Chatrion:Safer Connection for Smarter Generation

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Abstract

In the modern world Social meadia platform play crucial role in our society.with a social media usage chatrion is designed to be simple, secure and scalable features like chat,profile,notification,videocall.

Chatrion is a next generation social media platform which leads to provide a safe, authenticated, and personalized digital platform where users can form mean- ingful interactions with complete trust. Chatrion guarantees community credibil- ity through real user verification using UIDAI-based Aadhaar authentication which eliminates fake accounts. Users can also engage in real time communication through video calls and messaging. Using AI technology, Chatrion social media implements cyber bullying and harassment monitoring and moderation tools that ban disal- lowed actions as well as an automatic protective mechanism specially for woman during video call.

Keywords: Digital communication,AI-Based Video calling,UIDAI-based Aadhaar authentication,safe and secure.

1 Introduction

A. Overview

Chatrion is a new social media platform created for simple interaction and sharing. Cha- trion allows users to communicate through chatting and sharing media and updates. This helps users express themselves while staying engaged and connected with friends.

Chatrion's strong security features sets it apart from its competitors. Chatrion elim- inates fake accounts and builds a trustworthy social platform using Aadhaar-based au- thentication. Such verification reduces risks like fraud and harassment greatly, as users can interact without the need to worry about the authenticity of the other user.

Chatrion also employs AI-powered moderation, cyberbullying, and other activities. Chatrion provide safer communication with other users so basically it will more helpful for women.

B. Key Impact Areas of chatrion

• **Authenticity:** Chatrion requires Aadhaar-based authentication, eliminating fake accounts. As a result, users have more comfort to know they are actually engaging with verified and real people.

• **AI power moderation:** Chatrion can use AI to monitor content in real-time, searching for inappropriate behaviour, cyberbullying.

• **secure video calling communication:** Chatrion offers high-quality video calling, complete with an automatic safety feature designed especially for women. This includes options for instant reporting.

- **Technology innovation:** Users can create posts to share their thoughts, images, or videos, and engage with others through reactions like likes and comments and users also can create their indevidual posts.
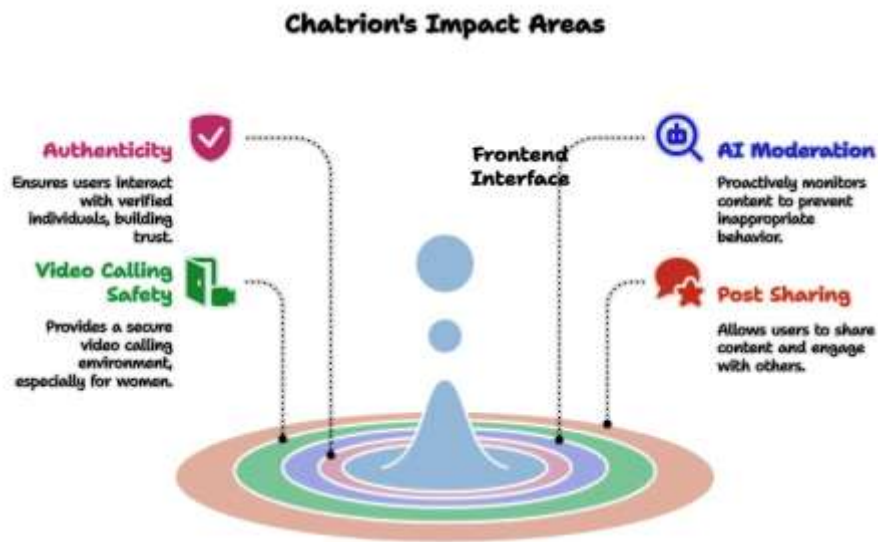

Figure 1: Impact area of chatrion

2   System Design and Architecture

A.   Technologies Used

- **Frontend Interface:** Built using React.js and Next.js for responsive UI. Integrated with WebRTC for real-time peer-to-peer communication.
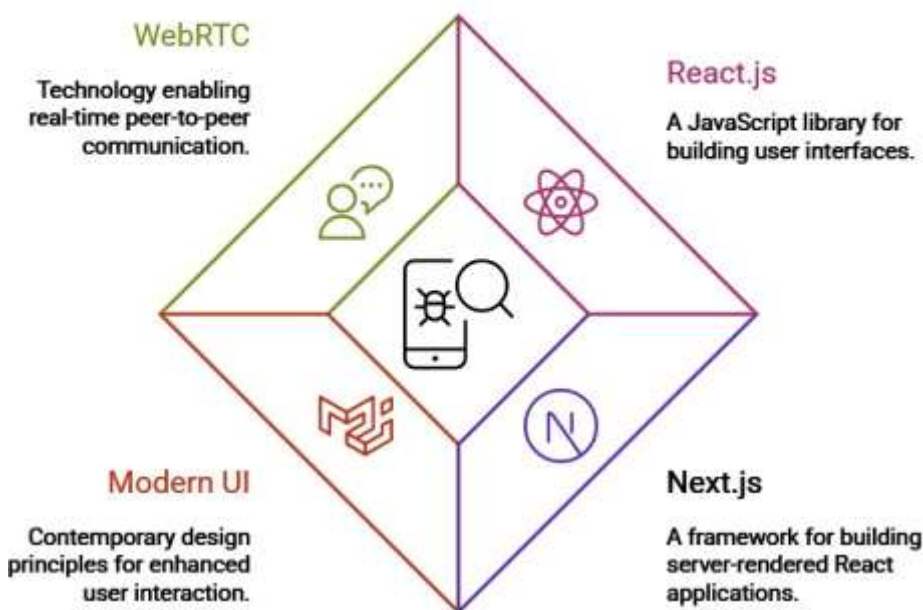

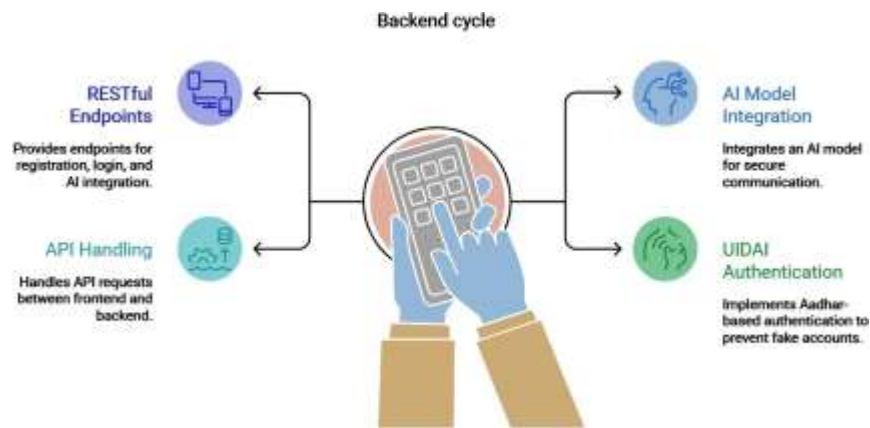Figure 2: Modern web development framework

Figure 3: Backend cycle

• **Backend Services:** Implemented in Express.js using JavaScript. Provides REST- ful endpoints for registration, login, AI integration, and Aadhaar-based authenti- cation.

• **Database and Cloud Storage:** MongoDB is used as the primary database to store user profiles, interests, and activities. We can write query and store data in JSON formate.Its NoSQL structure ensures flexibility and scalability.
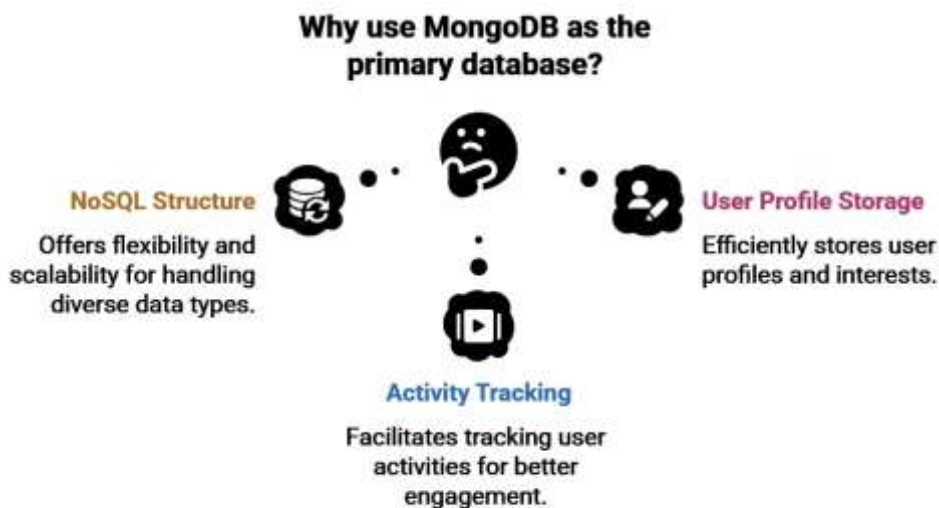

Figure 4: Database structure

• **AI Summarization Assistant:** Integrated machine learning model to monitor unauthorized activities like harassment during video calls, with special safety fea- tures for women.
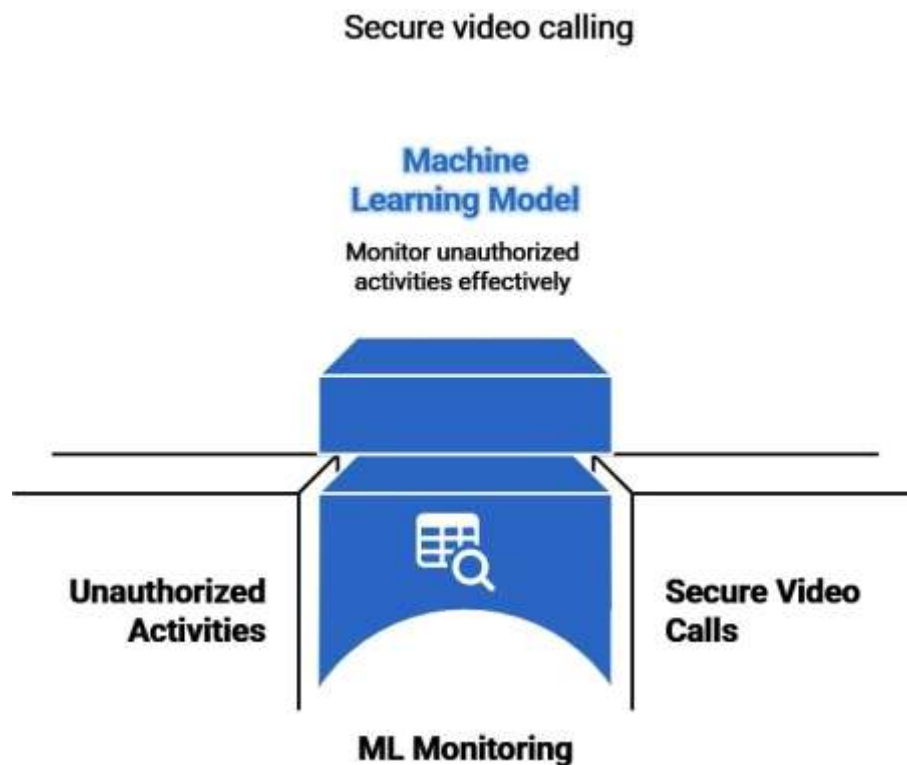
Figure 5: AI moderation model

• **Aadhar based authentication:** To check authenticity and verify the age of users, the platform integrates a mock Aadhaar-based authentication system. This method would verify the identity of users by matching the Aadhaar details at the time of registration.Another strong feature that the Aadhaar authentication enables is veri- fied communities, safe communication options, and parental controls, which further place our platform in a class apart from conventional social media applications.
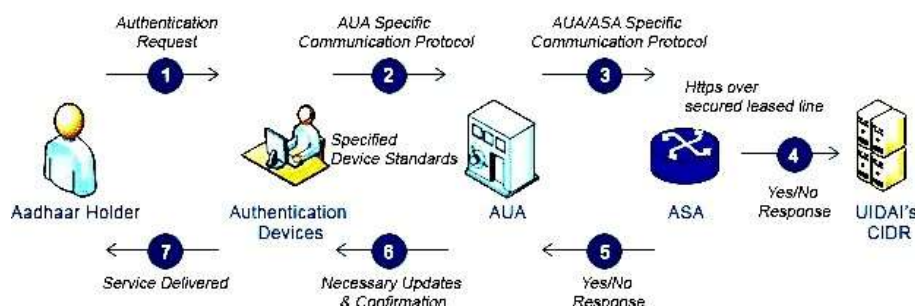

Figure 6: Aadhar authentication flow

B. Data Flow

The data flow in Chatrion explains how different components interact during user ac- tivity. When a user registers, Aadhaar-based authentication verifies their identity. User details and preferences are stored securely in MongoDB. During real-time communica- tion (chat or video call), data is transmitted via WebRTC while the backend ensures proper routing. AI modules continuously monitor interactions for harassment or unsafe behavior, triggering protective actions if required.
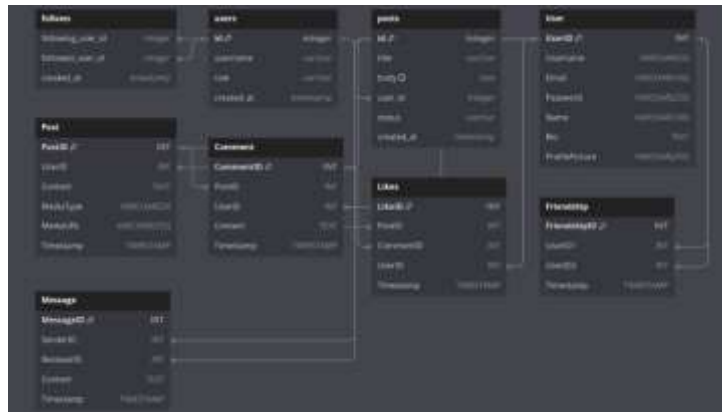
Figure 7: Overall data flow in Chatrion

3   Features and Functionalities

A.   **Aadhaar-Based Authentication :** Real-time conversion with support for accents and variable speeds.

B.   **Emotion Detection:** NLP-based detection of emotional tones (joy, stress, excite- ment, etc.).

C.   **Ask AI Feature:** Natural language interface to query and summarize stored voice notes.

D.   **Secure Cloud Synchronization:** Supabase ensures encrypted, cross-platform access with automatic backups.

E.   **User Authentication and Access Control:** Secure login via Supabase Auth with JWT tokens and role-based access.

F.   **Digital Diary Mode:** Stores reflections with emotion labels and timestamps for self-analysis.

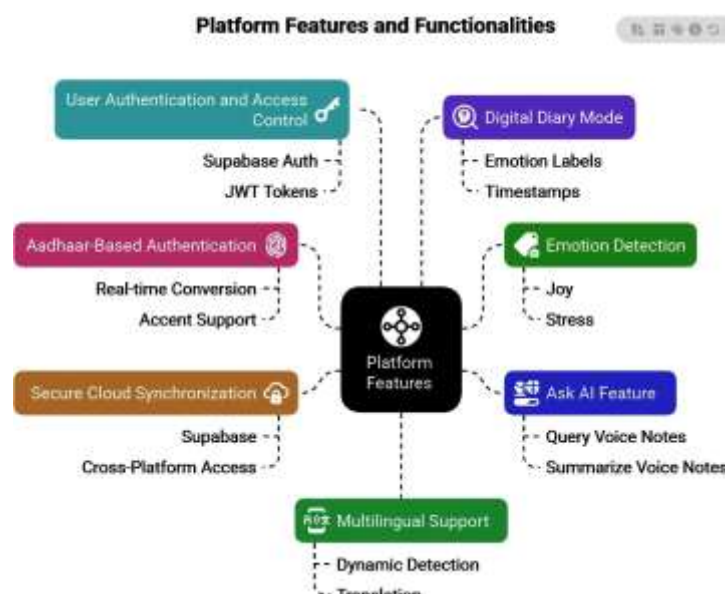G.   **Multilingual Support:** Supports multiple languages; future support for dynamic detection and translation.

Figure 8: feature and functionality

4   Real-Time Communication and Video Call in Cha- trion

A. Why Not Simple WebRTC?

WebRTC provides the peer-to-peer communication layer this will work only for one-to- one calls.With the help of mesh topology each user can participate with multiple user's connection.with the help of simple WebRTC it's difficult to monitoring and control qual- ity and real user data so to overcome this scenario we can take help of mediasoup. This is where media servers like Mediasoup become valuable. Mediasoup acts as a Selective Forwarding Unit (SFU). Instead of each client establishing multiple peer-to-peer connec- tions in a mesh, they establish a single connection to the Mediasoup server. Mediasoup then receives the media streams from each participant and selectively forwards them to   the other participants.
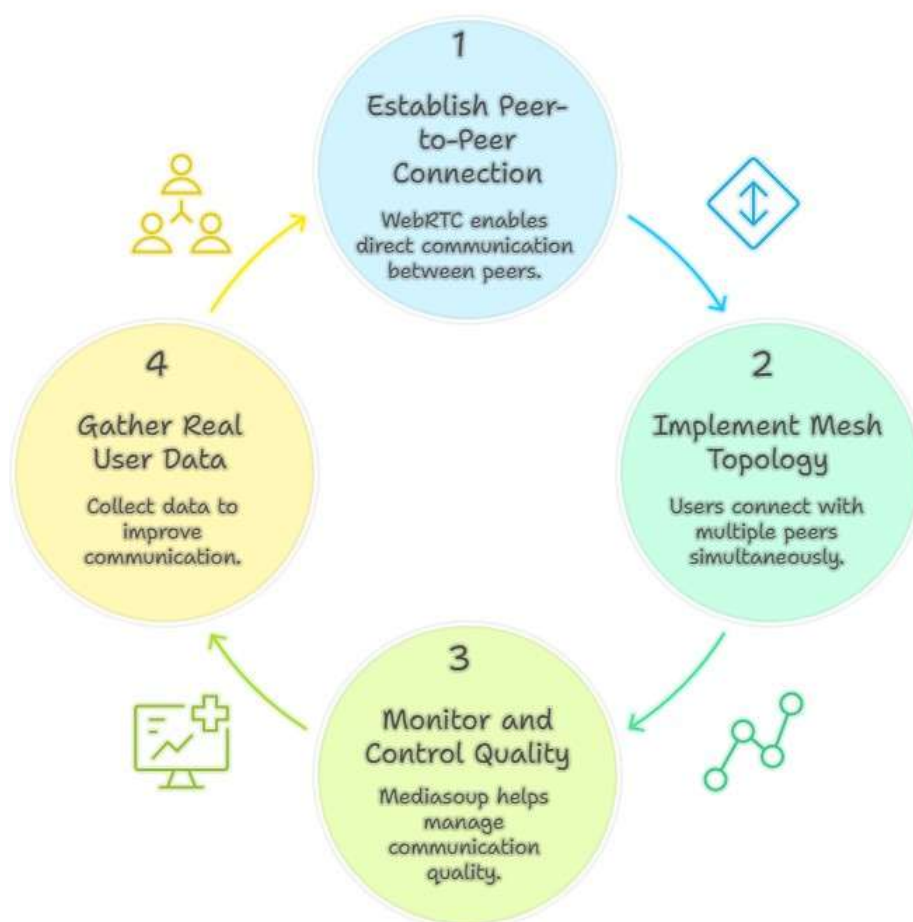

Figure 9: WebRtc communication Enhancing cycle

B. Why Mediasoup for Chatrion?

The reason for choosing Mediasoup is that it gives a flexible SFU implementation. It's full-fledged platforms such as Jitsi or Janus, Mediasoup allows developers to:

•   Decide what streams the server can send to each client.

•   Also focuses on how each client can communicte with server.

•   Monitor media statistics in real-time.

C. Media Topologies: Mesh vs SFU vs MCU

- **Mesh:** Each individual user connects directly to all others user. It is simple but it not handel more tahn 2-3 users.

- **SFU (Selective Forwarding Unit):**every user sends their media centralserver once then distribute to other users it is an approprivate manner for com- munication.It is more scalable and effective as compare to WebRtc.

- **MCU (Multipoint Control Unit):** This communication way havily lodes for server because server mixed all incoming and outging request from client side.

Figure 10: media communication architecture

D. Mediasoup Architecture and Monitoring

Mediasoup is a **Selective Forwarding Unit (SFU)** considered an audio/video stream- ing and capable of real-time streaming communication. It allows efficient routing of the media stream from/to different participants while allowing monitoring possibilities. With this in view, below are the backend integration and additional features provided by Mediasoup.

1. Mediasoup Architecture Integration with the Backend

1. **Clients connect through a signaling server:** Signaling is basically the exchange of metadata needed to establish WebRTC connections. This includes session de- scriptions (SDP), ICE candidates, and transport parameters. In principle, clients do not connect to Mediasoup directly but rather to the backend signaling server (via WebSocket/HTTP), which is responsible for authenticating users, managing rooms, and setting up streams.

2. **The server uses Mediasoup to create WebRTC transports:** Mediasoup acts as the SFU on the backend. After signaling, the server creates WebRTC producer and consumer transports. Producers are outgoing streams from clients while consumers are incoming streams from other participan.

5 Results and Observations

Chatrion has been successfully implemented as a secure, user-friendly social media plat- form for the modern generation. With Aadhaar-based verification and AI-powered mod- eration.
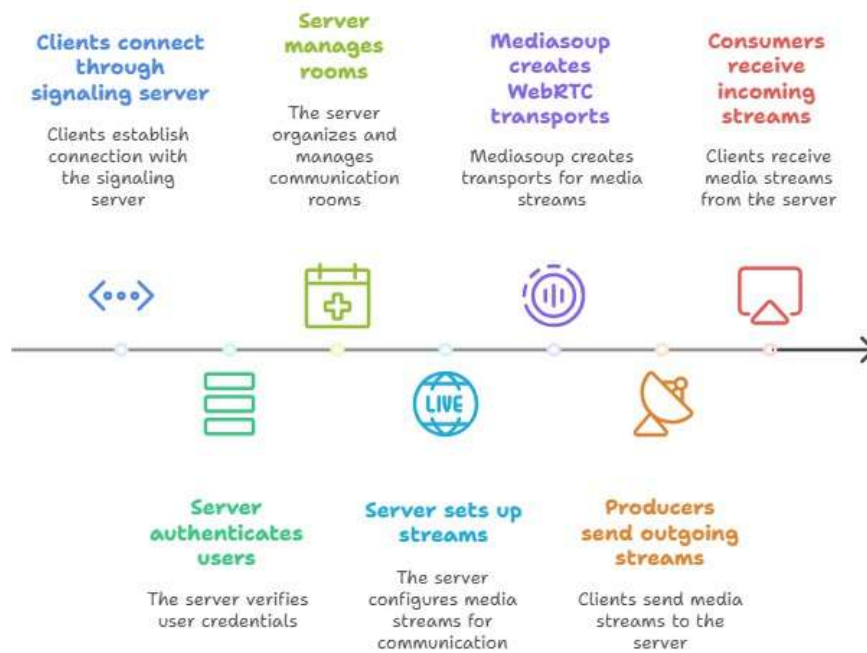
Figure 11: mediasoup Atchitecture and monitoring

6 Conclusion

Chatrion offers a secure and intelligent social media platform by integrating Aadhaar authentication, AI moderation, and real-time communication. It overcomes key issues of existing platforms and supports future technologies like blockchain and AR/VR. With its scalable and user-focused design, Chatrion sets a strong foundation for safe and mean- ingful digital interactions.

Acknowledgment

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