

Project Report

Full Stack Realtime Chat Application

1. Introduction

This report outlines the development and deployment of a Full Stack Realtime Chat Application. The project utilizes the MERN stack (MongoDB, Express.js, React.js, Node.js) in combination with Socket.io to deliver real-time messaging capabilities. The application focuses on performance, scalability, and user experience, making it suitable for modern communication needs.

2. Objective

The primary objective of this project is to build a secure and efficient chat application that supports real-time communication, user authentication, and live user status tracking, with a clean and responsive UI.

3. Technologies Used

- Frontend: React.js, TailwindCSS, Daisy UI
- Backend: Node.js, Express.js
- Database: MongoDB
- Real-time Communication: Socket.io
- Authentication: JWT (JSON Web Tokens)
- State Management: Zustand
- Cloud Storage: Cloudinary
- Deployment: Free hosting solutions (like Vercel, Render, or Railway)

4. Key Features

- User authentication and authorization using JWT
- Real-time chat functionality using Socket.io
- Live user status (online/offline)
- Secure media file uploads using Cloudinary
- Modern and responsive UI using TailwindCSS and Daisy UI
- Global state management using Zustand
- Efficient error handling on both client and server sides

5. Environment Setup (.env)

To configure the backend environment, the following variables should be added to the .env file:

```
MONGODB_URI=...  
PORT=5001
```

JWT_SECRET=...

CLOUDINARY_CLOUD_NAME=...

CLOUDINARY_API_KEY=...

CLOUDINARY_API_SECRET=...

NODE_ENV=development

6. Build and Run Instructions

To build the application:

npm run build

To start the application:

npm start

7. Conclusion

The Full Stack Realtime Chat Application successfully demonstrates the power of modern web technologies in building scalable and responsive applications. With real-time messaging, authentication, and seamless UI, this project serves as a strong foundation for future enhancements such as group chat, media sharing, and voice/video calling.