PRESIDENCY UNIVERSITY
Private University Estd. in Karnataka State by Act No. 41 of 2013
Itgalpura, Rajankunte, Yelahanka, Bengaluru – 560064

A SECURE AND PERSONALIZED ONLINE MEETING SYSTEM FOR AICTE

A PROJECT REPORT

Submitted by

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PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

Certified that this report "A Secure And Presonalized Online Meeting System For AICTE" is a Bonafide work of "CHILMAKURI VARUN (20221CSE0116),ABHISHEK MUTHANNA K(20221CSE0110), AMARA HEMA HARSHITH (20221CSE0010)",who have successfully carried out the project work and submitted the report for partial fulfilment of the requirements for the award of the degree of BACHELOR OF TECHNOLOGY in COMPUTER SCIENCE AND ENGINEERING during 2025-26.

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DECLARATION

We the students of final year B.Tech in COMPUTER SCIENCE ENGINEERING at Presidency University, Bengaluru, named CHILMAKURI VARUN, ABHISHEK MUTHANNA K , AMARA HEMA HARSHITH, hereby declare that the project work titled **"A Secure and Personalized Online Meeting System for AICTE"** has been independently carried out by us and submitted in partial fulfillment for the award of the degree of B.Tech in COMPUTER SCIENCE AND ENGINEERING, during the academic year of 2025-26. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

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ABSTRACT

The rapid digitalization of academic governance in India has highlighted the need for a secure, sovereign, and institutionally controlled online meeting platform tailored for regulatory bodies such as the All India Council for Technical Education (AICTE). Existing commercial meeting solutions, while feature-rich, lack essential capabilities such as tamper- proof audit trails, strict role-based confidentiality enforcement, India-region data localization, and compliance with the Digital Personal Data Protection (DPDP) Act, 2023. This project proposes and implements a Secure and Personalized Online Meeting System designed specifically to address these requirements by integrating modern real-time communication technologies with decentralized audit mechanisms.

The platform leverages WebRTC for encrypted peer-to-peer audio, video, and data transmission, supported by STUN/TURN servers to enable reliable connectivity across diverse network conditions. User authentication, session authorization, and meeting-level access restrictions are enforced through Supabase Authentication and PostgreSQL Row- Level Security (RLS), ensuring fine-grained control over participant privileges. To guarantee institutional transparency and trust, all critical system events—including join/leave actions, role escalations, file exchanges, and moderator interventions—are canonicalized, hashed, and immutably anchored on a Hyperledger Fabric permissioned blockchain network. This ensures evidence-grade, tamper-resistant logs suitable for regulatory and administrative scrutiny.

The architecture includes a React-based frontend engineered for performance and accessibility, a low-latency signaling layer built on Supabase Realtime, and a backend orchestration tier responsible for cryptographic hashing, chaincode invocation, compliance enforcement, and event-management functions. SFU-based media routing is integrated to support multi-participant meetings, providing dynamic stream forwarding, bandwidth optimization, and load balancing without compromising security. Extensive evaluation under varied network scenarios—including symmetric NATs, constrained bandwidth, high jitter, and packet loss—demonstrates that the system achieves stable negotiation, preserves media integrity, and maintains acceptable latency across all tested environments.

Beyond communication reliability, the system incorporates institution-specific governance features that commercial platforms often overlook. These include hierarchical role definitions mapped to academic designations, controlled access workflows for accreditation panels, dynamic meeting classification (public, restricted, confidential), and automated generation of cryptographically verifiable audit summaries. Compliance mechanisms aligned with the DPDP Act ensure lawful processing of personal data, while secure storage practices and RLS policies prevent unauthorized cross-institutional access, thereby supporting India's digital sovereignty objectives.

In summary, the proposed system bridges critical gaps in security, compliance, audit transparency, and institutional control, delivering a solution purpose-built for AICTE's governance workflows. The integration of real-time communication, secure authentication, decentralized audit logging, and compliance-aware backend logic establishes a robust foundation for future nationwide deployment. With further enhancements such as AI-driven reporting, integration with national digital public infrastructure, and large-scale server-side media optimization, the system holds the potential to become a standardized communication framework for India's educational regulatory ecosystem.