A Machine Learning Approach for Context-Aware Input/Output Validation in Mobile Applications

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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DECLARATION

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

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Date: 14/09/2024

ABSTRACT

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There is still insecurity in mobile application since, input/output validation is not well implemented since the rule-based methods cannot adapt the new attacking forms and the new environments. Thus, this work puts forward a novel approach for context-aware input/output validation in mobile applications to overcome these challenges with the use of machine learning. The work is targeted towards investigating a sequence of previous data, application context, and user input for identifying abnormal patterns in real-time using a machine learning model. In line with the formulated model, an adaptive validation system will be employed so that the validation criteria are fluid with the detected context and possible threats. To measure the impact and satisfaction level of the proposed system, this study will use both penetration test and users. Penetration testing will establish the effectiveness of the model in discovering and even preventing security threats while user research will determine the ease of use of the application with the implemented security method. The hope is that this research will be of significant value in formulating mobile applications that are more secure while at the same time providing users with a positive experience. In conclusion, this machine learning integrated method of validation seeks to enhance application security as well as satisfaction levels of the users.

Keywords: mobile applications, input/output validation, machine learning, anomaly detection, context-aware, user experience

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TABLE OF CONTENTS

List of Figures

List of Tables