COMPUTER AND CONTROL ENGINEERING

DAUIN - Improving End-to-End Testing of Web and Mobile Apps through Gamification

Funded By	Dipartimento DAUIN

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Context of the research activity	The PRIN project EndGame focuses on End-to-End (E2E) testing of web and mobile apps. It aims to support the generation of E2E test scenarios leveraging the gamification approach - i.e. the application of game-like mechanics to other activities -, as well as address the quality of the tests by revealing and removing issues - e.g., fragility, dependencies, and flakiness - found in tests. Effectiveness of the solutions and practical relevance will be assessed also in two real-world case studies.

| | The proposal is related to the "EndGame - Improving End-to-End Testing of Web and Mobile Apps through Gamification" PRIN project. EndGame focuses on End-to-End (E2E) testing of the W&M apps; E2E testing refers to validation of a complex system in its context. E2E test practice is still often manual and thus it results tedious and error-prone, and yields poor cost/effectiveness. EndGame aims to support the generation of relevant E2E test scenarios leveraging a powerful approach: gamification, i.e. the application of game-like mechanics to activities of different nature. A gamified approach for E2E testing will enable testers to challenge each other in the hunt for hidden faults and vulnerabilities. EndGame will also address the quality of the test harness, in particular the test suites, by providing novel gamified approaches to reveal and remove issues - e.g., fragility, dependencies, and flakiness - commonly found in test code so as to ensure the resilience of the tests themselves.

RESEARCH OBJECTIVES

1. Develop a Gamified Solution for Exploratory UI Testing. Build a proof-of-concept tool to perform exploration of UI in order to build test cases. The gamification enhancement will make the task more challenging and motivate the user to produce higher quality tests scripts.

2. Assess the Available Gamified Solutions for Exploratory UI Testing. Empirical assessment of the available gamified solutions in order to evaluate |
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Objectives	the practical benefits that can be gained by means of the gamification approach in general and through specific gamification mechanics.

OUTLINE OF THE WORKPLAN

The research activities will be carried out using a combination of two methodological approaches:
- an engineering approach thread devoted to the development of novel solutions to introduce gamification elements in E2E testing.
- a scientific approach thread focused on the empirical quantitative assessment of the developed solutions, in order to provide feedback to the engineering activities, and to build a knowledge base of empirical evidence.

LIST OF POSSIBLE VENUES FOR PUBLICATION

Journals:
• IEEE Transactions on Software Engineering
• Empirical Software Engineering
• ACM Transactions on Information Systems
• Journal of Systems and Software

Conferences:
• ACM/IEEE International Symposium on Empirical Software Engineering and Measurement
• International Conference on Software Engineering
• International Conference on Product-Focused Software Process Improvement
• International Conference on Evaluation and Assessment in Software Engineering (EASE) |

Skills and competencies for the development of the activity	The candidate should exhibit a good mix of:
• Solid foundation in SE principles, methodologies, and practices. He/she should be familiar with the software development lifecycle and software quality assurance techniques.
• Good understanding of mobile and web development is important to understand and put in practice the instrumentation needed to implement the gamification tools.

He/she should also be able to communicate the research in an effective way. |