Project Proposal

Title: **AI-Based Qur'an Tajweed Learning and Practice Platform**

Project Description:

- This project aims to develop an AI-powered web-based platform that helps users learn and practice the Tajweed (pronunciation rules) of the Holy Quran. The website allows users to listen to Qari recitations, recite along, and receive instant feedback on pronunciation errors using speech recognition technology. It provides an interactive and engaging learning environment for users to improve their Quranic recitation skills at their own pace, anytime and anywhere.

Objectives:

- **AI-Driven Feedback:** Detect pronunciation errors in real-time using speech analysis.

- **Interactive Learning:** Allow users to listen, repeat, and compare their recitation with a Qaari.

- **Progress Tracking:** Store and display user performance over time (daily, weekly, or monthly).

- **User Motivation:** Provide streak alerts and progress milestones to encourage consistency.

- **Accessibility:** Make Tajweed learning available to anyone with internet access, regardless of location.

- ## Scope of the Project:

The project focuses on developing an AI-based web platform to help users learn and practice Quran Tajweed through interactive recitation and instant feedback. It does not replace qualified Quran teachers but serves as a supportive learning tool to enhance pronunciation accuracy and engagement. The system is designed for educational purposes, demonstrating the potential of AI and speech recognition technology in improving Quran learning experiences.

Technologies to Be Used:

- **Frontend:** HTML, CSS, JavaScript, React.js

- **Backend:** Node.js, Express.js, Python

- **Database:** MongoDB

- **AI & Speech Processing:** Python (Speech-recognition, Librosa, Whisper API)

- **Deployment:** GitHub Pages

- **Methodology:**

1. **Data Collection:**
Gather Quranic recitations from verified Qaaris and collect sample user recordings to train and test the pronunciation analysis model.

2. **Preprocessing:**
Convert and clean audio data, segment it into verses and words, and extract key sound features such as pitch, tone, and duration using Python libraries like **Librosa**.

3. **Model Development:**
Develop and train an AI-based speech recognition model to analyze the user's recitation. When a user reads an ayah, their audio is converted into text (JSON format) and compared with the original, predefined ayah text.
If any word mismatches, the system identifies it as an incorrect pronunciation and highlights it in red on the interface to provide instant feedback.

4. **Evaluation:**
Evaluate the model's performance using metrics such as **Word Error Rate (WER)**, **accuracy**, and **pronunciation similarity scores** to ensure reliable and accurate feedback for users.

5. **Deployment:**
Integrate the trained model into the web application using **Node.js** and **Python APIs**, and deploy the final platform using **GitHub Pages** or a suitable web hosting service for user accessibility.

- **Expected Outcome:**

The expected result of this project is a real-time AI-powered web platform that helps users learn and practice Quran Tajweed with instant feedback. The system will analyze users' recitations, detect pronunciation errors by comparing them with Qaari references, and highlight incorrect words on the screen. It will also track user progress, display learning statistics, and motivate users through daily streak alerts. This project aims to make Quran learning more interactive, accurate, and accessible anytime, anywhere.

- **Plagiarism Report:**

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