

PHD PROGRAMME IN COMPUTER SCIENCE AND MATHEMATICS

PhD Course Proposal

Design of a Symbiotic AI system

Teacher

Dr. Luigi Quaranta (<https://collab.di.uniba.it/luigi-quaranta/>)

Course description

The general focus of this course is on the design of new interaction paradigms that can amplify, augment, and enhance human performance, in ways that make systems reliable, safe, and trustworthy. The underlying research is based on the new perspective that AI supports and facilitates human beings' activities by augmenting (and valuing) human cognitive abilities rather than replacing them. The specific focus of this course is on improving the practices and tools adopted by AI engineers to ensure the quality of AI-enabled systems. The set of practices used to augment the AI workflow with automated quality assurance (QA) and monitoring tools is becoming more and more adopted and is recognized under the umbrella term of MLOps. In this course, we will study and experiment with emerging MLOps practices and tools, aiming to substantially improve the work experience of future AI professionals and enhance the reliability, safety, and trustworthiness of resulting AI-enabled systems.

Course period

TBD

SSD

INF/01

Credits and Hours

3 ECTS credits:

- 2 T1, equivalent to 8 hours of lectures
 - 1 T2, equivalent to 15 hours of practice labs
- for a total of 31 hours.

Exam Modality

Student assessment will be based on a final presentation of the project work developed through incremental lab assignments throughout the course.

Teacher CV

- Luigi Quaranta: [Curriculum Vitae](#)

Teacher Main Publications

1. G. Colavito, F. Lanubile, N. Novielli, L. Quaranta, "Impact of data quality for automatic issue classification using pre-trained language models," *Journal of Systems and Software*, vol. 210, p. 111838, Apr. 2024, doi: 10.1016/j.jss.2023.111838.
2. G. Colavito, F. Lanubile, N. Novielli, L. Quaranta, "Leveraging GPT-like LLMs to Automate Issue Labeling," in proceedings of the 21st International Conference on Mining Software Repositories (MSR 2024), Lisbon, Portugal, April 2024.
3. F. Lanubile, S. Martínez-Fernández, L. Quaranta, "Training future ML engineers: a project-based course on MLOps," *IEEE Software*, pp. 1–9, 2023, doi: 10.1109/MS.2023.3310768.
4. F. Calefato, L. Quaranta, F. Lanubile, and M. Kalinowski, "Assessing the Use of AutoML for Data-Driven Software Engineering," in *2023 ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM)*, New Orleans, LA, USA: IEEE, Oct. 2023, pp. 1–12. doi: 10.1109/ESEM56168.2023.10304796.
5. F. Lanubile, S. Martínez-Fernández, L. Quaranta, "Teaching MLOps in Higher Education through Project-Based Learning," in *2023 IEEE/ACM 45th International Conference on Software Engineering: Software Engineering Education and Training (ICSE-SEET)*, Melbourne, Australia, May 2023.
6. F. Calefato, F. Lanubile, and L. Quaranta, "A Preliminary Investigation of MLOps Practices in GitHub," in *ACM / IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM)*, Helsinki Finland: ACM, Sep. 2022, pp. 283–288. doi: 10.1145/3544902.3546636.
7. L. Quaranta, F. Calefato, and F. Lanubile, "Eliciting Best Practices for Collaboration with Computational Notebooks," *Proc. ACM Hum.-Comput. Interact.*, vol. 6, no. CSCW1, Article 87, Apr. 2022, doi: 10.1145/3512934.
8. L. Quaranta, "Assessing the Quality of Computational Notebooks for a Frictionless Transition from Exploration to Production." In *Proceedings of the ACM/IEEE 44th International Conference on Software Engineering: Companion Proceedings (ICSE '22)*. Association for Computing Machinery, New York, NY, USA, 256–260. doi: 10.1145/3510454.3517055
9. L. Quaranta, F. Calefato, and F. Lanubile, "KGTorrent: A Dataset of Python Jupyter Notebooks from Kaggle," in *2021 IEEE/ACM 18th International Conference on Mining Software Repositories (MSR)*, Madrid, Spain: IEEE, May 2021, pp. 550–554. doi: 10.1109/MSR52588.2021.00072.
10. F. Lanubile, F. Calefato, L. Quaranta, M. Amoruso, F. Fumarola, and M. Filannino, "Towards Productizing AI/ML Models: An Industry Perspective from Data Scientists," in *2021 IEEE/ACM 1st Workshop on AI Engineering - Software Engineering for AI (WAIN)*, Madrid, Spain: IEEE, May 2021, pp. 129–132. doi: 10.1109/WAIN52551.2021.00027.