



# **Enhancing Software Testing Accuracy Through a Generative AI-Powered Framework**

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A THESIS  
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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is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources).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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# ABSTRACT

## **Enhancing Software Testing Accuracy Through a Generative AI-Powered Framework**

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Software testing is an essential part of the software development lifecycle that ensures the dependability and quality of software systems. However, traditional testing methods typically fail to detect flaws, resulting in potential software breakdowns and increased rectification costs. In response, this research aims to a revolutionary approach to improving software testing accuracy by generating test cases based on a Generative AI-Powered Framework. Using the power of generative artificial intelligence, this framework attempts to intelligently construct diverse and complex test cases, discovering hidden flaws that standard testing approaches may miss. This system employs strong machine learning algorithms to assess code structures and historical testing data, enabling the construction of custom test scenarios based on the program's specific properties. In addition, this incorporates feedback mechanisms for continuously refining and enhancing the testing process, resulting in improved overall testing accuracy and efficiency. This study demonstrates the utility and superiority of the proposed framework in enhancing software testing accuracy, hence raising the bar for software quality assurance operations. This system has the potential to result in better safer and reliable software solutions by boosting test coverage and maybe reducing the number of undetected problems. This study increases AI-powered software testing, paving the way for further usage of Artificial Intelligence technology in the software development process.

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# TABLE OF CONTENTS

DECLARATION .....	ii
ABSTRACT .....	iii
ACKNOWLEDGEMENT .....	iv
TABLE OF CONTENTS .....	v
List of Figures .....	vii
List of Tables .....	viii
Chapter 1 Introduction .....	1
1.1 Research Problem .....	3
1.1.1 Research Novelty .....	5
1.2 Research Objectives .....	6
Chapter 2 Literature Review .....	7
2.1 Gap Identification .....	13
2.1.1 Comparison: Text embedding based comparison mechanism using cosine similarity .....	14
2.1.2 Existing Tools Comparison .....	15
Chapter 3 Research Design and Methodology .....	20
3.1 Research Design .....	20
3.1.1 Key Steps of The Research Design .....	21
3.2 Data Collection Methods .....	22
3.3 Data Analysis Techniques .....	24
3.4 Research Methodology .....	27
3.4.1 Overall Architecture .....	27
3.4.2 Selected Tools Comparison .....	32
3.4.3 Implementations Steps .....	34
3.5 Test Case Verifier System Implementation Explanation .....	36
3.5.1 Library Installations .....	36
3.5.2 Imports and API Key Setup .....	37
3.5.3 Initialize the Gemini Model .....	37
3.5.4 Agent 1: SRS Loader and Text Extractor .....	38
3.5.5 Agent 2: Requirements Extraction Agent .....	39
3.5.6 Agent 3: Test Case Generator Agent .....	40
3.5.7 Main Execution .....	41
3.5.8 About the Database .....	41
Chapter 4 Results and Discussions .....	43
4.1 Research Project Output Discussion .....	47

4.2 Research Project Results Validation .....	56
Chapter 5 Conclusion .....	63
References .....	68
Appendix .....	72

# List of Figures

Figure 2.1 Asking the question/task from the ChatGPT .....	18
Figure 2.2 ChatGPT Response to the question.....	18
Figure 2.3 Gemini Response and the question .....	19
Figure 3.1 Overall Architecture of the Project .....	28
Figure 3.2 Implementation Steps .....	35
Figure 3.3 Library Installations .....	36
Figure 3.4 Imports and API Key setup.....	37
Figure 3.5 Initialize the Gemini Model.....	37
Figure 3.6 SRS Loader and Text Extractor .....	38
Figure 3.7 Test Case Generator Agent .....	40
Figure 3.8 Main Execution.....	41
Figure 4.1 Main Dashboard.....	47
Figure 4.2 Uploading the SRS Document.....	48
Figure 4.3 Test Cases Generation 1st step .....	49
Figure 4.4 Verifying the Test Cases as the 2nd step .....	50
Figure 4.5 Regenerated Test Cases .....	51
Figure 4.6 Regenerated Test Cases part 2.....	53
Figure 4.7 Designation or the Role of the Domain Experts' .....	58
Figure 4.8 Responses from the Domain Experts part 1.....	58
Figure 4.9 Responses from the Domain Experts part 2.....	59
Figure 4.10 9 Responses from the Domain Experts part 3.....	59
Figure 4.11 9 Responses from the Domain Experts part 4.....	60
Figure 4.12 Analyze the survey results using "XLMiner Analysis ToolPak" .....	61
Figure 4.13 Results of the analysis.....	61
Figure 5.1 Visual Studio tool for the coding.....	72
Figure 5.2 Form Responses to the QA Survey before the implementation.....	72
Figure 5.3 Mongo DB Compass.....	73
Figure 5.4 Questionnaire part 1.....	74
Figure 5.5 Questionnaire part 2.....	75
Figure 5.6 Questionnaire part 3.....	76
Figure 5.7 Questionnaire part 4.....	77
Figure 5.8 Questionnaire part 5.....	78
Figure 5.9 Questionnaire part 6.....	79



# List of Tables

Table 2.1 Existing Tools Comparison Table.....	15
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