

# An Experimental Evaluation of Approaches to Feature Testing in the Mobile Phone Applications Domain

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## ABSTRACT

Software engineering is a discipline that cannot be applied based solely on elegant theories. Real software production requires software solutions that may apply a mixture of engineering and ad-hoc practices in a systematic way. In this sense, experimentation is staple for identifying the best practices and solutions for a given software development problem. This paper presents results from an experimental evaluation of the use of model-based testing and the use of exploratory testing in the context of feature testing for mobile phone applications. The study is based on the Goal/Question/Metric paradigm. From the results obtained and conclusions reached, an approach to feature testing is proposed.

## Categories and Subject Descriptors

D.2.5 [Software Engineering]: Testing and Debugging—*Testing strategies*; D.2.8 [Software Engineering]: Metrics/Measurement—*Process metrics*

## General Terms

Experimentation, Measurement, Software Testing

## Keywords

Feature Testing, Model-Based Testing, Exploratory Testing, QQM Paradigm

## 1. INTRODUCTION

In recent years, the development of mobile phone applications has become more and more complex: at the same time that time-to-market decreases the development time it increases the demand for the quality level of products. The necessity of quality assurance intensifies the use of software testing.

In this paper, we focus on the domain of interactive features. This domain is characterized by applications, composed of a number of features, that are highly interactive,

having their flow of execution guided mostly by external input. These applications are often tested manually. Also, the gap between specification and program is narrow, since the logics are captured by external interactions. In this context, feature testing (FT) is a crucial testing activity. A feature is a set of individual requirements that describes some functionality. Alarm Clock, Phonebook and Messaging are example of features usually found in mobile phone applications. A functional understanding of these applications is more effectively achieved by investigating user interface tasks behaviour.

Because features are usually developed and tested either in isolation or within the context of a particular service [10], FT is very important to help to reduce the number of defects that escape from one phase to other during the development and testing processes.

Along with the usual challenges to functional testing, FT for mobile phone applications has some particularities:

- FT needs to be extensively executed - Due to the way a feature is developed and integrated with different applications, it is fundamental that its behavior is in accordance with requirements. Thus, the feature has to be thoroughly tested, maximizing defect detection.
- FT needs to be rapid - Time-to-market demands development time to be minimized and, consequently, feature testing needs to be executed with minimum time requirements.
- FT depends on deep requirements knowledge - FT is a kind of functional testing, so it is necessary to acquire an adequate level of knowledge of requirements and also of the application domain to devise and execute test cases. Moreover, it is usually necessary to know potential applications behavior because the feature can interact with others features.
- FT cases are executed several times - Feature test cases can be re-executed several times during its development cycle. Normally there is more than one test cycle with variants of the same test suite.

Considering these aspects, what functional testing approach is more appropriate to be used in FT for mobile phone applications? In attempt to answer this question, we conducted an experimental evaluation of the use of Model-Based Testing and the use of Exploratory Testing to test mobile phone features. Both approaches present advantages that make them potential candidates for FT. Nevertheless,

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DoSTA '07, September 4, 2007, Dubrovnik, Croatia  
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