

PhD Position

GUI maintenance and evolution

in DiverSE Team (Inria/IRISA)

Rennes - France

Keywords: software engineering, graphical user interface, design smell, software maintenance, software testing

Description. Graphical User Interfaces (GUI) are the visible and tangible vector that enable users to interact with software systems. While GUI design and qualitative assessment is handled by GUI designers, integrating GUIs into software systems remains a software engineering tasks. Like any code artefact, **GUI code must be tested, maintained and are prone to evolution.**

The goal of this PhD thesis is to investigate the use of modern software engineering techniques to define **new innovating and efficient methods to maintain and test GUIs.** GUI testing and maintenance challenges are numerous. Code analyses can be developed to **find errors, bad practices** specific to GUIs. **Mutation testing** can be applied to GUI test suites to evaluate their quality. **Refactoring operations** can be developed to port GUIs and their associated test suites to different toolkits or platforms. The developed methods will be evaluated through **large empirical studies.**

The candidate will: identify new GUI design smells, develop new techniques to identify and refactor them. Novel GUI refactoring techniques to port GUIs to different toolkits or to support new features will be investigate.

[1] Lelli V. et al. *Automatic Detection of GUI Design Smells: The Case of Blob Listener*

[2] Lelli V. et al. *Classifying and Qualifying GUI Defects*, ICST'15, 2015

[3] M. Fowler, *Refactoring: Improving the Design of Existing Code*. Addison-Wesley, 1997

[4] Palomba et al. *Anti-Pattern Detection: Methods, Challenges, and Open Issues*, 2014

[5] Nguyen et al. *GUIAR: An Innovative Tool for Automated Testing of GUI-Driven Software*, ASE journal, 2014

Working Environment. The PhD candidate will work at Inria in the DiverSE team. Inria is the French national institute for research in computer science. There are 8 Inria research centres located throughout France, hosting more than 200 research teams. The DiverSE team is located in Rennes. DiverSE's research is in the area of software engineering, focusing on model-driven engineering and software testing. The team is actively involved in European, French and industrial projects and is composed of 8 faculty members, 20 PhD students and 4 engineers.

Salary: TBD

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