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YOOM-Online Video Conferencing Website for AICTE

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ABSTRACT: Online Video Conferencing seek to create a special online meeting system for AICTE to ensure that it enjoys efficient means to fulfill virtual meetings. Web site of the platform is written in JavaScript, HTML and CSS for video and audio calls in real time. The features identified herein are base components of the system which may consist of chat functionality among others and user authentication for secure and effective interactions. The system is accessibility to the members of AICTE and well organized so that it will suit the desires of AICTE members.

KEYWORDS: Video Conferencing Virtual Meetings Real-Time Communication Chat and Messaging Integration User Experience (UX)

I. INTRODUCTION

The Yoom project is a online video conferencing application aimed at fulfilling the demand of real-time and 'compatible' application with growth factor. Developed with the technologies applied as Next.js, React, TypeScript, and Tailwind CSS with Stream SDK for trendy video and audio call. Yoom also guarantees durability and sensitivity on the performance. Clerk is used for safe user identity recognition. The system architecture used herein integrates server side- rendering and real-time communication technologies to support performance and scalability of video conferencing across various settings.

II. LITERATURE SURVEY

2.1 Current Video Conferencing Systems

Zoom, Microsoft Teams, Google Meet: Discuss their properties, appearance, and protection of the user's personal information.

Open Source Solutions: Check out Jitsi Meet and BigBlueButton to get some information on how it is possible to adjust and expand.

2.2 Technologies and Frameworks

WebRTC: CRITICAL for real time communications Web applications. You can do and send video, voice and generic data with the help of this technique to anybody.

JavaScript Libraries: Check out a few libraries such as PeerJS and SimpleWebRTC that help on WebRTC integration.

Backend Integration: Think about how users can authenticate themselves and how data is to be managed, using backend technologies.

2.3 Security and Privacy

Encryption: One way to guarantee protection of the privacy of the individuals involved in a communication is to apply end-to-end encryption.

User Authentication: Ensure that there is strong measure of authentication in the system – possibly OAuth or JWT.

Data Privacy: Abide Information Security regulations such as the GDPR.

2.4 Usability and ADA Accessibility

UI/UX Design: Emphasis on those principles of design that will improve the user experience.

Accessibility: The platform must be available for the users with disabilities, according to the WCAG guidelines.

2.5 Forms of Students' Work: Case Studies and Research Papers

Educational Use: Research articles on the implementation of video conferencing in learning environments to identify problems and their possible remedies.

Technological Limitations: Analyse current opportunities and threats in the global market of teleconferencing, and learn about modern approaches and solutions to the problem.

2.6 Implementation and Testing

Prototyping: Design a model to check the primary facilities.

User Feedback: Consult potential users to get the data for improving the system.

By convening these areas, it will be possible to pull together a coherent, comprehensive survey of the literature that should serve as the foundation for creating an optimal system for online video conferencing within AICTE.

III. RESEARCH METHODOLOGY

Requirement Analysis:

- **Objective:** Identify user needs for real-time video conferencing (scalability, security, performance).
- **Data Collection:** Market research, user surveys, technical specifications for video conferencing platforms.
- **Technology Selection:** Technologies evaluated based on scalability, ease of integration, and security.
- **Tools:** Next.js, React, Stream SDK, Clerk, Tailwind CSS, TypeScript.
- **System Design Architecture:** Client-server model using Next.js for SSR and Stream SDK for real-time communication.
- **Development & Implementation ::** Agile methodology for iterative development.
- **Frontend:** React components, Tailwind CSS for responsive design.
- **Backend:** Stream SDK for video calls, Clerk for authentication.

Testing & Validation:

- **Performance Tests:** Latency, bandwidth, and user load testing.
- **Security Tests:** Authentication robustness and data encryption validation.

Deployment & Monitoring:

- **Deployment Tools:** CI/CD pipelines to automate deployment.
- **Monitoring:** Tracking scalability and user behavior through analytics.

IV. THEORY AND CALCULATION

Theory:

Scalability: The project is designed to scale based on the number of concurrent users, ensuring that performance remains consistent.

Real-Time Communication: Utilizes WebRTC for peer-to-peer connections, allowing direct data transfer between users, minimizing latency and improving the quality of video calls.

Security: Implements encryption protocols for data protection, ensuring that user sessions and communications are secure from unauthorized access.

Calculations:

1. **Load Testing :**
 - a. Simulating user loads (e.g., 100, 500, 1000 users) to measure response times and server performance metrics (e.g., latency, throughput).
2. **Data Encryption :**
 - a. Analyzing the overhead introduced by encryption algorithms to ensure that performance remains optimal while maintaining security.
3. **Bandwidth Usage:** Calculating the average bandwidth required per user during video calls to ensure the infrastructure can handle peak usage:

Total Bandwidth=Number of Users × Average Bandwidth per User.

This combination of theoretical understanding and practical calculations ensures that the Yoom project is efficient, scalable, and secure for users.

V. RESULTS AND DISCUSSION

The Yoom project successfully integrates modern technologies like **Next.js**, **React**, **TypeScript**, and **Tailwind CSS** to create a scalable and secure video conferencing application.

Key Findings:

1. **Scalability:** Calculations demonstrated that the system can handle increased user loads efficiently, maintaining performance even at maximum capacity.
2. **Real-Time Communication:** Utilizing **Stream SDK** and **WebRTC** facilitated low-latency interactions, enhancing user experience.
3. **Security:** Implemented encryption protocols through **Clerk** ensure data integrity and user privacy.
4. **Stream SDK** is a powerful toolkit for integrating real-time video and audio communication into applications. It simplifies the implementation of features like video calls, chat, and screen sharing.
5. **WebRTC** (Web Real-Time Communication) is an open-source project that enables peer-to-peer audio and video sharing directly between browsers. It provides the underlying protocols for low-latency communication, essential for real-time interactions in applications like Yoom.

Discussion:

The combination of these tools and methodologies provides a robust framework for future enhancements and scalability, addressing the growing demand for remote communication solutions. Further research could explore advanced features, such as AI-driven analytics for user engagement and performance optimization.

Key Points to Remember:

- └ **Stream SDK:** Simplifies integration of real-time video/audio communication; supports features like video calls and screen sharing.
- └ **WebRTC** : Open-source technology enabling peer-to-peer audio and video sharing directly between browsers; ensures low-latency communication.
- └ **Scalability:** Both technologies help the application handle increasing user loads efficiently without degrading performance.
- └ **Security:** Implement robust encryption to protect user data and maintain privacy during communications.
- └ **User Experience:** Focus on seamless interactions for improved engagement and satisfaction.

Future Scope:

1.AI-Powered Attendance:

Implement AI to automatically record attendance by recognizing participants through video or audio input, ensuring accuracy without manual intervention.

2.Participant Data Analysis:

Use AI to analyze participant engagement, providing detailed insights on attention levels, participation frequency, and interaction patterns during meetings.

3.Smart Meeting Summaries:

Integrate AI to generate concise meeting summaries, highlighting key points and action items for easy reference post-meeting.

4.Enhanced Security with AI:

Use AI-driven security measures to detect and prevent unauthorized access, ensuring the platform remains secure and reliable for users.

VI. CONCLUSION

In conclusion, the development of YOOM, a dedicated video conferencing platform for AICTE, has been successfully completed, fulfilling both fundamental and advanced requirements. The platform integrates key features such as secure user authentication, real-time meeting functionalities, and tools for recording and participant management. Designed to

streamline virtual collaboration, YOOM enhances the efficiency of educators and administrators. With its user-friendly interface and responsive design, YOOM significantly simplifies the process of organizing and conducting virtual meetings.

For the yoom project, the setup and organization of the development environment, including frontend, backend, testing, deployment, and maintenance processes, ensure a structured and scalable framework for continued development. With clear formatting guidelines, streamlined CI/CD integration, and robust testing strategies, the project is well-positioned for consistent updates, efficient deployment, and long-term maintenance. By adhering to these practices, yoom aims to maintain high code quality, seamless collaboration, and efficient growth, while minimizing potential risks during deployment and future updates.

REFERENCES

- [1] "AICTE Video Conference," International Research Journal of Modern Engineering and Technology Studies (IRJMETS), 2023.
- [2] "Design and Develop an Online Meeting Platform for AICTE," International Advanced Research Journal in Science, Engineering and Technology (IARJSET), 2024.
- [3]. Thakker, S. V., Parab, J., & Kaisare, S. (2021). Systematic research of e-learning platforms for solving challenges faced by Indian engineering students Asian Association of Open Universities Journal, 5(1), 1- 10
- [4]. Smith, J. R., & Lee, H. (2020). User Experience and Satisfaction in Virtual Meetings. Journal of Human- Computer Interaction, 36(2), 123-138.



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