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EDU-CONNECT: AN AI-DRIVEN SMART VIDEO LEARNING PLATFORM WITH AUTOMATED NOTE GENERATION AND REAL-TIME CHATBOT SUPPORT

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ABSTRACT: ***Online video-based learning platforms are widely used in education, but many students struggle to understand lectures while taking notes at the same time. To solve this problem, this paper introduces EDU-CONNECT, a smart learning platform similar to YouTube but specially designed for educational use. The system uses artificial intelligence to improve student engagement and understanding. When a lecture video is played on EDU-CONNECT, the platform automatically detects the instructor's voice and converts the spoken content into text. Using this information, the system generates important lecture notes and provides them to students in real time. Additionally, the platform includes an AI-powered chatbot that helps learners by answering questions related to the ongoing lecture, allowing them to clear their doubts instantly. By reducing the need for manual note-taking and offering interactive support, EDU-CONNECT enables students to concentrate more on learning. The platform aims to make online education more effective, interactive, and accessible by combining video-based learning with voice recognition and AI chatbot technologies.***

KEYWORDS: *E-Learning, Educational Video Platform, Voice Detection, Automatic Notes Generation, Artificial Intelligence, AI Chatbot*

1. INTRODUCTION

Online learning has gained significant popularity due to its flexibility and accessibility. Video-based platforms such as YouTube provide extensive educational content; however, students often face challenges in simultaneously understanding lectures and taking notes. This limitation can negatively affect learning outcomes and make the revision process less efficient. To address these challenges, this paper proposes EDU-CONNECT, an intelligent learning platform designed to enhance the online learning experience. The platform integrates artificial intelligence technologies to automate note generation and provide real-time academic support. When a lecture video is played, the system detects the instructor's speech and converts the audio into text using speech recognition techniques. Based on the generated transcript, the system extracts key points and automatically produces structured lecture notes in real time. Furthermore, EDU-CONNECT incorporates an AI-powered chatbot that assists learners by answering questions related to the ongoing lecture. This feature enables students to clarify doubts instantly and promotes a more interactive learning environment. By reducing the need for manual note-taking, the platform allows students to concentrate more effectively on understanding lecture content. By combining video-based learning, speech-to-text processing, automated note generation, and AI-driven conversational support, EDU-CONNECT aims to improve learning efficiency and engagement. This paper presents the system architecture, underlying technologies, and potential benefits of the proposed intelligent educational platform.

2. FIRST-ORDER HEADING

The EDU-CONNECT platform is composed of four core modules: a video processing module, a voice detection module, an AI chat bot module, and an automated notes generation module. These components operate in an integrated manner to deliver real-time lecture notes and interactive academic support to learners.

2.1. SECOND-ORDER HEADING

This module detects the instructor's voice from the video stream and converts it into text using speech recognition technology. It ensures accurate real-time transcription and filtering of background noise.

2.2.1. THIRD-ORDER HEADING

This module identifies the instructor's speech from the video stream and converts it into text using automatic speech recognition (ASR) technology. It ensures accurate real-time transcription while minimizing the impact of background noise through noise reduction and filtering techniques.

FOURTH-ORDER HEADING

The EDU-CONNECT platform comprises four core modules: a video processing module, a voice detection module, an AI chatbot module, and an automated notes generation module. These modules are seamlessly integrated to provide real-time lecture notes and interactive academic assistance to learners. The voice detection module identifies the instructor's speech from the video stream and converts it into text using automatic speech recognition (ASR) technology. It ensures accurate real-time transcription while minimizing the impact of background noise through noise reduction and filtering techniques. Each module operates in coordination to enhance the online learning experience, reducing the need for manual note-taking and allowing students to focus on understanding lecture content. The AI chatbot further supports learners by answering questions related to the ongoing lecture, enabling instant clarification of doubts.

3. METHODOLOGY

The development of EDU-CONNECT involves several integrated modules designed to enhance the lecture learning experience. The video playback module **allows students to stream and control lecture videos directly within the platform. Simultaneously, the** voice detection module **captures the instructor's speech using Google's Speech Recognition API, ensuring accurate transcription. Captured speech is then processed by the** automatic notes generation module**, which leverages the Chat GPT API to convert spoken content into well-structured, real-time notes. To support interactive learning, the** AI chatbot module **provides students with instant responses to lecture-related queries and guidance.**

The frontend interface**, developed using HTML, CSS, and JavaScript, offers an intuitive and user-friendly experience for all users. Meanwhile,** backend services**, implemented in Java, manage server-side operations, user authentication, and seamless integration with AI modules and databases. All generated notes and user data are securely stored in** cloud storage solutions **such as AWS or Google Cloud, allowing students to retrieve and review content at any time. Each module is designed to operate in real time, ensuring continuous and responsive interaction between the user, the lecture content, and the AI-driven services.**

4. MATERIALS AND METHODS

- **Server is Cloud Storage: AWS Google Cloud for hosting and processing**
- **Audio Input: Microphones for testing voice detection accuracy**
- **User Devices: Computers, laptops, and mobile devices for accessing EDU-CONNECT**

Methods

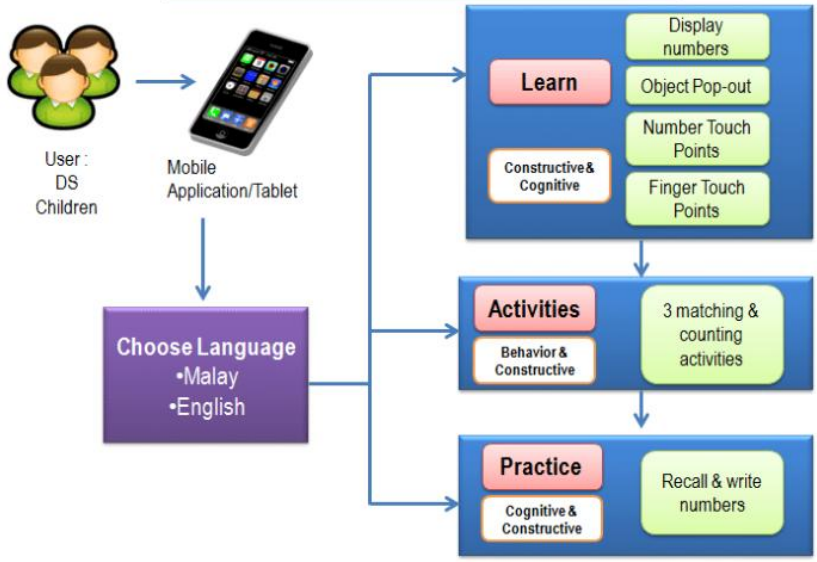
The development of EDU-CONNECT follows these main steps:

1. **Video Playback Module: Students can play lecture videos on the platform.**
2. **Voice Detection Module: Instructor's voice is captured using speech recognition.**
3. **Automatic Notes Generation: Chat GPT converts spoken lecture content into organized notes in real time.**
4. **AI Chatbot Module: The chatbot answers student questions related to the lecture and provides guidance.**
5. **Frontend Interface: HTML/CSS/JS is used to create an interactive and user-friendly web interface**
6. **Backend Services: Java handles server-side logic, user authentication, and integration with AI and database services.**
7. **Cloud Storage: Generated notes are saved in the cloud for easy retrieval and review.**

Module Name	Input	Output	Processing Method &Technology Used	Real-Time Support
Video processing Module	Lecture video stream	Video displayed to student	Video decoding, buffering, playback control	Yes
Voice Detection Module	Audio stream	Detected voice segments	Speech recognition (Google Speech API)	Yes
Automated Notes Generation	Detected speech	Structured notes	Chat GPT API for transcription & summarization	Yes
AI Chatbot Module	Student queries	Answers & guidance	AI chatbot (Chat GPT integration)	Yes

Material Type	Tools / Components	Purpose
Software	Java, JavaScript, React JS, Flutter	Development
Libraries	Google Speech API, Dialog flow	Voice detection & AI chat bot
Database	Firebase	Cloud storage of notes
Hardware	Microphones, Computers, Mobile devices	Testing and access

How the system works



5.RESULT AND DISCUSSION

In this section, we explain what we found in our project and what it means. The result show the outcomes of our work what actually happened when we tested or ran the system. This can include numbers, tables, charts, or examples that make it easy to see the results .The discussion explains why the results came out the way they did. We look at patterns, compare them to what we expected and talk about what they tell us about the system or problem we studied. We also mention any improvements or advantages our approach has over other methods.

6.CONCLUSION

Edu Connect app is used to transforming education by providing flexible, accessible, and personalized learning experiences. They leverage technology to offer a wide range of content and interactive features, making education more engaging. By providing a platform for both learners and educators, these apps make specialized and general knowledge available to anyone, anywhere, which ultimately promotes continuous learning and skill development.

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