

Combinatorial-based Pairwise Event Sequence Generation for Automated GUI Testing of Android Apps

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Mobile apps are Event-Driven Systems (EDS) that often rely on Graphical User Interfaces (GUI) as the primary means of interaction with end-users. These systems are tested using event sequences that exercise the system's functionality while covering as much of its source code as possible. In this work, we develop a greedy pairwise approach to automate event sequence generation for Android app testing. The proposed approach dynamically traverses an app by identifying and executing GUI events that maximize the coverage of pairwise event combinations. We implement two variants of a greedy pairwise algorithm. The first considers the order of the event pairs while the second one does not. We conduct experiments on five Android apps by comparing the proposed approach to random event sequence generation. The results show that given the same parameters, test suites generated using a greedy pairwise approach tend to achieve higher block coverage than test suites with randomly generated event sequences. The results also show that pairwise test suites tend to find a higher number of faults than randomly generated test suites. However, the results show that there was no significant difference between pairwise test suites generated using ordered pairs and pairwise test suites generated using unordered pairs in terms of block coverage and number of faults found.