

Mobile application testing – theory vs practice

Triin Samuel | Software Engineering, MSc | Institute of Computer Science, Faculty of Science and Technology, University of Tartu | <http://kodu.ut.ee/~samueltr/contest/> | Supervisor: Dietmar Pfahl

Questions

- What are the problems in mobile application testing?
- What are the solutions?
- Are the solutions proposed by literature considered useful by industry professionals?

Hypothesis

- There is some discrepancy between scientific research and industry practice

Project Overview

This project provides an overview of problems and solutions in mobile application testing according to literature and then compares the findings with feedback from industry professionals to verify the relevance of them for industry. First, a literature survey was conducted, which resulted in a list of problems, solutions and a mapping between the problems and solutions. Then interviews were conducted with 6 companies involved in mobile application testing. Each representative was asked to assess the relevance of each problem on an ordinal scale. Based on which problems each company considered important, some potential solutions were introduced and the companies were asked to give feedback on the potential usefulness of each of the proposed solutions.

Procedure

Step 1



Conduct literature survey

Step 2



Extract problems, solutions, mapping between them

Step 3



Interview companies

Step 4



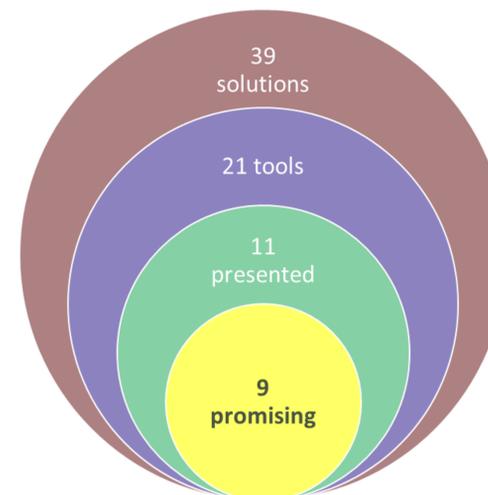
Compare results

Participating companies

Six companies that perform testing of native mobile applications in Estonia were interviewed. Half of them were testing companies – Testlio, Fob Solutions, TestDevLab. The other three were companies mainly focused on mobile application development who were big enough to have dedicated mobile application testers – Mobi Lab, Mooncascade, Wazombi.

The project in numbers

Item	Quantity
Papers read	50
Problems found	49
Solutions found	39
Companies interviewed	6



Observations

- Companies often had differing opinions regarding the relevance of a specific problem or solution
- Many solutions proposed in literature are too general or theoretical to be of interest to industry professionals
- Many solutions proposed in literature already exist
- Not all Android applications are developed in Java
- Level of test automation in interviewed companies was not very high, highlighting the potential usefulness of the project

Results

Problems considered important both by scientific literature and industry

- Fragmentation – multitude of device, operation system, screen size combinations
- Variability of user profiles – mobile applications are used by people with different ages and abilities

Problems considered important only by scientific literature

- Validating external communication – application communication with sensors, network and other applications
- Lack of methods, tools and guidelines for evaluating non-functional properties
- Lack of industry-wide standards and best practices – the guidelines proposed by each platform were considered sufficient

Solutions considered most promising by industry professionals:

- VALERA [1] – A sophisticated tool for recording test scenarios on Android devices. Records the whole externally visible state, is very precise and has a low overhead
- An approach for amplifying exception-handling code [2] – a tool that returns unexpected values (network errors, missing GPS coordinates, etc) to already existing test cases and observes whether this makes the application crash or very slow.

Conclusion

- Some of the problems considered important by scientific literature were also considered important by industry, while others were considered irrelevant
- Many of the solutions proposed in literature were too general or theoretical to be useful for industry
- Some of the solutions proposed in literature were considered very interesting by industry professionals and the respondents were interested in trying them out

Works Cited

- [1] Y. Hu, T. Azim and I. Neamtiu, "Versatile Yet Lightweight Record-and-replay for Android," Proceedings of the 2015 ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications, vol. 50, no. 10, pp. 349-366, 2015.
- [2] P. Zhang and S. Elbaum, "Amplifying tests to validate exception handling code: An extended study in the mobile application domain," ACM Transactions on Software Engineering and Methodology, vol. 23, no. 4, pp. 32:1-32:28, 2014.