**<Thesis Title>**

By

**<Student Name>**

**(<Registration Number>)**

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE

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TO

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**SZABIST University, Islamabad**

**2023**

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Master of Computer Science

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\_\_\_\_\_\_\_\_

<Student Name>

MS (CS/Data Sci/Cyber Sec)

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**List of Abbreviations**

API

Application Programming Interface

APK

Android Package Kit

AUT

Application under Test

SDLC

Software Development Life Cycle

SUT

System under Test

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**Abstract**

Automation of testing process not only reduces testing time and efforts of applications testers but also improves correctness and accuracy of the testing process. Mobile applications have their own quirks regarding testing, such as the high number of different events that need to be tested. Though several steps in the overall testing process had been automated but still there is a room of improvement and novelty.

**Keywords** —Android application testing, Model based testing, Functional testing, Smartphoneapp testing, Test case generation.

**Chapter 1**

**Introduction**

This chapter produces an introduction of general concept of testing, particularly the Smartphone application testing and the challenges that are faced while performing testing of Smartphone applications. This thesis focuses on Smartphone application testing through model-based testing.

**Chapter 2**

**Related Work**

In this chapter we review current state of the affairs in the area of Smartphone app testing with particular reference to MBT. The purpose of literature review is to discuss the existing software testing techniques/ approaches proposed in the contemporary studies in this domain. An allied purpose is to determine the research gaps and the key challenges linked to this area. For literature review, we have followed the systematic literature review method proposed in Kitchenham [21].

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**Chapter 3**

**Problem Statement and Study Objective**

Some of the key challenges we observed during our literature review that a software tester normally encounters during Smartphone apps testing, include:

1. Non-standardization of mobile apps and varying mobile app types
2. Usability (Device screen size)
3. Limited Resources (bandwidth, memory, computational power etc.)

**Chapter 4**

**Framework for Automated Test Case Generation**

In this section we present our proposed framework for automated test case generation of mobile applications using model-based approach.

**Chapter 5**

**Experimental Setup**

In this chapter we describe experimental setup for the selected case study implementation. For this purpose, we need to go through a series of steps to establish test bed to perform the experiments to validate our proposed framework. We used state coverage as coverage criteria of the model. AUT is modeled in such a way that each state of the application is logically visited at least once during the traversal.

**Chapter 6**

**Framework Implementation**

To implement our proposed framework, we need to model the application working behavior or analyze functionality by using state machine/chart diagrams. The constructed model should contain all the relevant interaction of the user with AUT. For instance, in case a user wants to send an email, it is important to have a valid email address prior to send/receive email. Similarly, all the prerequisites are necessary to be adhere to for a transition to take place i.e., a state can only change to fulfill the desired functionality as per the user behavior. Hence, such prerequisites should be kept in mind while modeling the application’s behavior.

**Chapter 7**

**Discussion**

In this study we applied MBT approach on a Smartphone application to analyze effectiveness and maturity of the approach in the domain of Smartphone applications. Smartphone applications are smart and respond accordingly when user interacts with these applications.

**Chapter 8**

**Conclusion**

We presented an MBT framework for Smartphone application testing. There are several conventional testing techniques and frameworks for software-based systems but still there is a lack of Smartphone specific testing techniques.

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