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"AI-Powered Smart Quiz: A Streamlit-Based Multimodal Assessment Platform for Automated MCQ Generation"

Abstract:
In modern learning environments, generating effective assessments and enabling learners to evaluate their understanding across diverse content formats remains a complex challenge. Traditional quiz creation methods rely heavily on manual effort and are often restricted to text-based inputs, limiting accessibility and scalability. To overcome these constraints, this project introduces an AI-powered MCQ generation and assessment system capable of processing multiple input modalities—including text, images, audio, video, and document files—to produce high-quality, context-aware multiple-choice questions (MCQs).

The system operates through a Streamlit-based interface and offers two core functionalities: Create Quiz, designed for educators or content creators who wish to generate assessments from any chosen input format, and Attempt Quiz, which enables learners to test their understanding from recently consumed materials such as readings, lectures, visuals, or audio explanations. Large Language Models (LLMs) enhanced with prompt engineering generate adaptive and pedagogically aligned MCQs, while computer vision and audio processing models extract semantic meaning from images, video frames, and speech. Generated questions, quiz attempts, and scores are securely stored in an SQLite database. Machine learning techniques and generative AI provide difficulty estimation and personalized feedback, helping learners identify strengths and areas for improvement.

By supporting multimodal inputs and offering dynamic assessment capabilities, this system eliminates the limitations of conventional quiz creation tools. It delivers an accessible, automated, and intelligent platform for both educators and learners, ultimately enhancing the quality, efficiency, and personalization of skill and knowledge evaluation.

Keywords:
AI-driven assessment, MCQ generation, multimodal learning, Large Language Models (LLM), Natural Language Processing (NLP), Computer Vision, Speech Processing, Streamlit UI.

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