Automated Multimedia Software Statistical Usage Testing

Automated software testing and verification for multimedia devices (TV sets, DVDs, STBs, mobile phones, etc.) where most likely usage scenarios are chosen as test cases.

The testing methodology relies on the following ideas:

- Due to increased technological development, there are more complex systems with extended functionality that require profound quality inspection.
- To shorten product development time and ensure fast time-to-market, which is essential in consumer product development, it is necessary to apply efficient testing methods.
- To provide software quality that meets users' expectations and needs in a real working environment, testing strategies have to be performed with regard to most critical functionality in the context of software expected usage.

Methodology Overview

The testing methodology consists of automated optimal test case design, automated test case execution and result reporting (see Figure 1).

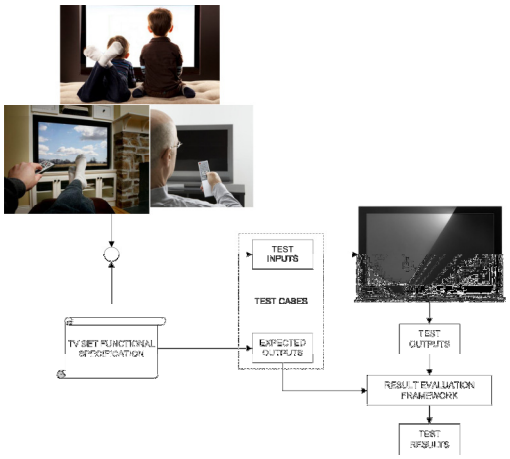

Figure 1

In optimal test case design, special attention is paid at the structure and content of the test cases, in order to detect defects within the functionality that will be intensively used by end-user. For this purpose, the approach is based on user profiles and the impact of the failures on end-users. Software usage is represented by Markov model with the states and transitions between the states weighted with probabilities (see Figure 2).

Test scenarios generated from a software usage model represent the set of most probable user actions in interaction with a device.

Test case execution and result reporting are carried through the automated functional failure detection.

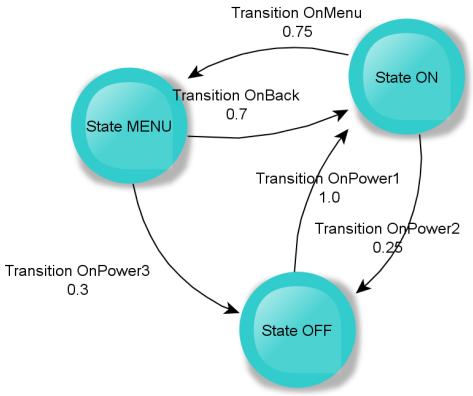

Figure 2

Benefits

The testing methodology improves the traditional testing process, in terms of speed, effectiveness and reliability, and provides software quality increase concerning end-user experience. Specifically, the benefits are:

- Software development/testing time decrease up to 6 times, comparing to traditional testing, enabling faster product time-to-market.
- Test suite effectiveness increase, in terms of number of detected failures, comparing to traditional testing (see Figure 3).

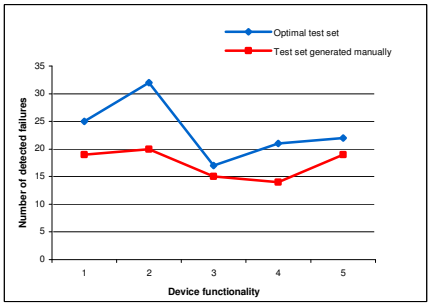

Figure 3

- Software quality increase with respect to user expectations. Defects detected using optimal test set are well correlated with subjectively detected failures and subjectively assessed device quality (see Figure 4).

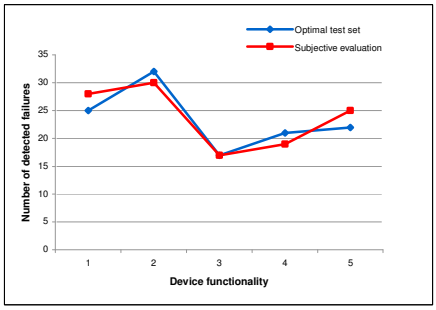

Figure 4