

Problem Statement: AI-Powered Quiz Application for Students

1. The Problem: Students and educators often face challenges in creating and accessing diverse, engaging, and relevant practice questions for quizzes. Manual question creation is time-consuming, repetitive, and may not cover a wide enough range of topics or difficulty levels. Students also need effective tools to test their knowledge comprehensively beyond static, pre-made quizzes.

2. The Goal (Solution):

- To develop a MERN stack-based Quiz Application that empowers students and educators to efficiently create, manage, and take quizzes, significantly enhancing the learning and self-assessment process.
- A key innovation will be the integration of Artificial Intelligence to assist in quiz content generation and potentially other learning aspects.

3. Target Audience:

- **Students:** Who want to practice specific topics, self-assess their understanding, and access a wide variety of questions.
- **Educators/Teachers:** Who need a streamlined tool to create customized quizzes for their classes without extensive manual effort.

4. Core Functionalities (Initial Focus for "Basic Working Part"): For the initial basic working part, the application will focus on providing a seamless experience for:

- **Question Management:**
 - **Manual Question Feeding:** Users can easily add new quiz questions manually, including defining the question text, options (for multiple choice), correct answer, and associated topics/categories.
 - **Question Viewing/Listing:** Users can browse and search through existing questions.
- **Basic Quiz Creation & Taking:**
 - Users can create a basic quiz by selecting existing questions.
 - Students can attempt these quizzes and receive immediate feedback on their answers.
- **AI Integration (Conceptual for Initial Phase):**
 - While the full AI integration will be developed incrementally, the initial concept for AI assistance will be explored for **automatic question generation based on user-provided topics or existing questions**. This aims to diversify the question pool and reduce manual input. *(Note: This can be a placeholder for now, we'll decide on the exact AI feature as we build).*

5. Technology Stack: The application will be built using the **MERN stack**:

- **MongoDB:** For flexible and scalable NoSQL database storage of questions, quizzes, and user data.
- **Express.js:** To build the robust backend API for managing data and business logic.
- **React.js:** To create an interactive and responsive user interface for an engaging learning experience.
- **Node.js:** As the server-side JavaScript runtime environment.