



BAHRIA UNIVERSITY KARACHI CAMPUS

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING PROJECT FINAL REPORT

AI-Based Assignment Quality Checker

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Name	ENROLLMENT NO
Muhammad Arslan	02-132232-009

Course Instructor: **M Irfan UI Haq Malik**

Lab Instructor: **Sidra Mudassar**

1. Introduction:

The AI-Based Assignment Quality Checker is an intelligent academic evaluation system designed to analyze student assignments automatically. The system helps teachers and students evaluate assignment quality based on grammar, keyword relevance, plagiarism similarity, structure, readability, and content accuracy.

The project uses Artificial Intelligence and Natural Language Processing (NLP) techniques to inspect assignment text and generate quality scores with detailed feedback. The system also supports similarity checking between assignments to help identify copied content and improve academic integrity.

The system is developed using Python and integrated with machine learning libraries, text processing tools, and a user-friendly dashboard interface for easy interaction.

2. Objective:

The main objectives of this project are:

1. To analyze assignment quality automatically
2. To check grammar and spelling mistakes
3. To evaluate keyword relevance and topic matching
4. To detect plagiarism or assignment similarity
5. To generate quality scores and feedback reports
6. To provide a simple dashboard for students and teachers

3. Types of Artificial Intelligence Used:

This project belongs to the following AI domains:

Natural Language Processing (NLP)

Used for analyzing assignment text, extracting keywords, checking grammar, and evaluating readability.

Machine Learning

Machine learning algorithms are used to classify assignment quality and analyze text similarity patterns.

Rule-Based AI System

Custom logic is implemented for scoring assignments based on predefined conditions such as:

- Missing keywords → Low relevance score

- High similarity → Possible plagiarism
- Good grammar and structure → High quality score

Text Mining

Used for extracting important information, keywords, and content patterns from assignment documents.

4. System Components

1- Assignment Input Module

- Allows users to upload assignment files or paste assignment text
- Supports TXT, PDF, and DOCX formats
- Stores assignment data for processing

2- Keyword Analysis Module

- Extracts important keywords from assignment text
- Compares assignment content with required keywords
- Calculates topic relevance score

3- Grammar & Spell Checking Module

- Detects grammatical and spelling mistakes
- Uses NLP libraries for sentence analysis
- Improves writing quality evaluation

4- Similarity & Plagiarism Detection Module

- Compares assignments using text similarity algorithms
- Detects copied or highly similar content
- Generates similarity percentage score

5- Quality Scoring Engine

This module evaluates assignments using AI-based rules:

- High grammar accuracy + keyword match → Excellent
- Moderate quality content → Average
- High plagiarism or weak content → Poor

6- Dashboard Interface

- Provides a user-friendly interface
- Displays assignment scores and feedback
- Shows similarity reports and keyword analysis
- Helps teachers review assignment quality efficiently

5. Technologies & Libraries Used

The following tools and libraries are used in this project:

- Python
- Streamlit – Web-based dashboard
- NLTK – Natural Language Processing
- Scikit-learn – Machine Learning algorithms
- Pandas – Data handling
- NumPy – Numerical computations
- Matplotlib – Data visualization
- LanguageTool / TextBlob – Grammar checking
- Cosine Similarity – Text similarity calculation
- PDF & DOCX Readers – File processing

6. System Architecture:

The working flow of the system is as follows:

1. Student uploads assignment or pastes text
2. System extracts assignment content
3. Keywords are analyzed and matched
4. Grammar and readability are checked
5. Similarity analysis is performed
6. AI engine calculates assignment quality score
7. Final feedback and reports are displayed on dashboard

7. Important Clarification:

- Prebuilt NLP and machine learning libraries are used
- No custom deep learning model was trained from scratch
- The intelligence is implemented through NLP techniques and rule-based scoring logic
- Similarity checking is based on cosine similarity and text analysis methods

8. Module Description:

• Assignment Submission Module

1. Student enters assignment details
2. Uploads assignment file or pastes text
3. Required keywords are provided
4. System validates uploaded data
5. Assignment is stored for analysis

• Text Processing Module

1. Removes unnecessary symbols and stopwords
2. Splits text into sentences and tokens
3. Extracts keywords and important phrases
4. Calculates readability and content structure

• Similarity Checking Module

1. Compares assignment with another assignment
2. Calculates similarity percentage
3. Detects duplicated content
4. Generates plagiarism warning if similarity is high

• Quality Evaluation Dashboard

1. Displays assignment quality score
2. Shows grammar mistakes and corrections
3. Displays keyword matching results
4. Generates similarity percentage report

• Feedback & Reporting System

All analysis results are stored automatically.

Generated Report Includes:

- Student Name
- Assignment Topic
- Keyword Match Percentage
- Grammar Score
- Similarity Score
- Overall Assignment Quality

• Analytics & Visualization Page

1. Displays assignment statistics
2. Shows similarity comparison charts
3. Displays keyword frequency graphs
4. Helps teachers analyze student performance

9. Final Outcomes:

The system successfully:

1. Evaluates assignment quality automatically
2. Detects grammar and spelling mistakes
3. Identifies plagiarism and text similarity
4. Analyzes keyword relevance
5. Generates assignment quality reports
6. Provides visual analytics dashboards

10. Conclusion:

The AI-Based Assignment Quality Checker demonstrates how Artificial Intelligence and Natural Language Processing can improve academic assessment systems. The project helps automate assignment evaluation, reduce manual checking effort, and maintain academic integrity.

The system is scalable, practical, and useful for educational institutions. It provides fast feedback to students and helps teachers monitor assignment quality effectively.