Controlled Anonymity Chat Platform

TEAM DETAILS

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Project Documentation

GITHUB REPO LINK: https://github.com/Uday5277/controlled-anon-chat

DEPLOYMENT URL: https://controlled-anon-chat.vercel.app/

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1. Introduction

Online anonymous chat platforms allow users to communicate freely but often suffer from misuse, fake identities, and unsafe interactions. At the same time, platforms with strict identity verification compromise user privacy.

The **Controlled Anonymity Chat Platform** solves this problem by providing:

- Anonymous chatting
- AI-based gender verification
- Controlled matchmaking
- Built-in moderation and safety mechanisms

Users remain anonymous while the system ensures verified and safer interactions.

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2. Problem Statement

Build a full-stack application that enables anonymous real-time chat between users while enforcing safety through verification, moderation, and controlled access.

The system must support:

- Onboarding without personal identity
- AI-based verification
- Profile setup
- Matchmaking
- Real-time chat
- Safety and moderation controls

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3. Objectives

- Provide anonymous yet verified chat experience
- Prevent misuse and fake identities
- Enable real-time communication
- Implement automated moderation
- Ensure scalability and low latency

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4. System Overview

The application consists of:

- **Frontend (React)** – User interface
- **Backend (FastAPI)** – Business logic & APIs

- **Redis** – Queues, matches, cooldowns, bans
- **WebSockets** – Real-time messaging

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5. Technology Stack

Frontend

- React.js
- HTML, CSS, JavaScript
- WebSocket API

Backend

- Python
- FastAPI
- Uvicorn / Gunicorn

Databases / Storage

- Redis (cloud) – Queue, sessions, bans
- LocalStorage – Device ID

AI / Image Processing

- Pillow (PIL)
- Base64 Encoding
- Lightweight image analysis

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6. Functional Modules

6.1 Onboarding

- Generates unique Device ID
- Registers user with backend

Endpoint:
POST /onboarding/init

6.2 AI Gender Verification

- User captures live photo
- Backend analyzes image
- Predicts gender (male/female)
- Image is discarded after processing

Endpoint:
POST /verify/gender

6.3 Profile Setup

- Nickname (2–20 characters)
- Short bio

Endpoint:
POST /profile/setup

6.4 Matchmaking System

- User selects preference (male/female/any)
- Enters queue
- Backend finds compatible match
- Stores active match in Redis

Endpoint:
POST /match/find

6.5 Queue Management

- Join queue
- Leave queue
- Prevent duplicate entries

Endpoints:
POST /queue/join
POST /queue/leave

6.6 Real-Time Chat

- WebSocket connection created after match
- Messages delivered instantly
- JSON-based protocol

WebSocket:
/ws?device_id=<id>

6.7 Safety & Moderation

- Report user
- Auto-ban after threshold
- Cooldown between matches

Endpoint:
POST /safety/check

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7. Application Flow

1. User opens website
2. Device ID generated
3. Camera opens
4. User captures image
5. AI verifies gender
6. User creates profile
7. User selects preference
8. User finds match
9. WebSocket chat starts
10. User may Leave / Next / Report

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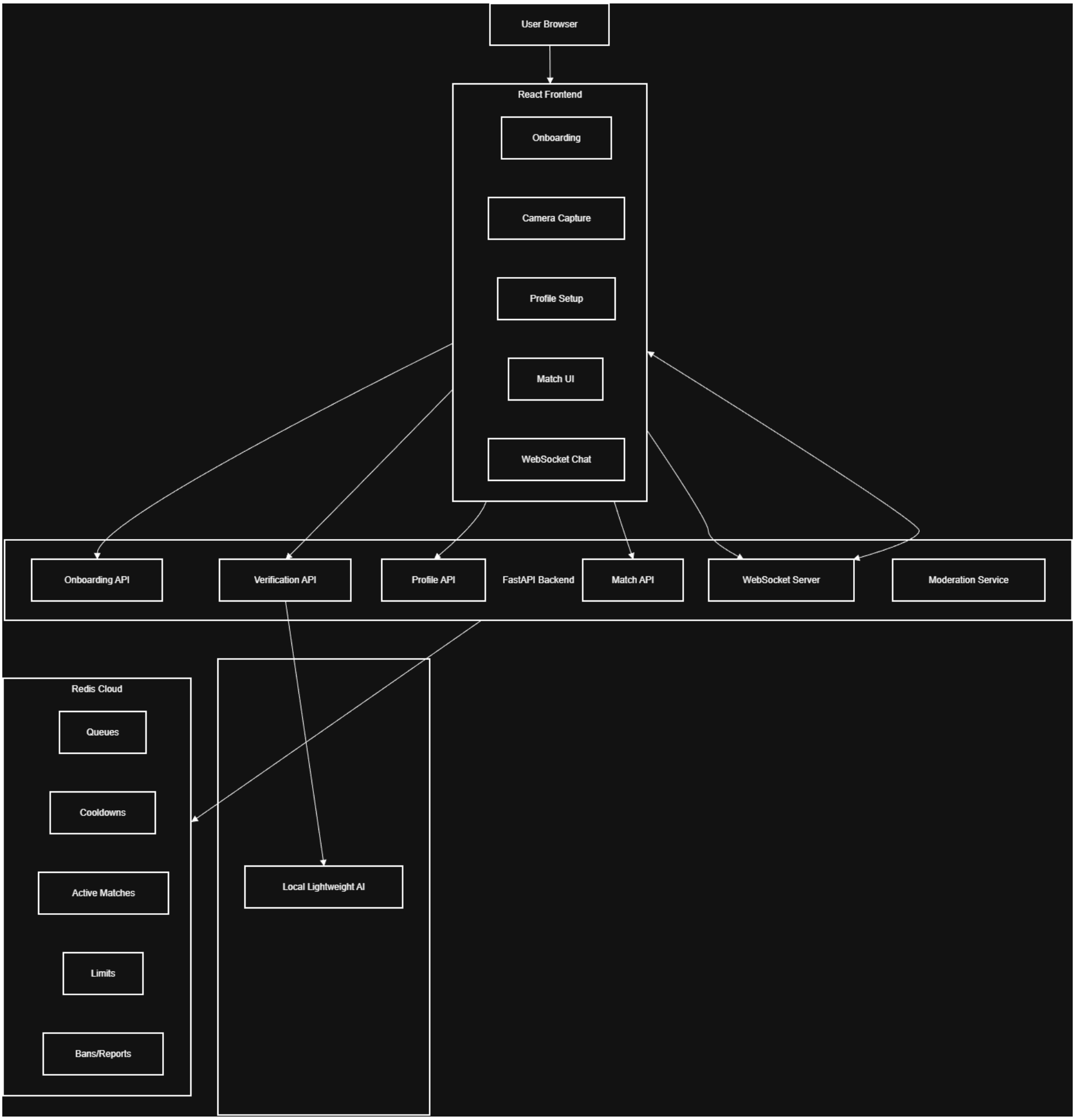
8. Architecture Diagram



9. Security Considerations

- No real identity stored
- Images discarded after verification
- Bans stored with expiry
- Rate limiting using cooldowns

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10. Performance Optimizations

- Redis in-memory operations
- WebSockets for real-time messaging
- Lightweight AI model
- Stateless backend

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11. Testing

- Two browsers used (Chrome & Edge)
- Verified onboarding
- Verified AI flow
- Verified matchmaking
- Verified chat delivery
- Verified reporting

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12. Deployment

Backend

- Hosted on Render
- HTTPS enabled

Frontend

- Hosted on Vercel

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13. Future Enhancements

- Voice chat
- Interest-based matching
- Better AI models
- User blocking
- Chat history encryption

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14. Conclusion

The Controlled Anonymity Chat Platform demonstrates how anonymity and safety can coexist. By combining AI verification, controlled matchmaking, and real-time communication, the platform provides a secure and scalable anonymous chat experience.