

Study Buddy

Lecture Summarization and Question-Answering System using Speech-to-Text

-By Akshay Chavan, Gaurav Tejawani, Ananya Asthana

Project Overview:

The goal of this project is to develop a speech-to-text system that transcribes lecture recordings, either in video or audio format, into a text transcript. The system will further summarize the transcript into notes and allow users to ask questions based on the summarized lecture notes. We will build and train our own model for the speech-to-text segment of the project, ensuring full control over the system and its outputs. For the summarization and QA segments we will utilize pre-existing LLMs.

Objectives: The core objectives of the project include the following:

1. Building a speech-to-text model using datasets such as LibriSpeech and TED-LIUM to transcribe lecture audio or video into accurate text.
2. The transcribed text will then be processed using a text summarization model, where we will use an existing LLM summarizer.
3. Then we will add a question-answering feature to allow users to interact with the summarized content. For this we will use a model based on FLAN-T5-Large and vector-based semantic search with Instructor XL embeddings that can answer questions by extracting relevant information from the summarized text.

We aim to design a streamlined workflow where lecture audio is transcribed, summarized, and made interactively accessible for question-based querying.

Dataset and Tools: We will use datasets such as LibriSpeech and TED-LIUM for training the speech-to-text model. For text summarization, we will use existing LLM summarizer, and for question-answering, we will train the model using FLAN-T5-Large and vector-based semantic search with Instructor XL embeddings. The project will be implemented using Python and will leverage TensorFlow or PyTorch for building and training deep learning models, along with spaCy for NLP tasks. By the end of the project, we aim to have a system that can transcribe, summarize, and provide answers based on lecture content.

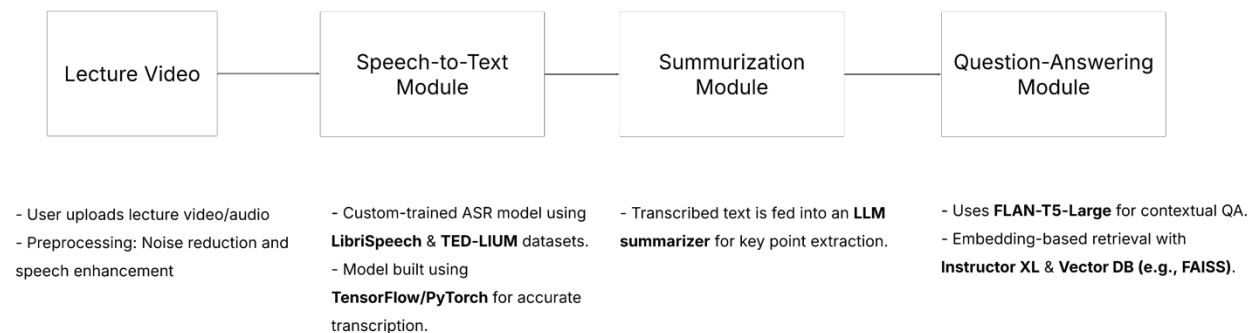


Fig 1: Flow Diagram