



**ARTIFICIAL INTELLIGENCE INTEGRATED E-LEARNING
SYSTEM**

UNDERGRADUATE THESIS

Submitted as one of the requirements to obtain

Sarjana Komputer

By:

Irene Putri Sihite

001202200013

FACULTY OF COMPUTER SCIENCE

INFORMATICS STUDY PROGRAM

CIKARANG

JULY, 2025

17% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Quoted Text

Match Groups

-  **126 Not Cited or Quoted: 17%**
Matches with neither in-text citation nor quotation marks
-  **0 Missing Quotations: 0%**
Matches that are still very similar to source material
-  **0 Missing Citation: 0%**
Matches that have quotation marks, but no in-text citation
-  **0 Cited and Quoted: 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 10%  Internet sources
- 3%  Publications
- 15%  Submitted works (Student Papers)

Irene Sihite

CAPSTONE INDIVIDUAL REPORT - IRENE PUTRI SIHITE (1)

 Thesis Computing

Document Details

Submission ID

trn:oid::3618:116042069

Submission Date

Oct 9, 2025, 1:08 PM GMT+7

Download Date

Oct 9, 2025, 2:00 PM GMT+7

File Name

CAPSTONE INDIVIDUAL REPORT - IRENE PUTRI SIHITE (1).pdf

File Size

2.2 MB

80 Pages

8,774 Words

54,748 Characters



*% detected as AI

AI detection includes the possibility of false positives. Although some text in this submission is likely AI-generated, scores below the 20% threshold are not surfaced because they have a higher likelihood of false positives.

Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

Disclaimer

Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (i.e., our AI models may produce either false positive results or false negative results), so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

Frequently Asked Questions

How should I interpret Turnitin's AI writing percentage and false positives?

The percentage shown in the AI writing report is the amount of qualifying text within the submission that Turnitin's AI writing detection model determines was either likely AI-generated text from a large-language model or likely AI-generated text that was likely revised using an AI paraphrase tool or word spinner.

False positives (incorrectly flagging human-written text as AI-generated) are a possibility in AI models.

AI detection scores under 20%, which we do not surface in new reports, have a higher likelihood of false positives. To reduce the likelihood of misinterpretation, no score or highlights are attributed and are indicated with an asterisk in the report (*%).

The AI writing percentage should not be the sole basis to determine whether misconduct has occurred. The reviewer/instructor should use the percentage as a means to start a formative conversation with their student and/or use it to examine the submitted assignment in accordance with their school's policies.

What does 'qualifying text' mean?

Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.



ABSTRACT

The foundation of this study relies on the fact that English is the global language that connects people around the world. It also plays a significant role as a medium for communication in global interactions in various sectors such as academic settings, business environment, or international travel. At present, many companies and institutions require English proficiency as a basic skill for hiring. Being able to communicate well in English has become a crucial skill not only for career development but also for accessing information and international networks. However, many individuals in non-English speaking countries still face challenges in learning English as a language. These struggles often arise due to lack of practice and low confidence in real-life conversation.

To address this issue, the objective of this research is to combine and utilize the advancement of technology, particularly in the field of Artificial Intelligence (AI) to detect and correct errors from learners. This project aims to improve speaking, writing, and understanding in English by instant feedback on grammar and sentence structure. The final system achieved an accuracy of 85% in identifying and correcting grammatical mistakes and inappropriate expressions. This result demonstrates the potential of AI-assisted tools to improve English language learning in an interactive, accessible, and personalized way.

The methodology involves collecting comprehensive dataset, applying preprocessing steps such as tokenization, cleaning, and labeling, build a neural network architecture such as Computer Neural Network (CNN) and Bidirectional Encoder Representations from Transformer (BERT), and Robustly Optimized BERT Pretraining Approach (RoBERTa) to detect and correct grammar error and hate speech detection. The system was able to achieve 85% accuracy in finding and fixing grammar errors and incorrect word choices. The overall

program achieved 90% of accuracy in detecting both grammar mistakes and bad words. These results highlight the potential of technological solutions to support language learning.

Keyword: CNN, BERT, GECTOR, Chatbot, Artificial Intelligence

TABLE OF CONTENTS

ABSTRACT.....	I
ACKNOWLEDGMENTS	IV
TABLE OF CONTENTS	VI
LIST OF TABLES	IX
LIST OF FIGURES	X
CHAPTER I	1
INTRODUCTION.....	1
1.1 Background	1
1.2 Problem Formulation	2
1.3 Problem Limitation	3
1.4 Research Objectives.....	3
1.5 Research Methods.....	4
1.5.1 Data Collection and Preprocessing	4
1.5.2 Model Selection of Data Training.....	4
1.5.3 Evaluation	5
CHAPTER II.....	6
LITERATURRE REVIEW	6
2.1 Python and Deep Learning Model	7
2.2 Basis Data MySQL	8
2.2 Speech-to-Text.....	8
2.3 Grammar Checker	8

2.4 Hate Speech Detection	9
2.5 Related Work	9
2.6 Comparison Table	10
CHAPTER II.....	12
LITERATURE REVIEW	12
3.1 System Analysis.....	12
3.2 Product Perspective.....	12
3.3 Product Function.....	13
3.3.1 Use Case Diagram.....	13
3.3.2 Description Use Case Diagram	14
3.3.3 Entity Relation Diagram (ERD).....	20
3.3.4 Activity Diagram	23
3.4 Interface Requirements	26
3.4.1 User Interface	26
3.4.2 Interface Hardware.....	27
3.4.3 Interface Software.....	27
3.5 Planning	28
3.5.1 Architectural Design	28
3.5.1.1 Overview System.....	28
3.5.1.2 Software Architecture	29
CHAPTER IV.....	31
SYSTEM IMPLEMENTATION AND TESTING	31
4.1 System Implementation and Interface Implementation	31

4.1.1 Interface Implementation	31
4.2.3 System Implementation	38
4.2 Software Functionality Testing.....	44
5.3.1.2 Functional Requirement.....	48
4.3 User Test Result	57
CHAPTER V	65
CLOSING	65
5.1 Conclusion	65
5.2 Suggestion.....	65
REFERENCES.....	67

LIST OF TABLES

Table 2.1 Manage Message Use Case Diagram.....	32
Table 3.2 Manage Grammar Correction Use Case Diagram	34
Table 3.3 Hate Speech Detection.....	36
Table 3.5 Grammar Checker Use Case.....	41
Table 3.6 Hate Speech Detection.....	42
Table 3.6 User Interface.....	44
Table 3.7 Interface Software.....	45
Table 5.5 Voice Based Chatbot	61
Table 5.6 Real Time Feedback System.....	63
Table 5.7 Microphone Able to Record User Voice	65
Table 5.8 Feedback Related Topic.....	68
Table 5.9 Recorded User's Speech	70
Table 5.7 Store Grammar Error	72

LIST OF FIGURES

Figure 3.1 Use Case Diagram AI Virtual Chatbot.....	13
Figure 3.2 Entity Relation Digram.....	29
Figure 3.3 Overview System.....	31
Figure 4.1 Log-in Interface.....	31
Figure 4.2 Sign-in Interface.....	32
Figure 4.3 Forgot Password Interface.....	33
Figure 4.4 Main Page Interface.....	34
Figure 4.5 Main Page Interface.....	35
Figure 4.6 Quiz Page.....	36
Figure 4.8 Track Your Journey AI Analysis Page.....	37
Figure 4.9 Voice Recognition Code.....	37
Figure 5.0 Setup Speech Recognition Code.....	38
Figure 5.2 Implementation Speech-to-Text Code.....	38
Figure 5.4 API Activator for Grammar Corrector.....	39
Figure 5.5 Route Implementation Code to the API.....	40
Figure 5.4 Declare Model Hate Speech Detection.....	42