

Scoop Labs Project Lab

Full Stack Development Project Brief

Project Title: AI Chatbot / Virtual Assistant

Difficulty Level: Advanced

Estimated Duration: 5-7 Weeks

Suggested Stack: MERN (MongoDB, Express.js, React, Node.js) + LLM APIs

Project Overview

In this project, you will build an **AI-powered chatbot application** capable of understanding user queries and generating intelligent responses using modern Large Language Model (LLM) APIs.

The application will include a chat interface where users can interact with an AI assistant. The backend will process queries using an LLM API and return responses to the frontend. The chatbot should maintain **conversation history and contextual awareness**, enabling more natural multi-turn conversations.

This project introduces students to **Generative AI integration in web applications**, an increasingly important capability in modern software development.

Students will also learn how to manage asynchronous API responses and build interactive conversational interfaces.

Why This Project Matters

AI-powered chat interfaces are becoming increasingly common in modern applications, from customer support assistants to productivity tools and knowledge retrieval systems.

Understanding how to integrate **LLM APIs into web applications** is becoming an essential skill for developers working with modern software platforms.

This project provides hands-on experience with:

- Prompt engineering and AI interaction
- Handling AI-generated responses
- Managing conversational state and history
- Designing user-friendly chat interfaces

Completing this project demonstrates the ability to build **AI-integrated applications**, which is a highly valuable skill in today's technology landscape.

Learning Outcomes

By completing this project, students will learn and practice:

- Integrating **AI / LLM APIs** into web applications
- Understanding prompt engineering basics
- Managing conversation history and context
- Handling asynchronous API requests and streaming responses
- Implementing chatbot user interfaces
- Working with vector databases and embeddings (optional advanced feature)
- Building AI-assisted user experiences

Project Requirements

Your AI chatbot application should include the following features:

Chat Interface

- A messaging interface where users can enter questions or prompts
- Display chat messages between the user and the AI assistant
- Maintain chat history during the conversation

AI Response Generation

- Send user prompts to an LLM API
- Receive AI-generated responses and display them in the chat interface

Conversation Context

- Maintain conversation history so the chatbot can respond with context awareness
- Support multi-turn dialogue between user and AI assistant

User Accounts

- Optional user authentication system
- Store chat history associated with each user

Conversation Logging

- Store past conversations in the database
- Allow users to review previous chats

Responsive Interface

- The chat interface should work properly on **desktop and mobile devices**

Technical Guidelines

Students are encouraged to follow the guidelines below while implementing the project.

Frontend

- Use **React** to build the chat interface
- Implement a message-based UI similar to modern chat applications
- Handle asynchronous responses from the backend

Backend

- Use **Node.js with Express.js** to create backend APIs
- Implement request handling for AI prompt submission and response retrieval

AI API Integration

Students can integrate AI APIs such as:

- OpenAI API
- Azure OpenAI
- Other compatible LLM APIs

Some AI APIs provide **limited free credits for development**, while others require paid usage depending on request volume.

Students may choose either free trial credits or paid usage depending on their implementation needs.

Database

- Use **MongoDB** to store chat history and user data

Free Development Tools

Students can complete this project using the following tools:

- **VS Code** for development
- **GitHub** for version control and repository hosting
- **MongoDB Atlas (Free Tier)** for database hosting
- **Vercel / Netlify** for frontend deployment
- **Render** for backend hosting

These platforms provide free tiers suitable for development and testing.

Bonus Challenges (Optional)

Students who want to extend their project can add additional features such as:

- Voice input and speech-to-text responses
- Retrieval-Augmented Generation (RAG) using document uploads
- Custom knowledge base integration
- Chatbot personality customization
- Streaming responses for real-time message generation

These features demonstrate deeper understanding of **AI system design and conversational interfaces**.

Submission Guidelines

To receive the **Project Completion E-Certificate**, students must submit the following:

Required

- GitHub repository link containing the complete project source code
- Live deployed project link

Students can deploy their project using free platforms such as **Vercel, Netlify, or Render**.

Optional (Recommended)

- 2-3 screenshots demonstrating the chatbot interface and functionality

All submissions must be made through the **official Scoop Labs Project Lab submission form**.

Submission Form:

<https://scooplabs.in/project-lab>

Ensure that your GitHub repository includes a **README file explaining the project setup and features**.

Certification

Students who successfully complete and submit their project will receive a **Project Completion E-Certificate from Scoop Labs, an Authorized Training Partner of the National Skill Development Corporation (NSDC) under the Skill India Mission**.

This certification recognizes the successful completion of an industry-oriented development project.

Project Showcase Opportunity

Selected high-quality submissions may be **featured in the Scoop Labs Project Gallery**.

Projects showcased in the gallery serve as a **public portfolio reference**, providing additional credibility when students share their work with recruiters and potential employers.

Need Help?

If you have questions or face issues while building the project, you can contact the Scoop Labs team for guidance.

Support Email:
info@scooplabs.in

Scoop Labs Project Lab

Building industry-ready projects for aspiring developers.

Scoop Labs is an **Authorized Training Partner of the National Skill Development Corporation (NSDC)** under the **Skill India Mission**, committed to helping learners develop practical technical skills through real-world projects.