**PROJECT REPORT OF EXPLORATORY PROJECT**

**ON**

**PeepPost**

**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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**DECLARATION**

I hereby certify that the work which is being presented in the project report entitled **“PeepPost”** in partial fulfilment of requirement for the award of the degree of Bachelor of Engineering (Computer Science and Engineering) submitted in the department of Computer Science and Engineering at Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India, is an authentic record of my own work carried out under the supervision of Dr. Gifty Gupta. The matter presented in this project report has not been submitted in any other university/institute for the award of any degree.

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This is to certify that the above statement made by the candidate is correct to the best of my knowledge and belief.

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**Abstract**

This project is a comprehensive web platform designed to address the myriad challenges faced by college students. It integrates a range of functionalities including posting, commenting, peer meetings, real-time chat, and accessing pertinent information related to college life. The platform serves as a dynamic community hub where students can interact, share knowledge, and support one another.

Built with a robust technology stack, the platform leverages MongoDB for scalable data management, Node.js and Express for efficient server-side operations, and React for a responsive and interactive user interface. Security and authentication are ensured through the implementation of JWT and OAuth, while Firebase facilitates real-time updates and notifications. Development and API testing have been streamlined using Postman.

By fostering a collaborative environment, this platform aims to enhance the college experience, providing students with the tools and resources they need to succeed both academically and socially.

1. **Introduction**

Navigating college life presents a variety of academic, social, and personal challenges. To address these issues, we have developed a comprehensive web application designed to enhance the overall college experience. This project offers an array of features tailored to meet the needs of students, providing a supportive and interactive platform. Below is a detailed breakdown of the project :-

* 1. **Purpose and Objectives:**
  + Create a centralized hub for students to connect, collaborate, and share resources.
  + Foster a sense of belonging and mutual support within the college community.
  + Provide tools to help students overcome common academic and social challenges.
  + Enhance the overall educational experience by facilitating communication and information exchange.

**1.2 Core Features:**

* + **Posting and Commenting:**
    - Allows students to post updates, questions, and content.
    - Facilitates discussions through comments and replies.
  + **Meeting Peers:**
    - Enables students to find and connect with peers based on shared interests or courses.
  + **Real-time Chat:**
    - Provides a platform for instant messaging and group chats.
    - Supports collaboration and social interaction among students.
  + **Information Access:**
    - Offers a repository of valuable information relevant to college-related issues.
    - Includes resources for academic support, campus events, and student services.

**1.3 Technology Stack:**

* + **MongoDB:**
    - Utilized for scalable and flexible data management.
  + **Node.js and Express:**
    - Provides a robust foundation for server-side operations.
  + **React:**
    - Delivers a responsive and dynamic user interface.
  + **JWT (JSON Web Tokens) :**
    - Ensures secure authentication and authorization.
  + **Firebase:**
    - Facilitates real-time interactions and notifications.
  + **Postman:**
    - Employed for API development and testing to ensure reliable application functionality.
  1. **Benefits:**
  + Enhances student engagement and collaboration.
  + Provides a structured and efficient way to address common college problems.
  + Promotes a supportive and inclusive campus community.

By integrating these features and technologies, our platform aims to empower students to connect, learn, and grow together. Through this project, we aspire to create a more supportive, engaging, and enriching college experience for all students.

1. **Methodology**

The development of this project followed a structured methodology to ensure the creation of a robust, secure, and user-friendly platform. Below is a detailed overview of the methodology used:

**2.1 Requirements Analysis**

* Conducted thorough research to understand the needs and challenges faced by college students.
* Gathered requirements through surveys, interviews, and focus group discussions with potential users.
* Defined the core functionalities and features based on the gathered insights.

**2.2 System Design**

* **Architecture Design:**
  + Designed a modular architecture to ensure scalability and maintainability.
  + Utilized the MERN stack (MongoDB, Express, React, Node.js) to build a full-stack application.
* **Database Design:**
  + Structured the MongoDB database to efficiently manage user data, posts, comments, and interactions.

**2.3 Implementation**

* **Front-end Development:**
  + Developed the user interface using React to create a responsive and interactive experience.
  + Implemented dynamic routing and state management using React Router and Redux.
* **Back-end Development:**
  + Set up the server using Node.js and Express to handle API requests and manage user authentication.
  + Employed JWT (JSON Web Tokens) for secure user authentication and OAuth for third-party logins.
* **Real-time Features:**
  + Integrated Firebase to support real-time chat functionality and notifications.

**2.4 Security Measures**

* **Password Verification:**
  + Utilized regular expressions to verify password strength, ensuring they meet security standards.
  + Implemented a system to generate secure, random passwords for new users.
* **Email Verification:**
  + Set up an email verification process for new registrations, sending verification links to confirm email addresses.
* **Data Protection:**
  + Ensured secure data transmission using HTTPS and encryption techniques.

**2.5 Social and Interactive Features**

* **Posts and Interactions:**
  + Enabled users to create posts, like, react, and comment on posts.
  + Implemented a feature to navigate to the profile page of users from posts and comments.
* **Friendship Management:**
  + Added functionality for users to send and accept friend requests, fostering a sense of community.

**2.6 Testing and Validation**

* **Unit Testing:**
  + Conducted unit tests to verify the functionality of individual components and modules.
* **Integration Testing:**
  + Performed integration testing to ensure seamless interaction between different parts of the system.
* **User Acceptance Testing (UAT):**
  + Engaged potential users in testing the platform, gathering feedback to refine features and fix any issues.

**2.7 Deployment**

* **Continuous Integration and Deployment (CI/CD):**
  + Set up a CI/CD pipeline to automate the deployment process, ensuring regular updates and maintenance.
* **Hosting:**
  + Deployed the application on a reliable cloud platform to ensure high availability and performance.

**2.8 Maintenance and Updates**

* Established a process for regular updates, incorporating user feedback and addressing emerging needs.
* Monitored system performance and security, applying patches and improvements as necessary.

By following this comprehensive methodology, we have developed a secure, interactive, and user-friendly platform that effectively addresses the needs of college students, fostering a supportive and collaborative environment.

1. **Tools and Technology Used**

**3.1 Front-end Technologies**

* **React:**
  + A JavaScript library for building user interfaces, ensuring a responsive and dynamic experience.
  + Utilized for creating reusable UI components and managing state effectively.
* **React Router:**
  + Used for dynamic routing, allowing seamless navigation between different pages of the application.

**3.2 Back-end Technologies**

* **Node.js:**
  + A JavaScript runtime built on Chrome's V8 engine, used for server-side scripting.
  + Enables the creation of scalable and efficient server-side applications.
* **Express:**
  + A minimal and flexible Node.js web application framework.
  + Provides robust features for building web and mobile applications, handling routing, middleware, and HTTP requests.

**3.3 Database**

* **MongoDB:**
  + A NoSQL database known for its scalability and flexibility.
  + Used to store and manage user data, posts, comments, and interactions in a JSON-like format.

**3.4 Authentication and Security**

* **JWT (JSON Web Tokens):**
  + Used for secure user authentication, ensuring that data transmission between client and server is secure.
* **Regular Expressions:**
  + Utilized for password verification to ensure strong and secure passwords.
* **Email Verification:**
  + Implemented to send verification links to new users, ensuring the validity of email addresses.

**3.5 Real-time Functionality**

* **Firebase:**
  + Used for real-time database and notifications, facilitating instant messaging and real-time updates.

**3.6 Deployment**

* **Git:**
  + A version control system used to track changes in the source code during development.
* **GitHub:**
  + A platform for version control and collaboration, used for hosting the project repository and managing code contributions.

**Other Tools**

* **VS Code (Visual Studio Code):**
  + A source code editor used for writing and editing code, providing a range of features and extensions to enhance development productivity.
* **Prettier:**
  + Tools used for code linting and formatting, ensuring consistent code quality and style.

By leveraging these tools and technologies, the project ensures a seamless, secure, and efficient user experience, addressing the various needs of college students and fostering a collaborative and supportive community.

1. **Project Plan**

**4.1 Project Overview**

The goal of this project is to develop a comprehensive platform designed to enhance the college experience for students. The platform aims to facilitate connections between students and alumni, simplify club event management, and provide easy access to solutions for common student problems. Additionally, the platform will serve as a hub for general information, ensuring that students can find what they need with minimal effort.

**4.2 Objectives**

* Enable students to connect with alumni for mentorship and networking opportunities.
* Provide a user-friendly interface for clubs to publish notices and events.
* Offer a repository of solutions for common student issues, such as attendance, fee fines, and exam preparation.
* Ensure easy access to general information, reducing the effort required for students to stay informed.

**4.3 Key Features**

* **Alumni Connection:**
  + Search and connect with alumni based on interests, majors, or career fields.
  + Enable direct messaging and scheduling for mentorship sessions.
* **Club Management:**
  + Allow clubs to publish notices, events, and updates.
  + Facilitate event registration and attendance tracking.
* **Student Solutions Repository:**
  + Provide a section for common problems, such as attendance issues, fee fines, and last-minute exam notes.
  + Include user-contributed tips and hacks to address these issues.
* **General Information Access:**
  + Create a centralized location for important information, such as campus news, academic schedules, and resources.
  + Implement search functionality to easily find relevant information.

**4.4 Project Phases**

**Phase 1: Planning and Requirements Gathering**

* + Conduct stakeholder meetings to gather detailed requirements.
  + Define project scope, objectives, and deliverables.
  + Create a project timeline and allocate resources.

**Phase 2: System Design**

* + Design the system architecture and database schema.

**Phase 3: Development**

* + Set up the development environment and initialize the project repository.
  + Implement front-end components using React.
  + Develop back-end services using Node.js and Express.
  + Integrate MongoDB for data storage.
  + Implement authentication and security features using JWT and OAuth.
  + Integrate real-time functionalities using Firebase.
  + Develop features for alumni connection, club management, and student solutions repository.

**Phase 4: Testing**

* + Conduct unit testing for individual components and modules.
  + Perform integration testing to ensure seamless interaction between different parts of the system.
  + Engage users in beta testing to gather feedback and identify issues.
  + Fix bugs and refine features based on user feedback.

**Phase 5: Maintenance and Updates**

* + Regularly monitor system performance and security.
  + Provide ongoing support and maintenance to ensure the platform remains functional and up-to-date.

**4.5 Milestones and Deliverables**

* **Milestone 1: Project Planning Complete**
  + Deliverables: Project plan document, requirements specification, timeline.
* **Milestone 2: System Design Complete**
  + Deliverables: Architecture design, database schema, wireframes, API specifications.
* **Milestone 3: Initial Development Complete**
  + Deliverables: Front-end components, back-end services, authentication, and security features.
* **Milestone 4: Feature Development Complete**
  + Deliverables: Alumni connection, club management, student solutions repository.
* **Milestone 5: Testing Complete**
  + Deliverables: Test reports, bug fixes, user feedback incorporation.
* **Milestone 6: Deployment and Launch**
  + Deliverables: Deployed application, launch plan, post-launch monitoring setup.

**4.6 Project Management**

* **Project Manager:** Responsible for overseeing the project, ensuring it stays on track and within scope.
* **Development Team:** Comprising front-end and back-end developers responsible for implementing the features.
* **Design Team:** Responsible for creating the user interface and user experience designs.
* **Support Team:** Provides ongoing support and maintenance post-launch.

**Conclusion**

This project plan outlines the structured approach to developing a platform aimed at enhancing the college experience for students. By focusing on connectivity, ease of access to information, and providing solutions to common problems, the platform aims to be a valuable resource for students, fostering a supportive and collaborative community.