AI Copilot for Personalized Learning

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1. Project Understanding

In today's classrooms, students have different learning speeds and styles. Some grasp concepts quickly, while others need more time and support. Traditional systems treat all students the same, which creates gaps in learning. With the help of Artificial Intelligence, we can build smarter tools that understand each student's needs. Our project focuses on using AI to support teachers and guide students through personalized learning paths.

1.1 Problem Statement

Traditional assessment methods are time-consuming and require significant resources. They often lack personalization and may result in inaccurate or biased evaluations. There is a need for an efficient and intelligent assessment system that adapts to individual student performance.

1.2 System Overview

The system will serve two types of users:

1. **Teachers**: Responsible for managing classroom activities by uploading lecture materials, including slides, notes, and books.
2. **Students**: Engage with course content, complete assessments, and receive personalized assistance.

1.3 Core Functionality

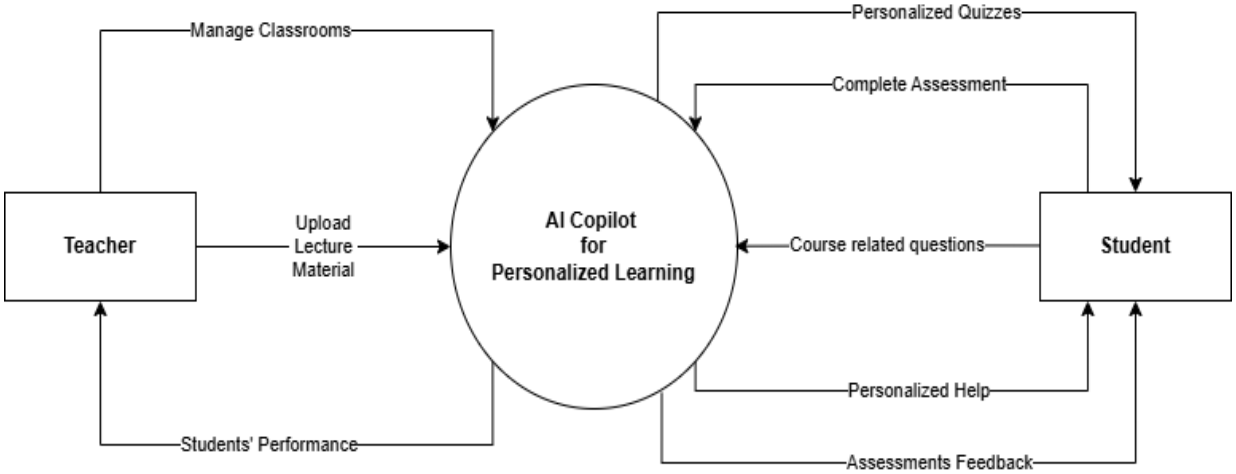

Figure 1. DFD Level 0 for AI copilot for Personalized Learning

- The system will automatically generate weekly quizzes based on the uploaded lecture content.
- The quizzes will be personalized for each student by considering their past performance.
- Students will complete the assessments, and the system will evaluate their responses and assign grades.
- An AI-powered assistant will be available to support students by answering queries related to the course material.

1.4 Expected Outcomes

- Reduced workload for teachers through automated quiz generation and grading.
- Personalized learning for students based on adaptive assessments.
- Instant feedback and performance tracking to enhance student engagement and learning outcomes.

2. Methodology

The system follows a structured process to generate, evaluate, and improve student assessments. Each step ensures efficient content management, personalized quiz generation, and automated evaluation.

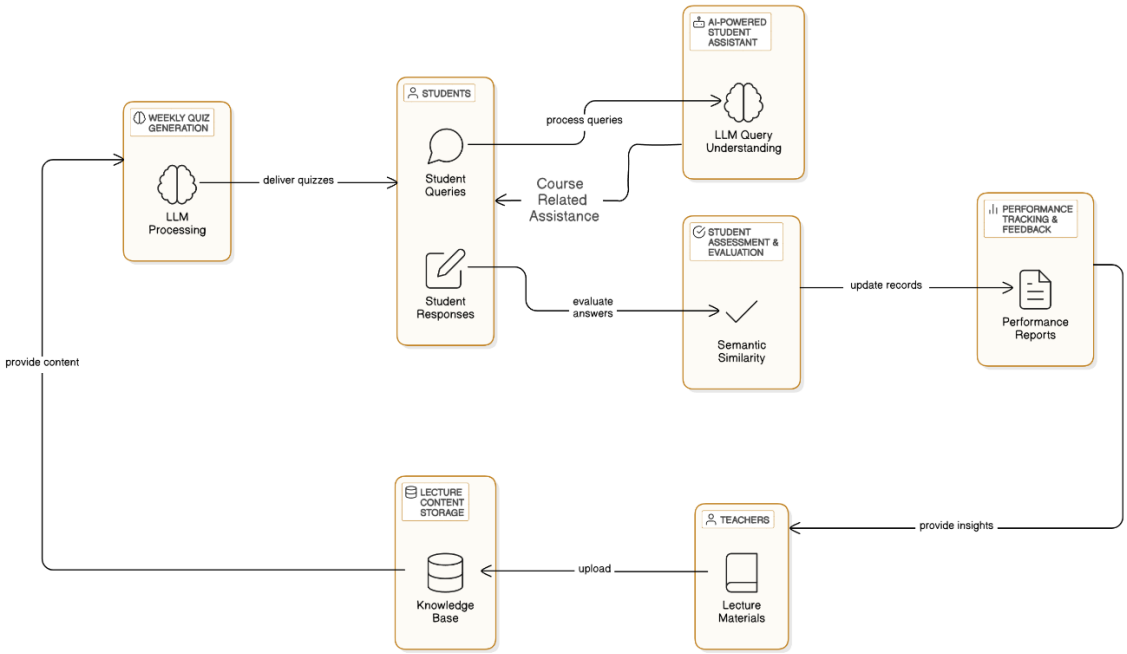

Figure 2. Methodology of AI Copilot

2.1 Lecture Content Storage

Teachers upload lecture materials, including slides, notes, and books. These materials are stored in a database (referred to as a knowledge base). The system organizes the content based on weeks and subjects for easy retrieval.

2.2 Weekly Quiz Generation

At the start of each week, the system retrieves that week's lecture content from the knowledge base. The content is passed to a Large Language Model (LLM), which processes the material and generates quiz questions.

The system also considers the past performance of each student. It adjusts the difficulty level and question types based on their strengths and weaknesses. This ensures that every student receives a personalized question set that matches their learning progress.

2.3 Student Assessment

Students complete the quiz through the platform. Their responses are then analysed using semantic similarity techniques. The system compares each response with an expected answer provided by the LLM.

- If the student’s answer closely matches the expected response, they receive full or partial credit.
- If the answer deviates significantly, the system assigns a lower score.
- The system ensures fair evaluation by considering variations in phrasing and expression.

2.4 AI-Powered Student Assistance

A built-in AI assistant is available to support students. It answers questions related to the course content, clarifies concepts, and provides explanations for incorrect answers.

2.5 Performance Tracking and Feedback

After evaluation, the system updates each student’s performance record. Teachers and students can view progress reports through interactive dashboards.

- Teachers can track class performance and identify struggling students.
- Students receive personalized feedback to help them improve.
- Future quizzes are adjusted based on individual learning needs.