia Elrakaiby. ***Formal Specification and Management of Security Policies with Collective Group Obligations***. [Journal of Computer Security 21\(1\)](#): 149-190 (2013).
10. Jan Broersen, Stephen Cranefield, Yehia Elrakaiby, Dov M. Gabbay, Davide Grossi, Emiliano Lorini, Xavier Parent, Leendert W. N. van der Torre, Luca Tummolini, Paolo Turrini and François Schwarzentruher: ***"Normative Reasoning and Consequence."*** [Normative Multi-Agent Systems 2013](#): 33-70 (2013).
11. S. Colombo Tosatto, Y. Elrakaiby, P. Ziafati: ***Compliance in Resource-based Business Processes***. [BNAIC 2013](#).
12. Diego Ambrossio, Alessio Antonini, Yehia Elrakaiby, Dov M. Gabbay, Marc van Zee: ***Argument Revival in Annotated Argumentation Networks***: [ARGAIP 2013](#).
13. Yehia Elrakaiby and Yves Le Traon: ***PEP-PDP Architecture to monitor and Enforce Security Policies in Java Applications***. [FARES 2013](#).
14. Donia El Kateb, Y. Elrakaiby, Tejeddine Mouelhi, Yves Le Traon: ***Access Control Enforcement Testing***. [AST 2013](#).
15. Yehia Elrakaiby, Tejeddine Mouelhi and Yves Le Traon: ***Testing Obligation Policy Enforcement using Mutation Analysis***. [Mutation@ICST 2012](#): 673-680.
16. Yehia Elrakaiby, Frédéric Cuppens, Nora Cuppens-Boulahia: ***Formal enforcement and management of obligation policies***. In [Data Knowl. Eng. 71\(1\)](#): 127-147 (2012).
17. Yehia Elrakaiby, Frédéric Cuppens, Nora Cuppens-Boulahia: ***An Integrated Approach for the Enforcement of Contextual Permissions and Pre-Obligations***. [IJMCMC 3\(2\)](#): 33-51 (2011).
18. Yehia Elrakaiby, Frédéric Cuppens, Nora Cuppens-Boulahia: ***From Contextual Permission to Dynamic Pre-obligation: An Integrated Approach***. [ARES 2010](#): 70-78.
19. Yehia Elrakaiby, Frederic Cuppens, Nora Cuppens-Boulahia: ***From state-based to event-based contextual security policies***. [ICDIM 2009](#): 241-247.
20. Stere Preda, Frédéric Cuppens, Nora Cuppens-Boulahia, Joaquín García-Alfaro, Laurent Toutain, Yehia Elrakaiby: ***Semantic context aware security policy deployment***: [ASIACCS 2009](#): 251-261.
21. Yehia Elrakaiby, Frédéric Cuppens, Nora Cuppens-Boulahia: ***Formalization and Management of Group Obligations***. [POLICY 2009](#): 158-165.
22. Y. Elrakaiby, F. Cuppens, N. Cuppens-Boulahia: ***Interactivity for Reactive Access Control***. [SECRYPT 2008](#): 57-64.

¹ Primary author of 16 scientific papers and journals, 294 Citations, and an h-index of 8 (Google scholar stats).