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Implementation of Web based Online Chat Application

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Abstract

Online chat applications have become essential communication tools, enabling real-time interaction across the globe. This research paper explores the development of an online chat application using HTML, CSS, and JavaScript. The study focuses on the fundamental technologies, including WebSockets for real-time messaging, frontend design principles for user-friendly interfaces, and backend integration for data storage and message retrieval. Security measures such as end-to-end encryption and user authentication are also discussed. The paper highlights challenges in scalability, data privacy, and user engagement while proposing solutions to enhance performance. The research aims to contribute to the development of efficient and secure chat applications suitable for various domains, including personal communication, customer support, and collaborative work environments. Chat application is a feature or a program on the Internet to communicate directly among Internet users who are online or who were equally using the internet. Chat applications allow users to communicate even though from a great distance. Therefore, this chat application must be real-time and multi-platform to be used by many users. This chat application in the manufacture begins with the collection of relevant data that will be displayed in the web and mobile versions of the research paper.

Keywords: HTML, CSS, JAVASCRIPT, Real Time Chat Application

1. Introduction

Chat applications have become an integral part of our day-to-day life and have had a significant impact on how we communicate with each other. With numerous chat applications available in the market, each offering unique features and capabilities, users are spoilt for choice. Companies that develop these applications compete with each other to add new features and improve the user experience with each release. This competition has led to the development of some of the world's top companies, generating high revenue and employing a large number of people. This project centers on the development of a chat application, designing to enhance communication. In the digital era, online chat applications have revolutionized communication by providing instant and seamless interactions across various platforms. These applications enable users to exchange messages, share multimedia, and collaborate in real-time, making them essential for both personal and professional use. The rapid growth of internet connectivity and advancements in web technologies has fueled the development of efficient and user-friendly chat applications. This research paper explores the design and implementation of an online chat application using HTML, CSS, and JavaScript. It examines key technologies such as Web Sockets for real-time communication, frontend frameworks for enhanced user experience, and backend

solutions for data management and security. Additionally, the paper discusses critical aspects such as user authentication, data encryption, and scalability challenges.

2. Literature Review

Literature review provides a comprehensive overview of the current state of knowledge and understanding in the field related to future research.

Sakshi Dosani, Shreya Pardhi, Deep Nikode, Anurag Jais , Ms. Archana Nikose, 2023.[1]developing a chat application using the MERN stack has been a challenging but rewarding experience. The use of MongoDB, Express, React, and Node.js. This application is being developed for real time communication.

Akshata Vhandale, Sayam Gandhak, Saundarya Karhale, Sandipkumar Prasad, Prof. Sudhesh Bachwani, 2022[2]. Create an instant messaging solution to enable users to seamlessly communicate with each other using MERN Stack. Project provides multi chatting functionality through network.

Gaurav Joshi, Jatin Bisht, Anurag CSE Department Krishna Engineering College Ghziabad U.P, India 2022.[3]. Developing the Chatting Application with Profanity Detection. This application only allows user data safety but doesn't allow the sharing of photos. This drawback is overcome in our project.

R. Gaytri and C. kalishwari International Journal of Engineering and Advanced Technology, June 2020.[4] Create a Multi user chat application using MERN Stack to enable user to communicate with each other. Allow both group chat and private chat. Ensure unlimited data transfer without any size limit. But does not allow the multimedia sharing

Sachin Bansal, Siddarth Dutt Sharma, Shahil Kumar Jha Sakshi Tomar, Roopali Pandey IIMT college of Engineering Greater Noida, India 2023.[5]. Create a real time chat application using MERN stack. Drawback of this project is that it does not support the multiple user. And not provide proper security.

3. Methodology

In our Online Chat Application we are using different methodology to create our project that is given below:

Websocket

In our project we are using a websockets. Websockets enable real-time bidirectional communication between a client (browser) and a server. Both the client and server can send messages simultaneously. It also provides security to user data.

We using websocket API with java to make server and using JavaScript in the client side to connect it with websocket. Websocket server defines endpoint. When user1 is connecting in chat with user2 that time websocket establish a connection between client and server show all the messages in chat box. When client is connect to websocket that time websocket method in run and the entire message from server show to the client. Similar when server is connect to websocket that time server can able to receive all message from the client side

MongoDB

MongoDB is a NoSQL document-based database that is widely used in real-time applications, including chat applications. That's why we choose MongoDB as a database to stores data in JSON-like documents.

- **For user's data collection**: we using MongoDB to collect all the data from user that includes username, email and password.
- **For message collection:** It is used to store messages include sender id, receiver id and their messages.
- **For backend Integration:** To integrate MongoDB with java in backend we using MongoDB Java Driver to store user message into the MongoDB database and also we used it to retrieve user's old chat.

Security and Encryption

For security purpose we are using AES-256 that is Advanced Encryption Standard -256 bit. It is used in our project to encrypt the message.

When user register or login in our chat application that time password is encrypt by AES-256 and after encryption of password it will saved in MongoDB database .when user login into the chat application That time this password will be decrypt. It also use in our project to encrypt and decrypt the messages. When user1 send the message that time this message is encrypt and saved in database and when the user2 receive the message it will be decrypt and show in the chat box.

Encryption: it convert the plain message of user into the encrypt by using AES-256 algorithms.

Decryption: It convert encrypted message into the original message

4. Result

4.1 Registration page:

This page is using for the registration of new user into the Chat Application

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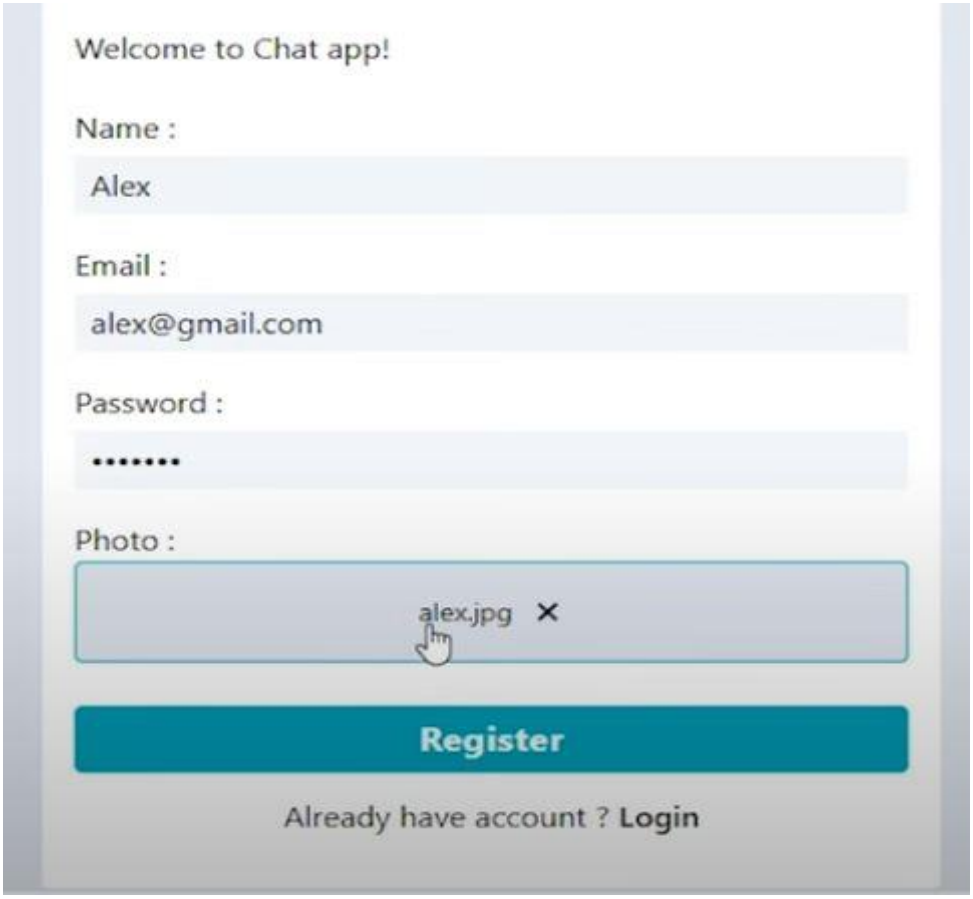
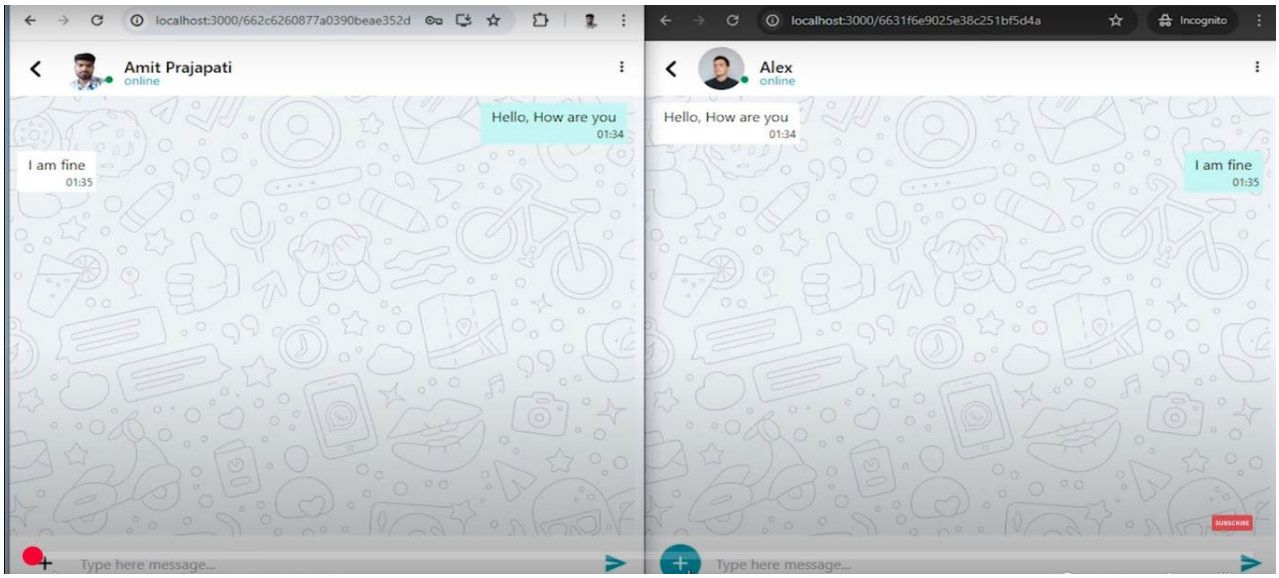


4.2 Private Chat

Two people can chat here with each other.



5. CONCLUSION

This research aimed to develop a secure and real-time online chat application using HTML, CSS, and JavaScript with WebSocket technology for instant communication. The study followed a structured development approach, including user authentication, real-time messaging, and security measures to ensure a seamless user experience. The implementation demonstrated that WebSockets provide efficient two-way communication, making the application highly responsive. Security enhancements, such as JWT-based authentication, password hashing, and message encryption, helped protect user data. The system was tested for performance, usability, and security vulnerabilities, confirming its reliability for real-world usage. In conclusion, this research successfully developed a functional and secure online chat application using fundamental web technologies. It provides a scalable foundation for future advancements in real-time communication platforms.

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