Proposal for CSU Student Research Competition

Project Title : Zoom Learning Assistant

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Problem Statement

The increasing reliance on virtual platforms like Zoom for education highlights a significant gap in tools that support active learning and content accessibility. Students often face challenges in revisiting lengthy lectures, finding relevant study materials, and retaining critical information. These barriers lead to reduced engagement and inefficiencies in learning.

The **Zoom Learning Assistant** seeks to address these challenges by integrating AI-powered tools directly into the Zoom platform. This project enhances the learning experience by offering real-time lecture summaries, quiz generation, additional resources, and automated note-saving capabilities. It aims to empower students with accessible and interactive tools for effective learning while reducing instructors' workload.

Introduction and Motivation

Video conferencing platforms such as Zoom lack features that cater to personalized and interactive student learning needs. By integrating state-of-the-art AI capabilities, the Zoom Learning Assistant offers a comprehensive solution to bridge this gap.

Building upon prior research and feedback from the **Zoom Learning Assistant prototype**, this project refines and expands its capabilities. It leverages natural language processing (NLP), vector databases, and advanced AI tools to create a dynamic and engaging virtual classroom environment. Inspired by successful AI teaching systems, this project is designed to complement existing learning platforms and drive educational innovation.

Features

1. **AI-Powered Lecture Summarization**
    - Extracts key points from lectures for quick and easy review.
    - **Example**: Converts a 60-minute lecture on "Data Structures" into a concise summary.
2. **Interactive Quiz Generation**

    - Generates multiple-choice questions based on lecture content.
    - **Example**: After a lecture on "Sorting Algorithms," quizzes are created with varying difficulty levels.
3. **Supplementary Resource Suggestions**

    - Recommends relevant articles, videos, and books to deepen understanding.
    - **Example**: Suggests "Introduction to Algorithms" after a lecture on divide-and-conquer techniques.
4. **Automated Note Saving**

    - Saves generated notes directly to Google Drive for future reference and organization.
    - **Example**: Uploads notes titled "Machine Learning Week 1" to a pre-specified Google Drive folder.

Implementation Approach

1. **Backend Development**

    - **Frameworks**: Flask for API development.
    - **Database**: Qdrant to store and retrieve lecture embeddings for quick processing.
    - **AI Models**: NLP models such as OpenAI GPT for summarization and quiz generation.
2. **Frontend Development**

    - **Interface**: Intuitive chatbot integrated within Zoom via Zoom APIs.
    - **User Interaction**: Commands like /summarize lecture, /generate notes, and /start quiz.

Expected Outcomes

1. **Enhanced Learning Efficiency**: Students access concise lecture summaries, reducing the time needed for review.
2. **Higher Engagement**: Quizzes and additional resources promote active participation and deeper understanding.
3. **Instructor Benefits**: Reduces the burden of creating study materials, allowing educators to focus on teaching.

References

1. Jill Watson: AI-powered virtual teaching assistant by Georgia Tech's Design Intelligence Lab.
2. Eduaide.AI: An AI tool for generating educational materials, quizzes, and summaries