

**AN AUTOMATED TOOL FOR DETECTION AND  
ENFORCEMENT OF SECURITY IN MOBILE  
APPLICATION DEVELOPMENT**

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Degree of Master of Computer Science

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This dissertation submitted in partial fulfillment of the requirements for the Degree  
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## DECLARATION

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Dr. Malaka Walpola

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Date

## **ABSTRACT**

With the large number of mobile applications being developed and used, the mobile application security has become a key concern to the mobile application users as well as to the mobile application designers, developers and testers. Numbers of security guidelines and prevention mechanisms have been introduced through previous research work and considerable amount of mobile security frameworks, testing tools and source code analyzers have been implemented upon those research outcomes. However it was identified that these tools and instruments majorly support the testing phase of secure software development life cycle and there is a research gap open for developing a technically supportive program for the developers to build secure mobile applications.

The intention of this project is to come up with a concept where the developer is enforced to build a secure mobile application based on a predefined set of security criteria during the application development phase. These security criteria are defined based on security requirements of the mobile application project. The source code will be validated against these security criteria and if any issue is found, it will be fixed automatically during the source code compilation. This system is implemented in java platform with the help of java annotation processor and xml parser. The source code is written as a set of reusable jar file which is published as “buildsec” library. This library is tested and evaluated in android mobile platform by injecting vulnerable codes snippets into the android mobile source code and “buildsec” library was able to find and fix those security issues in the source code. The automatic fixing of security issues during compile time will help the development team to ensure that the mobile application is security compliance in advance. This will reduce the testing effort as well as development re-work that takes to fix the security issues originated from the development phase.

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## LIST OF ABBREVIATIONS

Abbreviation	Description
API	Application Program Interface
APK	Android Package Kit
APN	Access Point Name
CIA	Confidentiality, Integrity, Availability
DEX	Dalvik EXecutable
DHS	Department of Homeland Security
DNS	Domain Name System
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hyper Text Transfer Protocol with Secure Sockets Layer
IP	Internet Protocol
IPA	IPhone Application Archive
IPC	Inter Process Communication
JAR	Java ARchive
MAM	Mobile Application Management
MDM	Mobile Device Management
MFA	Multi-Factor Authentication
NIST	National Institute of Standards and Technology
OS	Operating System
OWASP	Open Web Application Security Project
PIN	Personal Identification Number
QA	Quality Assurance
QARK	Quick Android Review Kit
SAST	Static Application Security Testing
SD	Secure Digital
SDK	Software Development Kit
SDLC	Software Development Life Cycle
SFR	Security Functional Requirements
SMS	Short Message Service
SQL	Structured Query Language
SSC	Software Security Checklist
SSL	Secure Sockets Layer
SSLC	Secure Software Life Cycle
TFA	Two-Factor Authentication

TLS	Transport Layer Security
UAT	User Acceptance Testing
UDP	User Datagram Protocol
UI	User Interface
URL	Universal Resource Locator
UUID	Universal Unique Identifier
WiFi	Wireless Fidelity