Project Report

Project Title:

SmartChat – AI Chatbot Using Gemini API

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1. Introduction

In today's fast-paced world, conversational AI has become an essential technology across various industries, including education, customer support, and content generation. The rise of intelligent chatbots offers new ways to provide fast, personalized assistance to users. However, many commercial solutions are costly, complex, or have limited access.

SmartChat was conceptualized to address this challenge. It is a lightweight, intelligent chatbot developed using **Node.js** and integrated with the **Google Gemini API** (free tier). The goal was to develop a feature-rich yet user-friendly interface that mimics natural conversation using AI-powered responses.

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2. Objective

- To develop a responsive and intelligent chatbot that communicates with users in real-time.
- To integrate the Google Gemini API and provide an AI-generated conversational experience.
- To ensure the chatbot is accessible, responsive, and visually appealing using web technologies.

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3. Problem Statement

Many students and institutions lack access to AI tools that can assist with learning, automate FAQs, or help with content creation. While platforms like ChatGPT or

Dialogflow exist, they either require premium subscriptions or come with learning curves for integration.

Thus, there is a need for a **free, deployable chatbot** that uses AI APIs and offers a modern user interface suitable for both educational and practical uses.

4. System Overview

SmartChat includes:

- **Frontend:** Built with HTML5, CSS3, and JavaScript to deliver a sleek and interactive UI.
- **Backend:** Developed using Node.js and Express, responsible for processing user input and API communication.
- **AI Integration:** Uses the Google Gemini API (free tier) to fetch real-time AI-generated responses.

5. Features Implemented

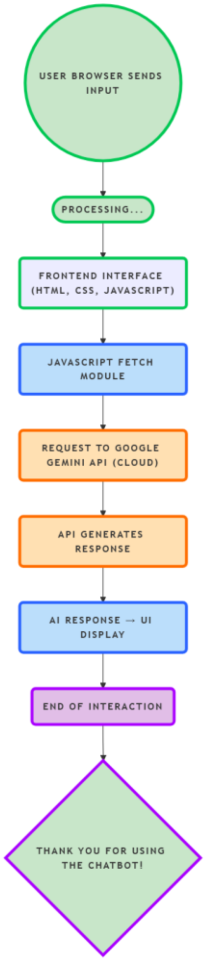
- Real-time text-based chatbot interface
- Gemini API integration for conversational AI
- Typing animation for bot replies
- Auto-scroll to latest message
- Timestamp on every message
- Responsive design (mobile and desktop support)
- Keyboard shortcuts (Enter to send)
- Error handling for network/API issues

6. Technologies Used

Component	Technology
Frontend	HTML, CSS, JS
Backend	Node.js, Express

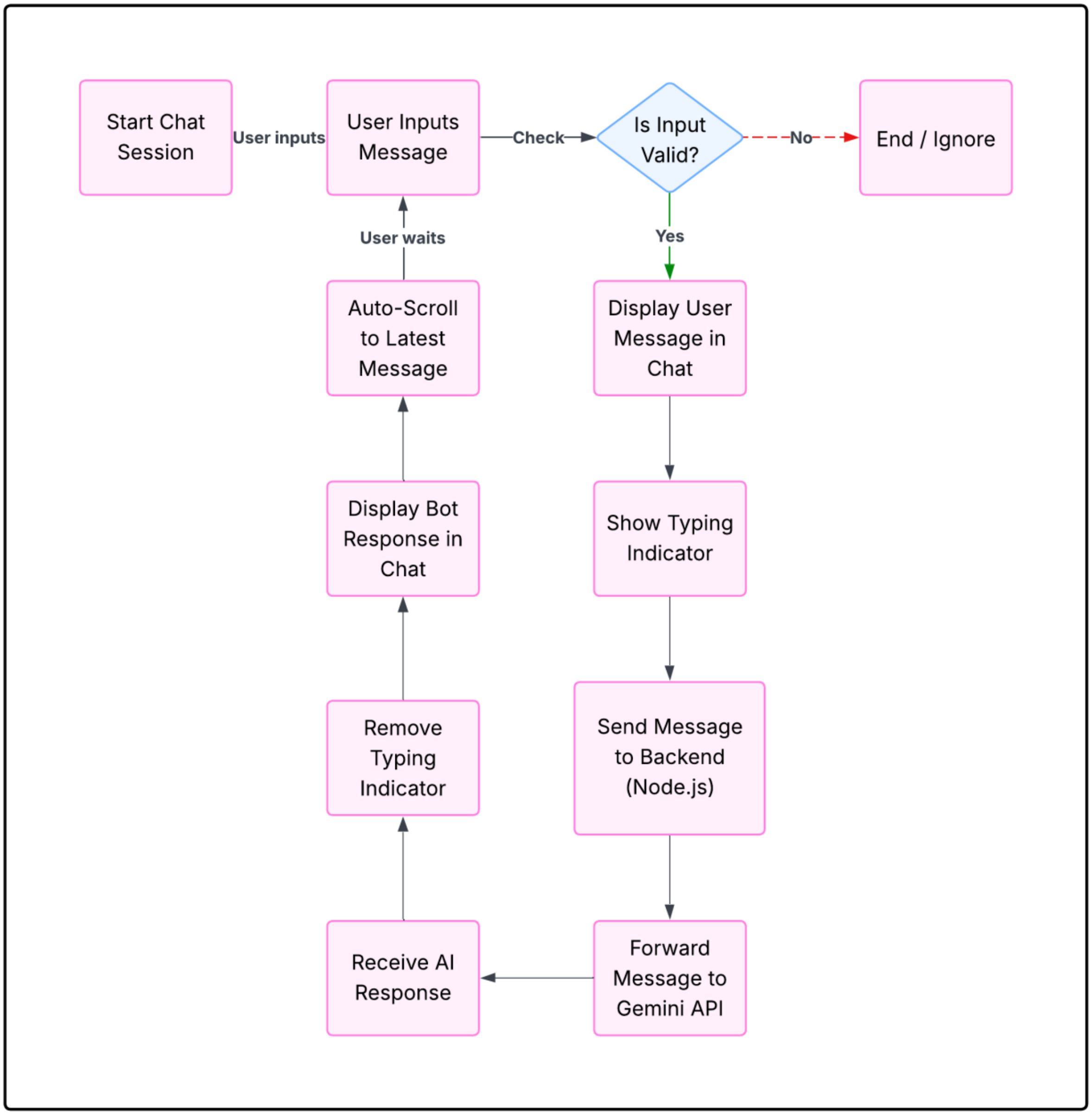
Component	Technology
AI Engine	Gemini API
Tools Used	VS Code, Postman, GitHub, Lucidchart

7. System Architecture



- The user sends a message via the frontend.
- The backend sends this message to the Gemini API.
- The API processes it and returns a response, which is shown to the user.

8. Flowchart Description



9. Testing and Results

Test Case ID	Module	Input	Expected Output	Actual Output	Status
TC01	Input Validation	Empty string	No message sent	No message sent	Pass
TC02	API Integration	"What is Node.js?"	AI-generated reply	AI-generated reply	Pass

Test Case ID	Module	Input	Expected Output	Actual Output	Status
TC03	UI Responsiveness	Mobile screen	Mobile layout adapts	Mobile layout adapts	Pass
TC04	Typing Effect	Valid input	Shows typing effect	Shows typing effect	Pass

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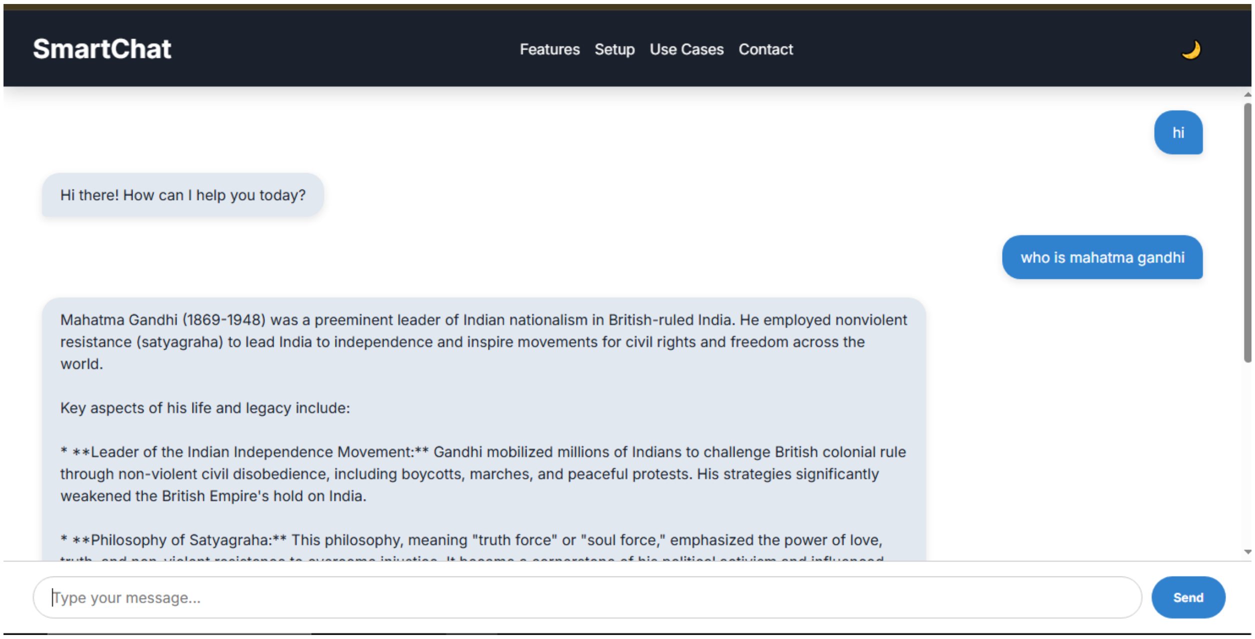
10. Screenshots

You can insert the following screenshots:

- Homepage (landing section with button)
- Chatbot interface (conversation view)
- Typing animation and timestamp
- Flowchart or system design diagram



hi

Hi there! How can I help you today?

who is mahatma gandhi

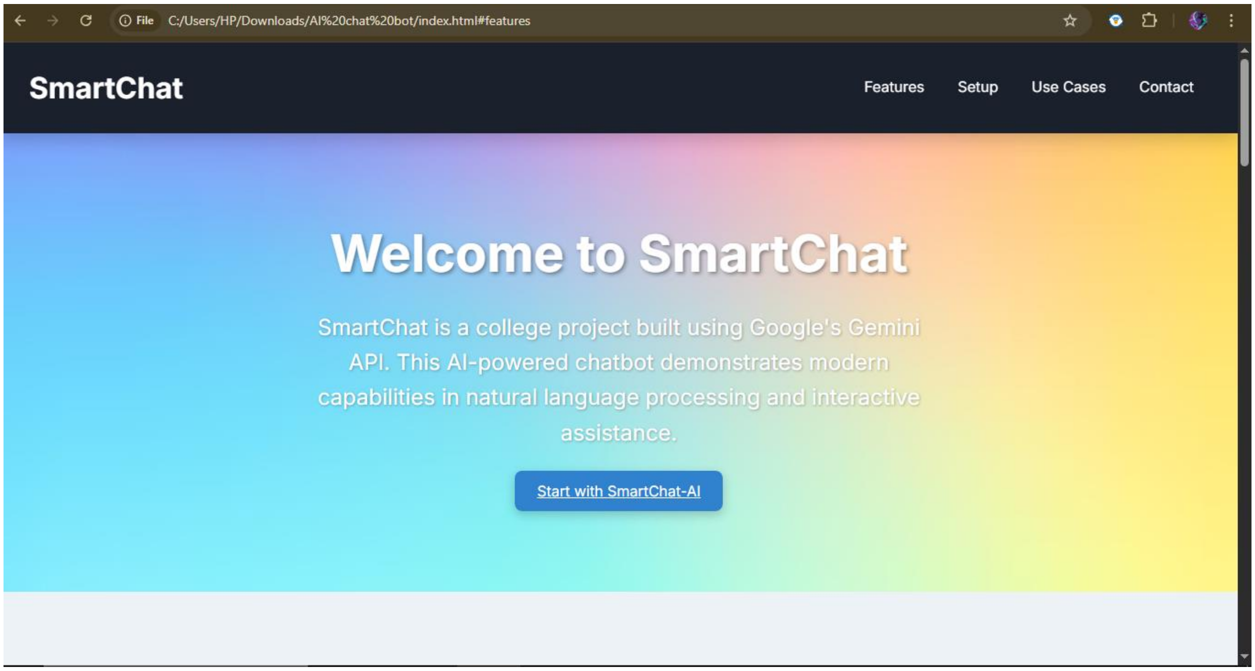
Mahatma Gandhi (1869-1948) was a preeminent leader of Indian nationalism in British-ruled India. He employed nonviolent resistance (satyagraha) to lead India to independence and inspire movements for civil rights and freedom across the world.

Key aspects of his life and legacy include:

* **Leader of the Indian Independence Movement:** Gandhi mobilized millions of Indians to challenge British colonial rule through non-violent civil disobedience, including boycotts, marches, and peaceful protests. His strategies significantly weakened the British Empire's hold on India.

* **Philosophy of Satyagraha:** This philosophy, meaning "truth force" or "soul force," emphasized the power of love, truth, and non-violent resistance to overcome injustice. It became a cornerstone of his political activism and influenced

Type your message...



File C:/Users/HP/Downloads/AI%20chat%20bot/index.html#features
SmartChat
Features
Setup
Use Cases
Contact
Start with SmartChat-AI

Welcome to SmartChat

SmartChat is a college project built using Google's Gemini API. This AI-powered chatbot demonstrates modern capabilities in natural language processing and interactive assistance.

11. Challenges Faced

- Managing the free quota and limitations of Gemini API
- CORS issues during frontend-backend API communication
- Designing UI elements to be consistent across browsers
- Optimizing typing animation without performance lag

12. Future Enhancements

- Add **voice input** and **speech output**
- Store chat history using **MongoDB**
- Deploy using **Render or Vercel**
- Implement **user login and sessions**
- Support **multi-language translation**
- Offer **downloadable chat transcripts**

13. Conclusion

SmartChat successfully demonstrates the integration of AI with web technologies to simulate human-like conversations. It combines a user-friendly interface with a powerful backend to deliver a lightweight, real-time chatbot suitable for academic and practical purposes.

The project meets its initial goals and offers opportunities for expansion into real-world applications, especially in the education and helpdesk sectors.

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14. GitHub Repository

- SmartChat GitHub Repository

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15. Team Members

- Patil Bhavesh Pravin
- Patil Kaushal Anandrao
- Tanksale Prathmesh Pandurang
- Nikam Akash Ravindra
- Javale Tushar Ashok

Mentor: Mr. S. D. Salunke