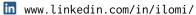
Ignacio D. Lopez-Miguel, M.Sc.

ignacio.lopez@tuwien.ac.at

http://ignaciolopezmiguel.github.io//



Education

2019 - 2021

Ph.D. Logic in Computer Science, TU Wien. 2022 - present

Applying logic reasoning to machine learning-based systems. It includes reinforcement

M.Sc. Artificial Intelligence Research, Menendez Pelayo Univ. (UIMP). GPA: 9.5/10.

learning, answer-set programming, runtime verification, and ethical AI.

Thesis title: Simplification of Numeric Variables for PLC Model Checking.

2016 – present B.Sc. Mathematics, National University of Distance Education (UNED). GPA: 8.7/10.

M.Sc. Business Consulting, ICADE Business School. GPA: 8.4/10. 2015 - 2017

Thesis title: Machine Learning Applied to Credit Scoring.

B.Sc. Ind. Electronics and Automation Eng., Valladolid University. GPA: 8.7/10. 2011 - 2015 Thesis title: Guided acoustic wave's phase and group velocity at low frequencies in fluid filled elastic pipes.

Employment History

Formal Verification Engineer, CERN 2020 - 2022 Geneva, Switzerland

- Development and usage of the tool PLCverif to automatically formally verify PLC code.

- Eclipse ecosystem with Java and Xtext.

- Research work to optimize model-checking algorithms for programs containing complex data types.

Model Validation Specialist, Deutsche Bank 2017 - 2019 Frankfurt am Main, Germany

> - Validation of Machine Learning models to estimate credit score by performing different analyses, such as assumptions validation, sensitivity, robustness, and back-testing.

- Validation of Natural Language Processing model for credit score of enterprises.

- Development of Machine Learning challenger models.

- Participation in Data Science competitions.

Quantitative Consultant, Management Solutions Madrid, Spain, and London, UK

- Design and development of tools in VBA to automate processes.

- Analysis of Hadoop-based ecosystem to integrate it in a data lake.

Research Engineer, Ifak e.V 2015 - 2015Magdeburg, Germany

- Experimental research in order to characterize fluids via acoustic waves.

LEGO Robotics Teacher, San Jose School Valladolid, Spain 2014 - 2015

- Teaching students aged from 10 to 14 how to program and build LEGO robots.

Research Publications

2015 - 2017

- Lopez-Miguel, Ignacio D., Fernández Adiego, B., Ghawash, F., & Blanco Viñuela, E. (2023). Verification of neural networks meets PLC code: An LHC cooling tower control system at CERN. In 24th International Conference on Engineering Applications of Neural Networks (in press).
- Ádám, Z., Lopez-Miguel, Ignacio D., Mavridou, A., Pressburger, T., Beś, M., Blanco Viñuela, E., ... Fernández Adiego, B. (2023). From Natural Language Requirements to the Verification of Programmable Logic Controllers: Integrating FRET into PLCverif. In NASA Formal Methods - 15th International Symposium, NFM 2023 (in press).





- Lopez-Miguel, Ignacio D., Fernandez Adiego, B., Tournier, J.-C., Rodriguez-Aguilar, J. A., & Blanco Viñuela, E. (2021). Simplification of Numeric Variables for PLC Model Checking. In 19th ACM-IEEE International Conference on Formal Methods and Models for System Design (MEMOCODE'21).
- Fernandez Adiego, B., **Lopez-Miguel, Ignacio D.**, & Tournier, J.-C. (2021). Applying model checking to highly-configurable safety critical software: the SPS-PPS PLC program. In *ICALEPCS'21*.
- **Lopez-Miguel, Ignacio D.**, Tournier, J.-C., & Fernandez Adiego, B. (2021). PLCverif: status of a formal verification tool for Programmable Logic Controller. In *ICALEPCS*'21.
- **Lopez-Miguel, Ignacio D.** (2021). Survey on Big Data Preprocessing Techniques. In XOVETIC'21.

Skills

Languages 📕 Spanish (mother tongue), English (fluent), German (intermediate), French (basic).

Coding Python, Java, C, R, sql, vba, LTEX, NuSMV

References

Juan A. Rodriguez-Aguilar, Research Professor at Artificial Intelligence Research Institute (IIIA-CSIC)

Borja Fernandez Adiego, Automation Engineer at CERN

Jean-Charles Tournier, Software Engineer at CERN and Lecturer at EPFL

Ezio Bartocci, Full Professor at TU Wien