

# TECHNICAL SUMMARY

## AI POWERED QUIZ PLATFORM (PROTOTYPE)

### PROBLEM STATEMENT:

AI Quiz Portal (Platform Replication (like Kahoot) with AI Quiz Generation) The objective is to build an AI-powered quiz platform capable of generating quizzes from inputs such as topics, text, or documents. Users should be able to create quizzes, host quiz sessions, join using a session PIN, and play interactively. The prototype must demonstrate core AI logic, backend processing, quiz creation workflow, and an operational user interface.

### APPROACH AND AI COMPONENTS:

- Implemented AI quiz generation using the **Groq LLM** for topic-based MCQs.
- Created structured **JSON-driven prompts** to ensure clean, validated MCQ output.
- **Integrated backend API** endpoints that communicate with the AI system and store quizzes in the **database**.
- Prototype includes foundation for **future enhancements**.
  - PDF/Text → quiz conversion.
  - Adaptive difficulty.
  - Analytics engine.

### TECHNICAL ARCHITECTURE:

#### FrontEnd:

HTML, CSS, and JavaScript-based prototype with interfaces for quiz creation, AI quiz request, hosting, and quiz-playing.

#### Backend:

Node.js + Express application handling quiz APIs, user sessions, authentication, and AI integration.

#### Database:

MongoDB stores quizzes, users, ratings, game history, and session data.

#### AI Layer:

Groq API generates dynamic multiple-choice questions from topics.

#### System Flow:

User Input → Backend API → AI Engine → Quiz Generation → Stored in MongoDB → Played via UI

### CHALLENGES AND MITIGATIONS:

#### AI Output Reliability:

AI sometimes generated inconsistent JSON. Mitigation: Improved prompts and added JSON validation.

#### Real-Time Gameplay (Not in Prototype):

WebSocket-based multiplayer is not yet implemented. Mitigation: Session PIN flow added; sockets planned for final build.

### **PDF/Text Quiz Generation:**

Only topic-based AI generation is available. Mitigation: Designed pipeline for text extraction and OCR for next phase.

### **Scalability:**

Final system must support many concurrent users. Mitigation: Backend structured modularly for microservice expansion.

## **ROADMAP TO FINAL BUILD:**

**Phase 1 – Core System** (Completed): Authentication system (Email/Google/Facebook), complete Dashboard UI, AI Quiz Generator, Manual Quiz Builder, Quiz Player (timer + scoring + results), Local Hosting prototype, MongoDB data models

**Phase 2 – Platform Polish** (Near Completion): Smooth animations, improved login experience, dashboard refinement, stable state management, optimized localStorage flow, cleaner backend routes.

**Phase 3 – Competitive Features** (Planned Next): Real-time battle mode (1v1/2v2), host controls, synced questions, team scoring.

**Phase 4 – Growth Systems:** Enhanced rating logic, XP/level progression, leaderboard upgrades.

**Phase 5 – Community Expansion:** Public quiz library, tagging system, search filters, shareable quizzes.