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Teacher Assistance Platform

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Abstract:

The education system is changing fast with technology. This has brought chances for teachers and students but it also means teachers have a lot more work to do. Teachers have to do things like write down what they said in class get tests give grades and talk to each student one on one. These tasks take a lot of time so teachers have time to actually teach. This paper is about a tool called the Teacher Assistance Platform that uses artificial intelligence to help teachers with these tasks. The Teacher Assistance Platform uses computers to understand what people are saying, language models that can understand a lot of things and a system that gets all the parts working together. The Teacher Assistance Platform automates the tasks that teachers have to do, like lecture documentation and assessment preparation and grading and personalized feedback generation, for students. The Teacher Assistance Platform is an AI-driven tool that can really help teachers. The proposed system converts lecture audio into structured textual content, performs abstractive summarization, generates assessments, evaluates student submissions, and delivers personalized feedback through an integrated analytics dashboard. A modular multi-agent architecture enables task parallelism, scalability, and reliability. Experimental evaluation demonstrates significant improvements in processing efficiency, grading consistency, and content quality compared to manual methods. The results confirm that agent-based AI systems can effectively augment educators, enabling a more intelligent, efficient, and data-driven educational ecosystem.

Keywords : *Artificial Intelligence, Teacher Assistance Platform, Large Language Models, Multi-Agent Systems, Speech-to-Text, Educational Automation.*

INTRODUCTION

Artificial Intelligence is really changing the way we learn. It helps make things automatic and personalized for each student. Artificial Intelligence also makes decisions. Because Natural Language Processing and some new computer designs are getting better . Machines can now understand what people are saying and writing. Machines can even ,Create text that makes sense in context. This is very helpful, for teachers. Artificial Intelligence is doing things that old digital tools cannot do.

Teachers are still having a time with academic work even though a lot of schools use Learning Management Systems. They have to do things over and over like get notes, for class create tests, grade work and give each student feedback. These tasks take time and can be done differently each time. The problem is that the educational software that is available does not really understand what is going on in the classroom and it does not work well with parts of the system. This means it does not work well as it could. Learning Management Systems are supposed to help. They are not doing a great job.

This research introduces an AI-powered Teacher Assistance Platform (TAP) designed to address these limitations by integrating speech recognition, LLMs, and multi-agent AI systems into a unified framework. The platform aims to reduce educator workload while improving academic quality, accessibility, and scalability, counters may not be effective with real-time reliable data, especially in areas with high trade.

This created a system that automatically counts people entering and exiting rooms, making it an effective tool for crowd management and security monitoring.

LIERATURE REVIEW

The paper "HumSum: A Personalized Lecture Summarization Tool for Humanities Students Using LLMs" by Zahra Kolagar and Alessandra Zarcone in 2024 is really interesting. It is about a web-based system that helps university students by summarizing lectures.. The people who wrote the paper used something called GPT-4 and the Lang Chain framework to make this system work. They wanted to make sure students could get summaries of lectures that were just right for them. So they made it possible for students to choose how detail they want what style the summary is in and how deeply the summary explains

things. The system uses a method to break down big transcripts into smaller parts and then put them together into summaries that make sense... The lecture summarization system is a tool, for university students because it helps them understand lectures better. Experimental evaluation showed that personalized summaries enhanced comprehension and engagement among students compared to standard summaries.. Future research could expand personalization for domain diversity and integrate multilingual and real-time summarization capabilities. [1]

By connecting two transmitters and transferring their data to one central processing unit CPU on receiver, Firuz Kamalov and colleagues (2025) published "AI Agents in Education", a structured literature review focusing on agentic AI systems applied to academic settings. The paper categorizes four paradigms of agentic AI—reflection, planning, tool use, and collaboration—and examines how these can automate teaching tasks such as essay grading, feedback generation, and tutoring. The authors conclude that multi-agent coordination improves reliability, scalability, and consistency compared to single-model systems. The review also identifies interpretability and trust as critical challenges in deploying AI-driven educational agents. Although it highlights promising results, it calls for further research into transparency, accountability, and sustainable integration of agentic AI systems in diverse educational environments.[2]

Diana-Margarita Córdova-Esparza (2025) in her study "AI-Powered Educational Agents: Opportunities, Innovations, and Ethical Challenges" provides an extensive review of 82recent works on the integration of LLM-based educational agents. The author identifies six major categories of applications—tutoring, assessment, personalization, content generation, curriculum planning, and feedback automation—and proposes a hybrid model where teachers collaborate with AI rather than being replaced by it. The research underscores that hybrid human–AI systems outperform fully autonomous ones due to their adaptability and human oversight. Despite its breadth, the study notes that ethical design and clear pedagogical alignment remain underexplored. It emphasizes the need for strongerframeworks governing AI fairness, data privacy, and interpretability in classroom contexts.[3]

In "Artificial Intelligence-Inspired Multi-Language Framework for Note-Taking andQualitative Content-Based Analysis of Lectures" (2022), Munish Saini and colleagues propose an AI system for multilingual lecture transcription and note generation. The model records lectures, performs speech recognition, and then applies natural language summarization algorithms to produce both full transcripts and condensed "minutes." Tested across multiple languages and accents, the system achieved near-human accuracy in capturing core content, outperforming manual note-taking. The authors highlight that the framework also enables qualitative content analysis of lectures for improved teaching feedback. However, they acknowledge limitations in real-time performance and domain adaptation. Future work may focus on optimizing model latency and extending support forspecialized academic vocabulary.[4]

Winston Chan and Aijun An (2023) in "A Case Study on ChatGPT Question Generation" explore the use of large language models for automated assessment creation. The authors employed GPT-3.5 to generate diverse types of questions—multiple-choice, fill-in-the blank, and open-ended—from academic passages. Through a series of controlled experiments, they assessed question accuracy, contextual relevance, and linguistic quality .The study found that LLMs can generate well-structured, contextually aligned questions, reducing manual workload for educators. However, it also notes that AI sometimes overemphasizes factual recall over conceptual understanding. The paper recommends integrating cognitive frameworks such as Bloom's Taxonomy to balance question depth and variety.[5]

METHODOLOGY

The methodology of the proposed AI-Driven Teacher Assistance Platform is designed as a sequential yet fault-tolerant workflow, The platform integrates multiple intelligent modules operating under a multi-agent framework to automate academic content generation, validation, and delivery. Each stage is monitored, authenticated, and supported by error-handling mechanisms to ensure reliability and scalability.

WORKING PRINCIPLE

The Teacher Assistance Platform that uses Artificial Intelligence works in a way. It has different parts that work together to make sure everything runs smoothly. This platform can automatically make, check and give out school resources. It uses things like speech

recognition, big language models and people checking to make sure everything is correct and useful for teaching. The Teacher Assistance Platform also puts everything together in a way that makes sense. You can see how the whole thing works in Figure 1. The Teacher Assistance Platform is really good at making sure school resources are accurate and reliable.

BLOCK DIAGRAM

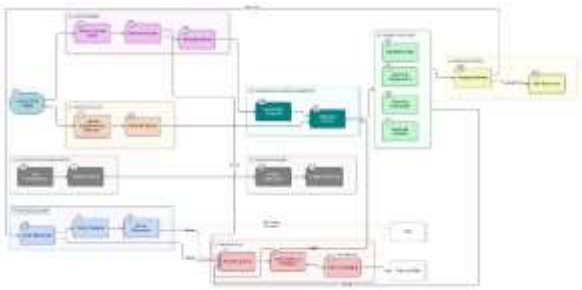

Figure 1

The software component of the Teacher Assistance Platform (TAP) forms the core intelligence of the system. It integrates multiple Artificial Intelligence (AI) modules, agent-based decision-making frameworks, and web-based interfaces to support educators in automating academic tasks such as lecture summarization, assignment generation, grading, and feedback distribution. The software architecture follows a modular multi-agent framework, allowing independent agents (modules) to handle specialized educational functions. Each agent communicates with a central planner and reflection engine to ensure accuracy, adaptability, and efficiency. It also needs to present an interactive dashboard for teachers, displaying performance analytics, class progress, and reports . Each of these features is handled by specialized software modules known as agents, which communicate through a centralized orchestration mechanism.

User Authentication

The system uses a way to make sure only the right people can get in this is done with the help of JWT and OAuth 2.0. The system has rules, about who can do what so teachers and administrators can only use the parts of the system that they are allowed to use. The system also keeps user information and school work private by using codes and keeping an eye on who is logged in. The system protects user information and school work. This is done by using encrypted credentials and session management to keep everything safe.

Lecture Transcription

When someone gives a lecture we can capture what they say in audio away or we can upload the audio later. We use computer programs that can understand what people are saying and turn the audio into text. To make sure the text is accurate we do some work, on the audio first. This helps us get the words right. Then we send the text to parts of the system to work on it some more. The lecture saudio is turned into text using these computer programs that can recognize what people are saying.

Content Summarization

When user wants to go through lecture transcripts they can use a special tool that helps understand what is important. This tool is based on transformer-based language models. The tool looks at the lecture transcripts, Finds the key concepts for user. It also lets user decide in how much detail user wants to see the summary so user can quickly go over what they need to know and get prepare for their exams. The tool is really helpful for review and exam preparation of lecture transcript.

Question Generation

The system makes questions like choice questions and short answer questions from the main points of the content. This part of the system makes sure the questions are about the topic and it also makes the answers so the system can check them automatically. The system is really good at making sure the questions are relevant to the topic and it helps with the assessment by making the answer keys, for choice questions and short answer questions.

Feedback Generation

The teacher gives students personalized feedback. This feedback is based on how the students do in school. It helps the students learn and get better. The feedback is like a guide for the students. It tells them what they do well and what they need to work on. The teacher wants to help the students so they give them feedback that's just right for them. The students get feedback that is meant to help them learn and do better in school. Personalized feedback is important, for student

performance. Student performance is what the teacher looks at to give the students feedback

Performance Analytics

You can use a web-based dashboard to see how students and classes are doing at any time. This tool has analytics that help teachers make good decisions about academics based on the information they get from the student and class-level performance data. The web-based dashboard is really helpful, for understanding student and class-level performance.

CONCLUSION

This study is about a tool called the Teacher Assistance Platform. It uses computers to help teachers with their work. The platform can listen to what the teacher says and turn it into written text. It can also make a summary of what was said and give the students a grade. The Teacher Assistance Platform gives the teacher information about how the students are doing in real time.

The Teacher Assistance Platform is safe. Only lets the right people use it. It keeps all the information. When we tried out the Teacher Assistance Platform we saw that it really helps teachers. They do not have to work hard and they can give grades that are fair. The Teacher Assistance Platform also helps teachers give students their lessons faster. The Teacher Assistance Platform is a useful tool, for teachers. The results demonstrate that multi-agent AI systems can effectively support educators by improving scalability, efficiency, and learning accessibility. The proposed platform offers a practical and extensible solution for modern educational environments and establishes a foundation for future advancements in intelligent academic automation, efficient, and data-driven education ecosystem

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