

## ABSTRACT

**Topic:** «Software for automatic GUI testing on Android»

**Master's degree thesis:** 104 pages, 15 figures, 7 tables, 3 attachments, 68 sources

**Relevance of the topic.** Testing is an important stage of software development and it is performed either manually or using the special software. However, manual testing is usually time-consuming and requires additional time, so it is an actual task to research and create methods and tools for automating testing. The graphical user interface is the crucial part of the application, since it determines the final attitude of the user to the software product. Over time, the technologies used to develop interfaces lose their relevance and are replaced by new ones. In the context of Android application development, such technology is the declarative programming paradigm, which is now used for interface development along with the Kotlin programming language. The relevance of this research lies in the fact that existing IDEs and tools do not support the automatic generation of unit test code for GUIs, developed using the Kotlin and the new paradigm, which makes it impossible to use these tools during testing, so it requires the design of new tools that would meet the current requirements.

**Research objective.** Expanding the scope of using IDEs for Android by supporting automated code generation of the GUI unit-tests for the declarative paradigm, which will reduce the time for tests development.

**The following tasks were formulated to achieve this research objective:**

- study the existing methods, algorithms and approaches to building automated testing scenarios for the graphical user interface;
- study existing solutions and tools and identify their shortcomings;
- improve the methods and tools for generating unit tests to achieve maximum code coverage by extending them to support the declarative;
- design and develop a plugin for the IDE Android Studio for automatic code generation of unit test scenarios;
- evaluate the effectiveness of the proposed solution.

**The object of research.** Software for automatic generation of Android GUI test code.

**The subject of research.** Software quality assurance processes.

**The scientific innovation** of the obtained results lies in improvement of the automated testing scenarios creation method, that differs from existing analogues by taking into account all possible interface element events and combinations of data sets, and by the availability of support for automated GUI unit test code generation, developed using the declarative paradigm and the Jetpack Compose framework, which was not previously available in Android application development environments.

**The practical innovation** lies in the creation of a unit testing plugin for the Android Studio IDE, which allows testing and generating tests the declarative paradigm of GUI development of Android applications and makes it possible to increase the coverage of a component with tests and significantly save developers' time.

**Approbation.** The results of the work were presented at the VI International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies SoftTech-2024".

**Publications.** The results of the work on the master's thesis were published at the V and VI International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies SoftTech-2024".

**Keywords:** AUTOMATED TESTING, GUI, ANDROID, KOTLIN, JETPACK COMPOSE