FYP Proposal Document Template

Automated Self Assessment

Final Year Project Proposal

By:

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Lahore, Pakistan

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Automated Self Assessment

Abstract of the proposal

This project aims to develop a Dynamic Quiz Generation and Assessment System tailored for students preparing for MDCAT exams and teachers managing theoretical subjects. The primary objective is to create a web-based application that dynamically generates quizzes, evaluates answers, and provides real-time feedback to enhance learning outcomes.

The methodology involves utilizing frameworks such as Flask or Django for backend development, with HTML, CSS, and JavaScript for a responsive user interface. A MongoDB or MySQL database will store user data and quiz content.

In the AI part, we'll be leveraging different Large Language Models like LLAMA 3.1 and different transformers to create embedding of the input data. Advanced techniques like Prompt Engineering and Fine-tuning will be used to further improve our model performance.

Natural language processing libraries like NLTK will facilitate the evaluation of subjective answers based on criteria of Concreteness, Completeness, Accuracy, and Relevancy. The system will also create its own dataset, allowing for the development of a custom model to improve quiz generation and grading accuracy. Docker will be employed for consistent deployment across environments.

Expected outcomes include a user-friendly application that significantly reduces the time teachers spend creating assessments while improving students' exam preparation through automated feedback and tailored quizzes. The successful implementation of this system is anticipated to enhance educational efficiency and provide a scalable solution for both students and educators.

1. INTRODUCTION

Background:

In today's education system, preparation for exams is a significant challenge, particularly in theoretical subjects, where students often struggle with organizing their learning material and evaluating their progress. Teachers, on the other hand, spend considerable time preparing quizzes, tests, and exams that assess student understanding of key topics. With the increasing reliance on digital learning tools, there is a need for automated systems that can both generate and evaluate quizzes, saving time for teachers and helping students

prepare effectively. The system will assist students in their exam preparation while reducing the burden on teachers for creating and evaluating assessments.

Problem Statement:

The traditional process of quiz creation and evaluation, especially in theoretical subjects, is time-consuming and inefficient. Students need personalized and frequent quizzes to better prepare for exams, but manual quiz generation can be inconvenient. Furthermore, current digital tools often fall short in catering to subjective evaluations. The unmet needs are:

- Lack of automated quiz generation for theoretical subjects.
- Absence of a system that evaluates and grades quizzes, including MCQs, true/false, short questions, and optionally, subjective papers.
- Inefficient manual efforts required from teachers for quiz generation.

Who needs it?

- **Students:** Students need continuous assessment tools to track their progress and prepare for exams effectively.
- **Teachers:** Teachers need tools that automate quiz creation and grading to save time and provide consistent feedback to students.
- **Educational Institutions:** Schools and universities looking for scalable solutions to automate assessments will benefit from this application.

Objectives:

- Develop a user-friendly web-based platform for students and teachers to access quiz generation and assessment features.
- Implement dynamic quiz generation for multiple question types, including MCQs, true/false, short questions, and descriptive questions.
- Automate the evaluation and grading of quizzes, focusing on theoretical subjects, particularly for MDCAT preparation and computer-based courses.
- Provide real-time feedback to students based on their quiz performance to enhance their learning experience.

- Enable optional subjective evaluation for descriptive questions, allowing teachers to manually grade and provide insights.
- Create a custom dataset to support building a unique model for quiz generation and evaluation, enhancing the system's accuracy and efficiency.

Scope:

- The application will support two user roles: student and teacher.
- Procedural generation of quizzes in various formats, with MCQs primarily focused on MDCAT preparation.
- Automatic evaluation and grading for MCQs, true/false, and short questions.
- Descriptive questions will be generated for computer-based courses, with subjective evaluation optional and manually handled by the teacher.
- The focus is on theoretical subjects, specifically targeting exam preparation for medical and computer-based courses.

Limitation:

- The system will not cover practical or technical subjects.
- The platform will be designed for exam preparation and will not support real-time classroom engagement.
- Subjective answers are evaluated based on keywords, context, completeness and model answers, which might not fully capture drawbacks in student responses.

2. LITERATURE REVIEW

Related Work:

1. **Existing Quiz Systems:**

   Platforms like **Google Forms**, **Quizizz**, and **Kahoot!** allow teachers to create quizzes and automate grading for objective questions (MCQs, true/false). However, these systems primarily focus on objective-type questions and lack support for subjective evaluation.
   Disadvantages:
   - Limited to objective questions.
   - No procedural quiz generation.
   - Inadequate for subjective, theory-based subjects.

2. **Automated Grading Systems:**

   Tools like **EdX** and **Grammarly** use AI for grading essays and short answers, but they struggle with understanding scientific, complex responses in theoretical subjects, often requiring human intervention.
   Disadvantages:

   - Poor accuracy in grading scientific answers.
   - Requires manual oversight for content evaluation.

3. **Virtual University Quiz Systems:**

   The **Virtual University of Pakistan (VUP)** offers a comprehensive system for quiz generation, mainly using automated processes to generate quizzes for students across various theoretical courses. The system focuses on objective questions such as MCQs and true/false but also includes subjective questions, which require manual grading by instructors. However, VUP's system lacks dynamic quiz generation features based on real-time data or adaptive learning.

   Disadvantages:

   - Limited procedural quiz generation.
   - Manual grading for subjective questions.

Gap Analysis:

Current systems are inadequate for generating and grading quizzes for theoretical subjects, especially with scientific and technological questions. Our project fills this gap by providing:

- Automated generation and evaluation of MCQs, true/false, short answer, and subjective questions.
- AI-based evaluation designed specifically for theoretical subjects, improving accuracy and reducing manual effort.

2. Project Proposal/Goal:

Project Title: Automated Self Assessment

Group Leader: Abdul Moeed

Project Members:

Name	Registration#	Email Address	Signature
Abdul Moeed	BSDSF21A004	Bsdsf21a004@pucit.edu.pk	
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Project Goal:

To develop a web-based application that dynamically generates quizzes and evaluates them, primarily focusing on MDCAT preparation and computer-based courses, enhancing exam readiness for students and streamlining assessment for teachers.

Objectives:

Sr. #	
1.	Develop a user-friendly web-based platform for students and teachers to access quiz generation and assessment features.
2.	Implement dynamic quiz generation for multiple question types, including MCQs, true/false, short questions, and descriptive questions.
3.	Automate the evaluation and grading of quizzes, focusing on theoretical subjects, particularly for MDCAT preparation and computer-based courses.

4.	Provide real-time feedback to students based on their quiz performance to enhance their learning experience.
5.	Enable optional subjective evaluation for descriptive questions, allowing teachers to manually grade and provide insights.
6.	Create a custom dataset to support building a unique model for quiz generation and evaluation, enhancing the system's accuracy and efficiency.

Project Success criteria: Successful implementation of a web-based application that dynamically generates and evaluates quizzes, achieving 75% to 80% user satisfaction and accuracy in assessments.

Assumptions:

- Users possess basic computer skills and internet access to utilize the application effectively.
- The context matching between two given texts is possible, enabling accurate evaluation and grading of quizzes.

Risk and Obstacles:

- Challenges in accurately matching students' answers based on four measures: Concreteness, Completeness, Accuracy, and Relevancy, which may impact the evaluation process.

Organization Address: Department of Data Science, University of the Punjab, Lahore, Pakistan.

Target End Users: Students, Teachers, Educational Institutes.

Suggested Project Supervisor: Prof. Dr. Adnan Abid

Approved By: Prof. Dr. Adnan Abid

Date: October 3, 2024

Tools and technologies used with reasoning

List the tools, libraries, and technologies used:

- **Python** - Ideal for AI development with extensive libraries and community support.
- **Django** - Secure and scalable web framework for backend development.
- **React** - Enables dynamic, fast, and interactive user interfaces
- **HTML, CSS, JavaScript** - Enables dynamic, fast, and interactive user interfaces
- **MongoDB** - NoSQL database for scalable, unstructured data management.
- **Streamlit** - Rapid web app development for machine learning models.
- **NLTK** - Provides NLP tools for analyzing and grading subjective answers.
- **Transformers** - State-of-the-art AI models for understanding complex text responses.
- **OpenAI** - Enhances grading with human-like evaluation for subjective answers.
- **Trello** - Task management tool for effective project collaboration.
- **Github** - Version control for collaborative development and code management.
- **Docker -**For containerization and consistent deployment across environments

WORK DIVISION

Machine Learning, DeepLearning and NLP – Led by Abdul Moeed

Frontend – Led by Iqra

Backend – Led by Hamza

Deployment – All of us

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