



# DAV INSTITUTE OF ENGINEERING AND TECHNOLOGY, PALAMU

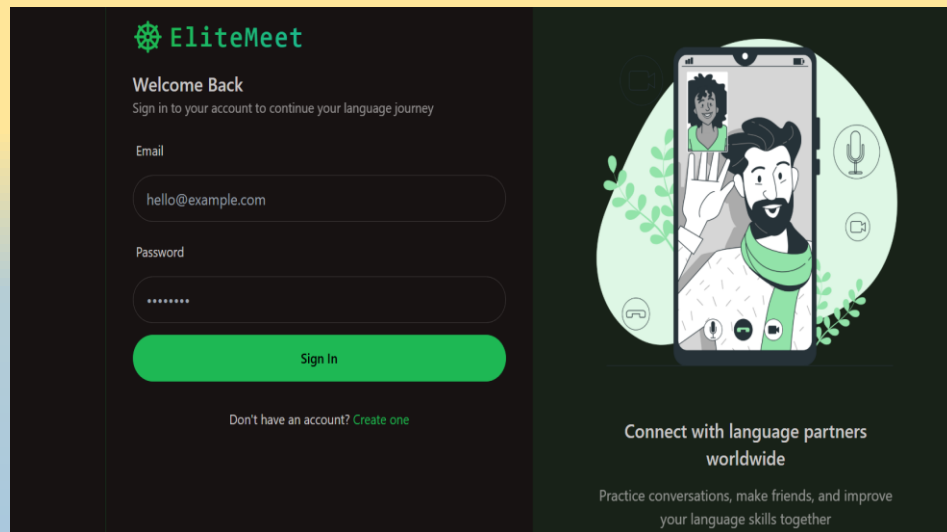
**ELITEMEET**

**B.Tech Final Year Project**

**Department of Computer Science  
Engineering**

**Submitted By: Group EndZone**

**Guided By: Mr. Vivek Sir**



# GROUP MEMBERS

1. Bablu Pandey (21020440006)
2. Dolly Gupta (21020440008)
3. Nitish Gupta (21020440018)
4. Kajal Kumari (21020440012)



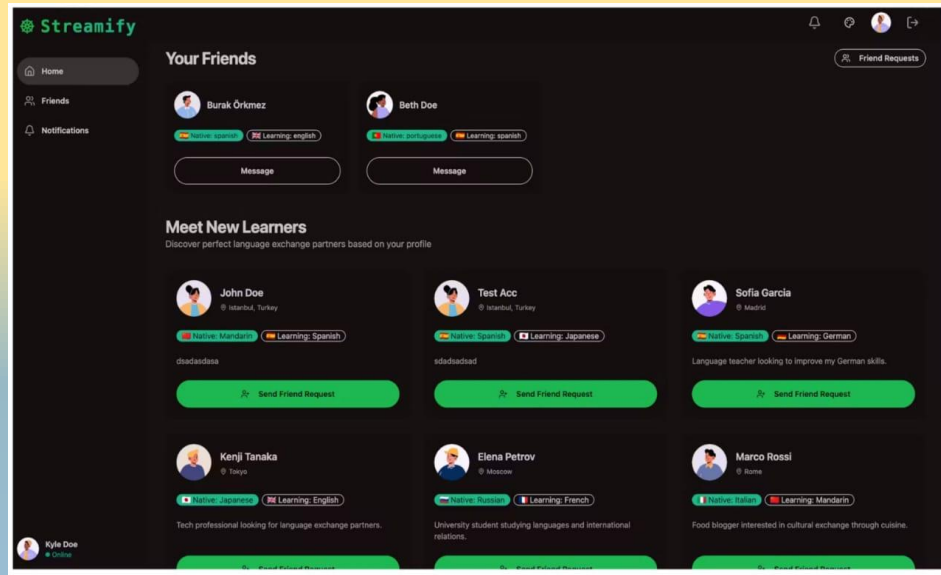
# OUR ESTEEMED FACULTY MEMBERS

1. **Mr. Vivek Sir**  
(HOD & Assistant Professor)
2. **Mr. Rahul Sir**  
(Assistant Professor)
3. **Mrs. Jyoti Mam**  
(Assistant Professor)



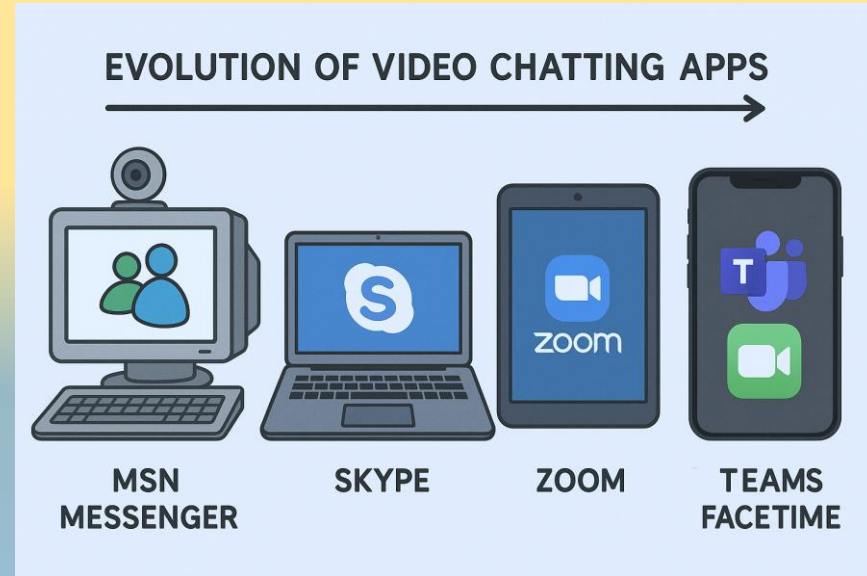
# INTRODUCTION

- Real-time one-on-one video communication via web browser.
- Built using MERN stack and WebRTC for seamless streaming.
- Secure login system with JWT-based user authentication.
- Language exchange support for cross-cultural interaction.
- Lightweight, responsive, and scalable communication solution.

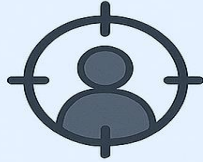


# EVOLUTION OF VIDEO CHAT APPS

- MSN Messenger kicked off the video chat revolution in the early 2000s.
- Skype made long-distance video calling accessible and popular worldwide.
- Apple's FaceTime brought smooth, native video calls to smartphones.
- Zoom rose as the remote work hero during the pandemic era.
- AI and AR are transforming modern video apps into smarter, immersive platforms.



# DESIGN PHILOSOPHY OF ELITEMEET



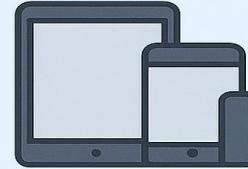
## USER-CENTERED DESIGN

Prioritized ease of use and intuitive navigation for all user types.



## MINIMALIST INTERFACE

Clean UI with focus on video feed and essential controls only.



## RESPONSIVE LAYOUT

Optimized for seamless use across desktops, tablets, and mobiles



## REAL-TIME FEEDBACK

Instant connection status, call alerts, and user availability updates

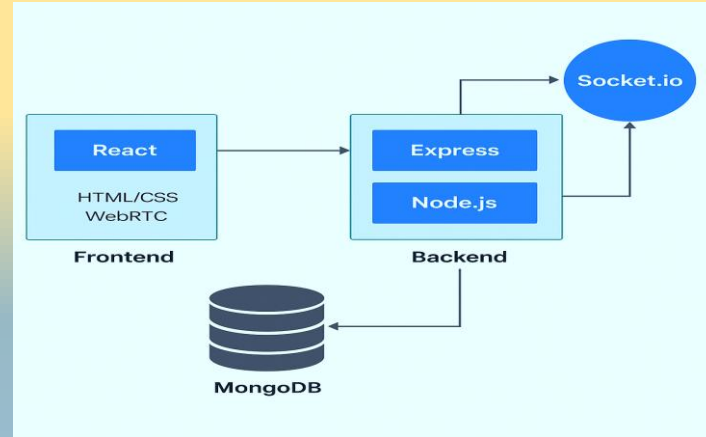


## SECURE BY DESIGN

JWT authentication and encrypted signaling to ensure user safety.

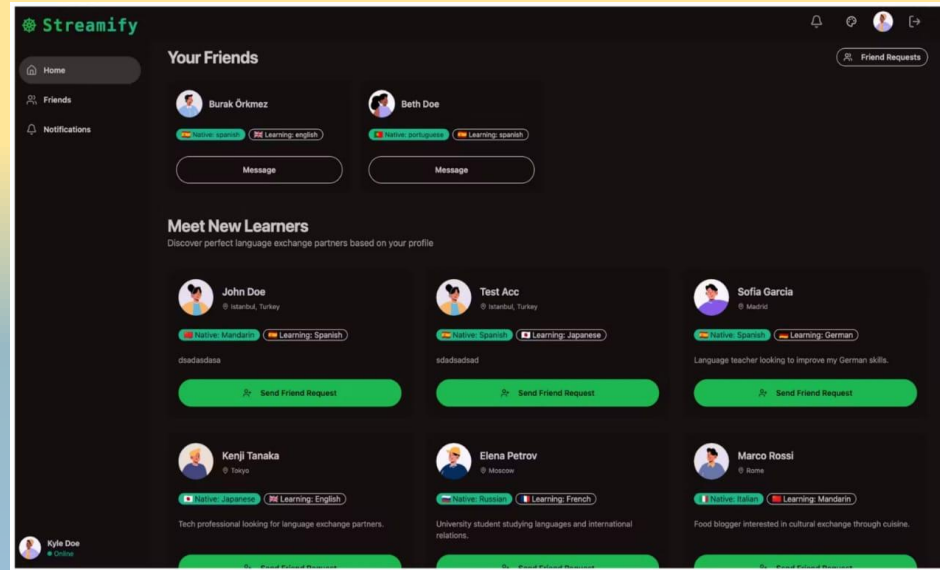
# SYSTEM ARCHITECTURE

- **Frontend (React.js):** Builds the user interface for video calls, chat, and user authentication.
- **Backend (Node.js + Express):** Handles API requests, signaling, and session control.
- **WebRTC Integration:** Enables real-time peer-to-peer video and audio communication.
- **MongoDB Database:** Stores user data, chat history, and authentication tokens securely.
- **Socket.IO:** Facilitates real-time communication and event broadcasting between users.



# USER INTERFACE DESIGN

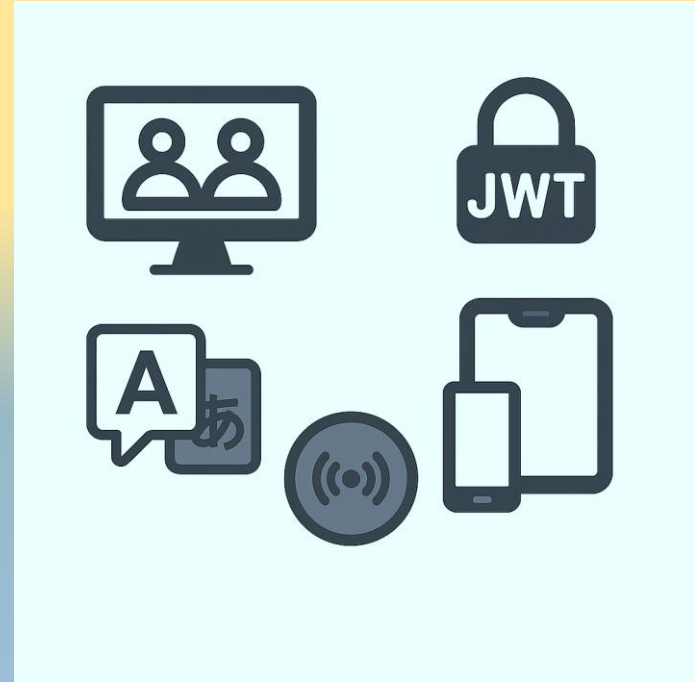
- Clear, distraction-free layout focused on active video stream.
- Floating call controls for easy access without blocking view.
- Color-coded call status indicators (connected, ringing, ended).
- Clean typography and intuitive icons for accessibility.
- Mobile-first responsive layout ensuring seamless interaction on all screens.





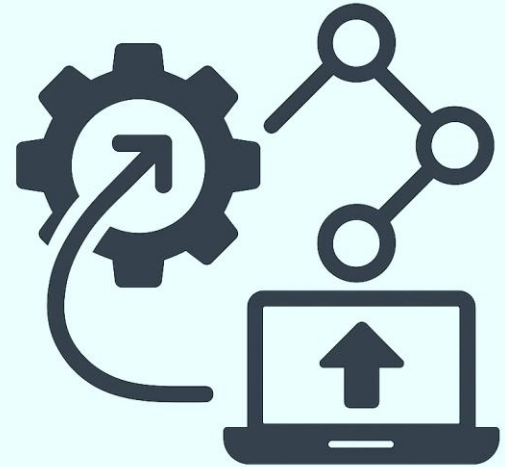
# CORE FEATURES

- **One-on-One Video Calls** – Real-time HD communication using WebRTC.
- **JWT Authentication** – Secure user login and session handling.
- **Language Exchange Mode** – Connect users based on language preferences.
- **Real-Time Signaling** – Fast call setup using Socket.IO.
- **Responsive UI** – Works smoothly across desktop and mobile devices.



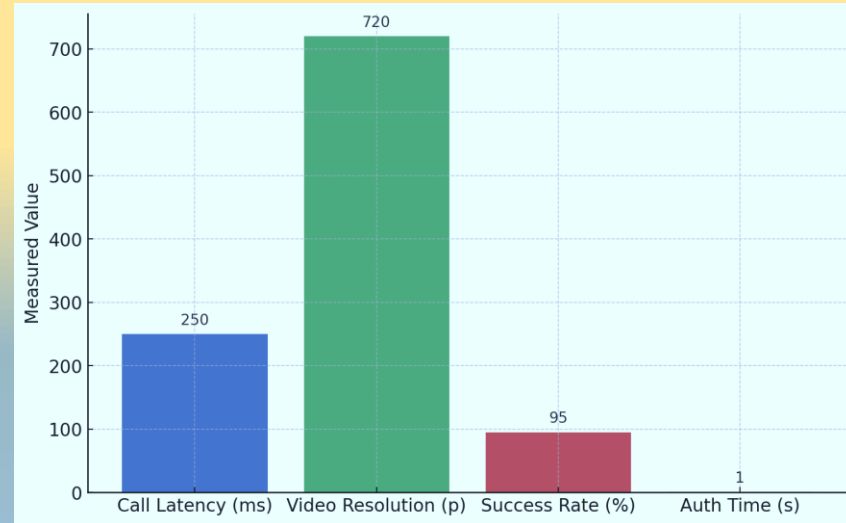
# INTEGRATION AND DEPLOYMENT

- **Frontend–Backend Integration** via REST APIs and WebSocket (Socket.IO) for real-time communication.
- **WebRTC Setup** integrated for peer-to-peer media exchange and STUN/TURN server configuration.
- **JWT Token Flow** connected across frontend, backend, and database for secure authentication.
- **MongoDB Atlas** used for cloud-based storage and easy integration with Node.js backend.
- **Deployed on Render/Vercel** with environment variables and CI/CD support for seamless updates.



# RESULT AND PERFORMANCE METRICS

- **Average Call Latency** maintained under 250ms on stable networks.
- **Video Quality** consistently achieved 720p resolution in peer-to-peer calls.
- **Connection Success Rate** of over 95% across multiple test sessions.
- **Cross-Browser Compatibility** verified on Chrome, Firefox, and Edge.
- **Authentication Time** under 1 second using JWT on all tested devices.



# CASE STUDIES AND APPLICATIONS



## **Language Learning Platforms**

Used for peer-to-peer language exchange sessions



## **Remote Interviews**

Enables secure and real-time communication between candidates and recruiters



## **Virtual Counseling**

Provides a safe space for therapists and clients to connect from anywhere



## **Customer Support**

Integrated into websites for face-to-face interaction with clients

# BENEFITS

- **Real-Time Communication:** Enables instant video and audio interaction across devices.
- **User-Friendly Interface:** Simplified UI enhances user experience and accessibility.
- **Secure Authentication:** JWT-based login ensures secure access to user sessions.
- **Scalable Architecture:** MERN stack allows easy scaling for future user growth.
- **Low Latency Streaming:** WebRTC ensures smooth and delay-free video calling.



# CHALLENGES AND LIMITATIONS

- **Network Dependency:** Video quality and call stability degrade on poor internet connections.
- **Scalability Constraints:** Handling multiple users simultaneously can strain server performance.
- **Security Challenges:** Ensuring end-to-end encryption and secure data transfer is complex.
- **Limited Features:** Lacks advanced options like call recording and group video support.
- **Browser Compatibility Issues:** Varying WebRTC support affects cross-platform consistency.



# FUTURE SCOPE

- **Mobile App Development:** Extend support to Android and iOS platforms for broader reach.
- **Group Video Calling:** Enable multi-user conferencing with dynamic screen layouts.
- **Call Recording Feature:** Allow users to record and save video calls securely.
- **AI-Powered Features:** Integrate real-time translation, noise suppression, and facial filters.
- **Cloud Scalability:** Shift to cloud infrastructure (e.g., AWS, Azure) for better performance and global access.



# CONCLUSION

- Developed a real-time video chat app using the MERN stack and WebRTC.
- Ensured secure communication with JWT authentication and encrypted media streams.
- Achieved seamless one-on-one video calling with low latency.
- Gained practical experience in full-stack and real-time application development.
- Laid a strong foundation for future enhancements like group calls and mobile support.





**THANK YOU!**