SYNOPSIS OF EXPLORATORY PROJECT (EP)

ON

ProPrep

submitted in partial fulfilment of the requirements for the award of degree of

BACHELOR OF ENGINEERING

In

COMPUTER SCIENCE AND ENGINEERING

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Abstract

The project *ProPrep* aims to revolutionize the job preparation process by integrating AI-driven solutions for resume building and mock interviews into a single cohesive platform. It addresses key challenges faced by job seekers, such as lack of personalized guidance and real-time feedback. The platform includes an AI Resume Builder that crafts optimized resumes using intelligent suggestions and formatting based on job roles, and an AI Mock Interview App that simulates live interview scenarios while offering real-time feedback using Gemini AI.

Developed using full-stack technologies like React, Next.js, Vite, Tailwind CSS, Drizzle ORM, and Clerk, the platform ensures a secure, scalable, and seamless user experience. It leverages WebSocket for real-time interaction and cloud services like Cloudinary and S3 for efficient file management. *ProPrep* not only streamlines the job application journey but also enhances user confidence and readiness, making it a powerful tool for career success.

1. Introduction

1.1 Background and Context

In today's competitive job market, candidates face increasing pressure to present themselves effectively through professional resumes and confident interview performance. Despite the availability of various tools and platforms, most solutions are fragmented—offering either resume creation or interview practice in isolation, often lacking personalization and real-time guidance.

The rise of AI technologies offers a transformative opportunity to bridge this gap. *ProPrep* was conceptualized to address these limitations by building an integrated platform that combines intelligent resume generation with dynamic AI-powered mock interviews. By leveraging tools such as Gemini AI for feedback, Next.js for backend services, and real-time communication via WebSockets, the project aims to deliver a personalized and interactive experience.

This platform is designed not only to enhance job seekers' technical readiness but also to boost their confidence and improve their chances of success in the hiring process. It reflects a growing trend toward smart, user-centric career preparation tools that empower individuals through AI and full-stack development innovations.

1.2 Problem Statement

Job seekers often face significant challenges in crafting optimized resumes and preparing effectively for interviews. These hurdles are primarily due to the fragmented nature of existing tools, a lack of personalized guidance, and limited access to real-time feedback. This project addresses these pain points by integrating two AI-powered solutions: an AI Resume Builder App that helps users create professional, tailored resumes with intelligent suggestions, and an AI Mock Interview App that provides seamless, real-time interview simulations and feedback. By leveraging AI, the platform streamlines the job application journey, enhances career readiness, and ultimately increases the user's chances of success in the hiring process.

1.3 Significance of the Project

The *ProPrep* project is significant as it addresses critical challenges faced by modern job seekers by offering a comprehensive, AI-powered solution for career preparation. In an environment where professional success is closely tied to strong resumes and confident interview skills, ProPrep bridges the gap between fragmented tools and lack of personalized guidance. By integrating intelligent resume building and real-time mock interview feedback into a single platform, it provides users with a personalized, interactive, and scalable experience. The project not only empowers users to improve their technical and soft skills but also demonstrates the practical application of advanced technologies like Gemini AI, full-stack web development, and cloud integration. Its relevance extends beyond individual users to educational institutions and career services, making it a forward-thinking solution in the evolving landscape of digital career readiness.

1.4 Objectives

1. **Develop an Integrated AI-Powered Career Toolkit**
   Build a unified platform that offers both AI-driven mock interviews and intelligent resume generation to streamline the career preparation process.
2. **Leverage AI for Personalization and Real-Time Feedback**
   Utilize AI technologies like Gemini AI to provide tailored resume suggestions and live, adaptive feedback during mock interviews.
3. **Design a User-Centric Interface**
   Create an intuitive and engaging UI/UX that ensures smooth navigation and accessibility across the resume builder and mock interview modules.
4. **Implement Full-Stack Web Development Practices**
   Gain practical experience using technologies such as React, Vite, Tailwind CSS, Next.js, Drizzle ORM, and Clerk to build a scalable, secure, and efficient application.
5. **Resume and Roadmap Tools:-**Include a resume builder and career roadmaps to guide users through technical and professional preparation effectively.

1.5 Scope and Limitations

Scope:

1. ProPrep combines AI-powered resume building and mock interview simulation into a single web-based solution, offering end-to-end career preparation support
2. Uses **WebSocket/Socket.io** for live communication during mock interviews, simulating realistic interview conditions.
3. Designed to be deployed on platforms like **Vercel**, allowing for wide accessibility, high availability, and efficient performance across different user bases.

Limitations:

1. The quality of AI feedback may sometimes be generic or contextually inaccurate, potentially affecting the user's preparation quality.
2. Reliance on external services like Clerk, Cloudinary, and Gemini AI introduces risks such as downtime, API limitations, or pricing changes.
3. Managing multiple concurrent mock interview sessions with live feedback may cause performance bottlenecks if not optimally configured.

2. Methodology

2.1 Technical Approach

The project *ProPrep* aims to revolutionize the job preparation process by integrating AI-driven solutions for resume building and mock interviews into a single cohesive platform.Developed using full-stack technologies like React, Next.js, Vite, Tailwind CSS, Drizzle ORM, and Clerk, the platform ensures a secure, scalable, and seamless user experience.

Client-Server Architecture:-React (frontend) communicates with Node.js/Express (backend) via RESTful APIs. MongoDB stores user data, progress, and interview records.

Algorithm-Optimized System:-Coding question recommendations and mock interview generation are optimized using algorithms that consider user performance and topic difficulty.

2.2 System Architecture

A. Frontend-Backend Structure:

- **Frontend (Client-Side):**

1. Built reusable components using **React** and styled them with **Tailwind CSS**.
2. Implemented user dashboards for resume editing, interview feedback viewing, and profile management.
3. Integrated resume export functionality using **react-pdf** or **html2pdf**.

- **Backend (Server-Side):**

1. Created backend routes with **Next.js API** to handle form submissions, AI requests, and user session data.
2. Used **Drizzle ORM** with a relational database (e.g., PostgreSQL) to manage resume data, interview logs, and user profiles.

B. Algorithm Flow:

1. **User Registration/Login:-**User enters credentials → Auth API verifies and generates JWT token → Access granted to dashboard.
2. **Live Stats Integration:-**Frontend sends request → Backend fetches data from external APIs → Data parsed and displayed.
3. **Coding Sheet & Question Recommendation:-**Backend analyzes user progress → Applies filtering algorithms → Generates personalized sheet based on topic and difficulty.
4. **Mock Interview Simulation:-**User answers questions → Rule-based AI evaluates responses → Feedback stored and displayed.
5. **Resume Generation:-**User fills template → Data formatted into PDF using frontend libraries → Option to download/export.

2.3 Functional Modules Overview

1. **User Authentication Module:-**Handles user registration, login, and session management using JWT. Ensures secure access to personalized features like dashboards, coding sheets, and resumes.
2. **Input Handling Module:-**Captures user inputs such as login credentials, quiz responses, coding preferences, and resume details from forms and UI components. Validates inputs before processing or storing.
3. **Live Stats Integration Module:-**Fetches real-time user data (like solved problems and ranks) from external platforms like LeetCode, GeeksforGeeks, and CodeChef using APIs. Parses and formats data for dashboard display.
4. **Coding Sheet & Question Management Module:-**Retrieves, filters, and organizes a list of coding questions from the database. Uses topic and difficulty-based filtering logic (sorting/searching) to generate customized coding sheets for users.
5. **Mock Interview & Quiz Module:-**Simulates AI-based text interviews by presenting predefined technical questions, evaluating user input using rule-based logic, and generating feedback. Also handles CS trivia quizzes and scoring logic.
6. **Resume Builder Module:-**Allows users to input academic, technical, and project details. Formats this information into clean resume templates and provides options for preview and PDF download.
7. **Career Roadmap Viewer Module:-**Displays structured learning paths and preparation guides using tree-like data structures. Helps users navigate through various CS topics and technologies step-by-step.

3. Tools and Technologies

3.1 Programming Languages

- JavaScript – For frontend interactivity and dynamic content.
- HTML/CSS – For structuring and styling the user interface.
- Node.js (JavaScript) – For backend server-side logic and REST API handling.

3.2 Frameworks / Libraries

- React.js – For building a responsive, component-based user interface.
- Express.js – For handling backend routing and API requests.
- Tailwind CSS – For rapid, utility-first styling.
- Mongoose – For modeling and interacting with MongoDB in Node.js.
- Axios – For making HTTP requests to external coding platform APIs.

3.3 Databases / Storage

- MongoDB – NoSQL database used to store user data, coding sheets, progress, and platform integration metadata.

3.4 IDEs / Platforms

- Visual Studio Code (VS Code) – Main development environment for frontend and backend coding.
- MongoDB Compass – GUI for managing and visualizing database collections.

3.5 APIs / External Integrations

1. Gemini AI API (by Google)

- **Purpose**: Provides intelligent feedback and suggestions.

2. Clerk

- **Purpose**: User authentication and session management

3. WebSocket / Socket.io

- **Purpose**: Enables real-time communication.

3.6 Hosting / Deployment Tools

- GitHub – For version control and collaboration.
- Render / Netlify – For hosting backend (Render) and frontend (Netlify) respectively.
- MongoDB Atlas – Cloud-based MongoDB instance for database hosting.
- Postman – For testing and validating backend APIs.

3.7 Real-Time Communication Module

Technology Used: WebSocket / Socket.io

Features:

- Instant delivery of interview questions
- Bi-directional real-time messaging between user and AI
- Low-latency feedback transmission

4. Project Plan

4.1 Module-wise Feature Breakdown

The CodeCracker platform is designed as an all-in-one coding preparation portal. Below is a breakdown of its key modules and functionalities:

1. User Authentication & Profile Module

Technology Used: Clerk

Features:

- Secure user sign-up and login (OAuth, email/password)
- Persistent session management
- User profile creation and editing

2. Resume Builder Module

Technologies Used: React, Tailwind CSS, Gemini AI, react-pdf/html2pdf

Features:

- Interactive resume input form (personal info, experience, education, skills)
- AI-powered keyword suggestions and content enhancement
- Live preview of resume

3. Mock Interview Module

Technologies Used: Gemini AI, WebSocket/Socket.io, Next.js API Routes

Features:

- Selection of interview domain/role (e.g., frontend, backend, HR)
- AI-generated dynamic interview questions
- Real-time Q&A simulation

4. AI Integration Module

Technology Used: Gemini AI

Features:

- Resume analysis and optimization suggestions
- Real-time mock interview question generation
- Evaluation and scoring of user response

5. Interview Preparation & Company-Wise Analysis Module

- Curated company-wise questions based on previous hiring trends (Amazon, Google, etc.).
- Filtering options by topic, difficulty, or company.
- Includes mock test environment with timers and performance tracking.

6. Resume & Resource Export Section

- Offers access to developer resume templates, interview roadmaps, and placement guides.
- Future scope includes exporting user progress or selected sheet problems to PDF or CSV format.
- Resource-rich section aids both coding and placement preparation.

7. Real-Time Communication Module

Technology Used: WebSocket / Socket.io

Features:

- Instant delivery of interview questions
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4.2 Week-wise Development Timeline

Module	Planned Weeks	Expected Deliverables
Module 1: Login/Auth System	**Week 1–2**	**Login Page,Clerk Setup**
Module 2: Mock Interview	**Week 3–5**	**Real time socket.io integration**
Module 3: Resume Builder	**Week 5–6**	**Form + PDF export + AI Integration**
Module 4: AI and Storage	**Week 6–7**	**Gemini feedback**
Module 5:AI and Storage	**Week 7–8**	**Cloudinary Setup**
Module 6: Final Testing	**Week 9–10**	**Complete Website**
Final Documentation & Report	**Week 11**	**Technical report, codebase documentation, GitHub README updates**
Final Demo + Viva + PPT	**Week 12**	**Code Freeze, Project Presentation, Deployment Demo & Evaluation**

4.3 Expected Outcomes

- Fully functional career prep platform with integrated resume and interview tools.
- Real-time AI feedback for improved career readiness.
- Scalable, cloud-hosted application with a modern tech stack

- Seamless user experience with secure login, platform handle sync, and an intuitive, responsive UI.

4.4 Risk Factors / Assumptions (Optional)

- AI API limitations or downtime.
- Cost of cloud services (e.g., API usage, file storage).
- Accuracy of AI feedback and user dependency.

5. References / Literature Review Table

S. No.	Source Title / Tool	Key Idea	Project Relevance
1	Gemini AI	AI based text generation	user feedback
2	clerk	User authentication	Secure login system
3	Next js	Full-stack framework	Routing API
4	Socket.io	Real time communication	Live interviews
5	React/Tailwind	Frontend Framework	UI and styling