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Live Meeting Scribe: Transforming Meetings with Real-time Live Transcriptions

1st DrA Karunamurthy[1], 2nd M Gayathri [r2]
[1]Associate Professor, Department of computer Applications, Sri Manakula Vinayagar Engineering College (Autonomous), Puducherry 605008, India
karunamurthy26@gmail.com
[2]Post Graduate student, Department of computer Applications, Sri Manakula Vinayagar Engineering College (Autonomous), Puducherry 605008, India
gayuravi2002@gmail.com

ABSTRACT: In the modern era of remote collaboration and hybrid work environments, accurate documentation of meetings is more critical than ever. Live Meeting Scribe is an intelligent mobile application designed to automate the transcription of live meetings, providing real-time speech-to-text conversion, mood detection, and smart time-stamping features.

The system captures spoken content, transcribes it accurately into text, and detects the emotional tone of the speaker to enrich meeting records with context. Each entry is saved with an automatically generated date and time, ensuring chronological clarity. By combining Natural Language Processing (NLP), sentiment analysis, and speech recognition technologies, Live Meeting Scribe enhances meeting documentation, supports post-meeting reviews, and improves team collaboration and transparency.It aids in improving team communication, accountability, and productivity by providing accurate and contextual meeting summaries.

Future enhancements may include speaker identification, keyword highlighting, multi-language support, and integration with popular video conferencing platforms. By streamlining documentation and enriching transcripts with emotional cues, Live Meeting Scribe bridges the gap between traditional meeting notes and intelligent, data-driven communication tools.

KEYWORDS: Mobile application, Speech-to-text, Mood detection, User Profile, Smart time-stamping, Meeting Records, Communication.

1. INTRODUCTION

In today's fast-paced and distributed work environments, accurate and contextual documentation of meetings is essential for maintaining team alignment, accountability, and productivity. Live Meeting Scribe is a mobile application developed to automate the transcription of live meetings while enriching them with emotional and chronological context. The application uses real-time speech-to-text conversion, sentiment analysis, and smart time-stamping to create comprehensive and structured meeting summaries. By integrating these intelligent features, Live Meeting Scribe eliminates the need for manual note-taking, reduces the risk of miscommunication, and ensures that no critical information is lost during discussions. The project is built using Flutter and Dart, enabling cross-platform compatibility and a seamless user interface experience across Android and iOS devices. Firebase has been used as the backend for real-time data storage, user authentication, and cloud synchronization, ensuring that all transcriptions and user data are securely managed and instantly available. This technology stack not only accelerates development and deployment but also provides scalability and performance necessary for real-time applications. The use of Firebase Cloud Fire store supports structured data storage, while Firebase Authentication ensures secure access and user management

The main aim of Live Meeting Scribe is to improve post-meeting productivity and communication by providing accurate, accessible, and context-aware meeting records. It empowers users to revisit meeting highlights, analyze emotional tones for better understanding of team dynamics, and maintain organized archives with automatic time-stamping. In the future, the app is expected to expand its capabilities by introducing features such as speaker identification, keyword-based search, multi-language support.

Live Meeting Scribe emerges as a solution tailored for the growing demand for efficient, intelligent, and automated meeting documentation in today's hybrid and remote working environments. Designed with usability and performance in mind, the application goes beyond traditional transcription tools by integrating real-time audio processing, mood detection, and structured data storage into a single unified platform. By leveraging advanced speech recognition technologies and Natural Language Processing (NLP), it converts spoken words into text with high accuracy while also capturing the emotional tone of speakers adding a valuable layer of insight to meeting records. This emotional annotation can help users better understand the sentiment behind decisions or discussions, fostering improved communication and empathy within teams. The application's architecture, built on Flutter and Dart, ensures consistency in user experience across multiple platforms, while Firebase provides a secure, scalable, and responsive backend infrastructure. With real-time syncing, instant saving of transcripts, and features like download, share, and search.

2. LITERATURE SURVEY

The development of Live Meeting Scribe is informed by several key studies in the fields of real-time transcription, speech recognition, and emotional analysis.

Anderson and Liu (2021) [1], in their study *"Real-Time Speech Recognition for Mobile Applications"*, emphasize the significance of integrating lightweight, cloud-assisted speech-to-text engines for mobile platforms. Their findings support Live Meeting Scribe's architecture that uses efficient APIs and cloud services to enable real-time transcription with minimal latency.

Martínez and Zhou (2022) [2], in *"Sentiment Detection in Spoken Conversations Using NLP"*, explore techniques for detecting emotional tones in live audio streams. Their approach to using tone modulation and word patterns to infer speaker sentiment directly influences the emotion-detection module in Live Meeting Scribe.

Nguyen and Das (2020) [3], in their paper *"User-Centered Design in Voice-Driven Applications"*, stress the importance of intuitive UI/UX when dealing with real-time data. Their research highlights the need for seamless interaction between speech input and transcription output principles that guide the app's user-friendly interface.

Singh and Kaur (2021) [4], in *"Smart Time-Stamping and Speech Segmentation for Meeting Summarization"*, discuss intelligent time-labeling techniques that improve transcript readability. Live Meeting Scribe incorporates similar timestamping strategies to segment meetings chronologically and provide context.

Chowdhury and Mehta (2023) [5], in *"Secure Cloud Storage and Access for Voice Data Applications"*, focus on ensuring secure, scalable storage for sensitive audio and text data. Their recommendations for using platforms like Firebase Firestore and encrypted storage methods directly inform the backend data handling and security in Live Meeting Scribe.

3. PROPOSED SYSTEM

The proposed system, Live Meeting Scribe, aims to provide an intelligent and automated solution for capturing, transcribing, and contextualizing live meetings in real time. It leverages cutting-edge technologies such as speech recognition, natural language processing (NLP), and sentiment analysis to convert spoken content into accurate text while simultaneously identifying the emotional tone of the speaker. The application is designed for mobile platforms using Flutter and Dart, ensuring cross-platform compatibility and delivering a seamless user experience. Firebase services are employed for backend operations, including real-time database management with Firestore, user authentication, and cloud synchronization. The system architecture supports live meeting sessions where audio is processed into readable text, enriched with timestamps and emotion tags for improved clarity and context. Users can view, edit, save, download, and share their transcriptions, which are automatically stored with relevant metadata such as date, time, and speaker labels. Additionally, the system includes features like a searchable archive of previous meetings, user profile management, and logout options for security. For future scalability, the system is modular in design, allowing easy integration of advanced features such as speaker identification, keyword highlighting, multi-language transcription, and integration with platforms like Zoom and Google Meet. Overall, the proposed system addresses the limitations of manual note-taking and traditional meeting documentation by offering a smarter, faster, and more accurate solution for modern teams and professionals. For backend functionality, the system uses **Firebase Fire store** as its primary cloud database, supporting real-time data synchronization and efficient storage of transcripts, user data, and meeting metadata. **Firebase Authentication** is used to manage user accounts securely, supporting various sign-in options such as email/password and third-party logins. All communication between the app and Firebase is encrypted to ensure user privacy and data integrity. The proposed system addresses the common challenges of meeting documentation by offering a centralized, secure, and easy-to-use solution. With built-in search functionality, users can quickly locate past meeting transcripts or filter by keywords and sentiment tags. Overall, **Live Meeting Scribe** simplifies the process of capturing, organizing, and revisiting meeting content, making it a practical tool for students, professionals, and organizations.

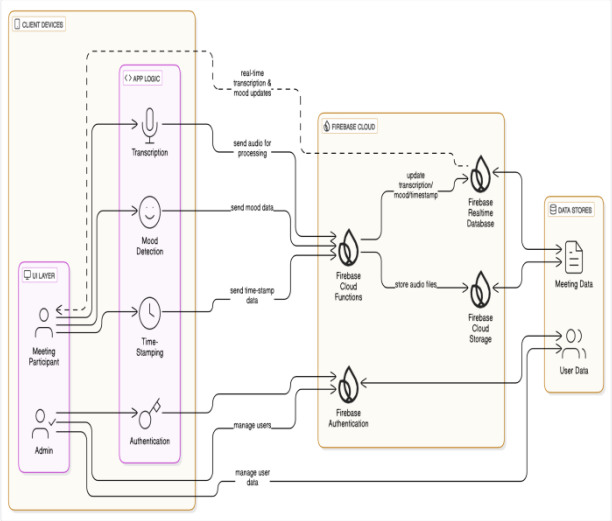

Fig 1. Architecture Diagram

Fig 1 represents the architectural diagram of *Live Meeting Scribe* presents a comprehensive overview of the system's modular structure and the seamless flow of data across different layers. At the forefront are the client devices, where meeting participants and admins interact with the user interface. These users utilize core app functionalities such as real-time transcription, mood detection, and time-stamping, all encapsulated within the app logic layer. Audio input from users is processed by the Transcription module, which sends the data to Firebase Cloud Functions for speech-to-text

conversion. Simultaneously, the Mood Detection module analyzes the emotional tone of the speaker and forwards the sentiment data, while the Time-Stamping module generates accurate chronological markers for each speech segment. All these outputs are relayed to Firebase services: the processed transcription, mood, and timestamps are stored in the Firebase Realtime Database, while raw audio files are securely saved in Firebase Cloud Storage. Authentication and user management are handled by Firebase Authentication, ensuring secure access and role-based privileges. Admins have the ability to manage user data and system permissions efficiently. Finally, structured meeting and user data are maintained in designated Data Stores, ensuring that all content is organized, accessible, and synchronized across the platform. This architecture supports real-time collaboration, scalable data handling, and secure operation, making Live Meeting Scribe a robust solution for modern, AI-driven meeting documentation.

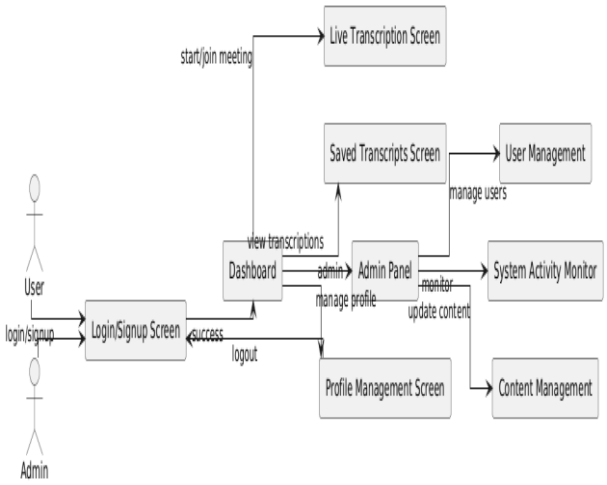

Fig 2 Data Flow Diagram

4. DISCUSSIONS AND RESULTS

The development and implementation of the **Live Meeting Scribe** project yielded promising results, demonstrating its effectiveness in automating and enhancing the documentation of live meetings. Throughout testing, the application successfully captured real-time audio, processed speech-to-text conversion with high accuracy, and displayed live transcriptions with minimal latency. The mood detection module provided contextual emotional cues, which added a valuable layer of interpretation to standard meeting transcripts. Users were able to view timestamps aligned with spoken content, offering improved clarity for revisiting key points. The use of Firebase Realtime Database ensured seamless synchronization of meeting data, while Firebase Authentication handled secure access and user role management efficiently. Admin users were able to manage meetings and participant data with ease, reflecting the strength of the role-based access system.The integration of Flutter and Dart proved to be optimal for cross-platform deployment, delivering consistent performance across Android and iOS devices. Feedback from trial users highlighted the application's intuitive interface, fast response times, and the usefulness of features like mood detection and automatic time-stamping. Additionally, the cloud-based storage of audio and transcript data enabled users to retrieve and review meeting summaries anytime, reinforcing the system's reliability and convenience. Overall, the project met its core objectives of reducing manual note-taking, improving meeting clarity, and supporting post-meeting reviews. These outcomes indicate strong potential for future scalability and real-world deployment, with further enhancements such as speaker recognition, multi-language support, and integration with platforms like Zoom likely to make the application even more impactful.

5. CONCLUSION AND FUTURE ENHANCEMENT

Live Meeting Scribe successfully achieves its thing of furnishing a smart, effective, and stoner-friendly result for real- time meeting recap and emotional analysis. By combining speech- to- textbook conversion, sentiment discovery, and automatic time- stamping, the operation enhances the quality and availability of meeting attestation. The system's integration with Firebase ensures secure data storehouse, authentication, and flawless real- time synchronization, making it a dependable tool for both regular druggies and directors. Itscross-platform capability, erected using Flutter and Dart, ensures harmonious performance on both Android and iOS bias, offering a smooth stoner experience. The Live Meeting Scribe design represents a significant advancement in automating and enhancing meeting attestation processes. By using real- time speech recognition, sentiment analysis, and timestamping, the operation offers an effective way to capture and organize meeting content without the need for homemade note- taking. Its modular design ensures scalability, maintainability, and easy integration with other services. The system's capability to store, download, share, and search transcribed lines makes it largely practical for druggies seeking accessible and well-organized records of their meetings. Through its flawless stoner interface and backend synchronization, the operation demonstrates both specialized robustness and stoner- centric design.

In the future, the operation can evolve into a further intelligent meeting adjunct by incorporating features like AI-generated meeting summaries, automatic discovery of crucial opinions and tasks, and timetable- grounded meeting monuments. Adding offline recap capabilities and pall backup integration could further ameliorate trustability and availability. Expanding the emotion discovery module with deeper sentiment perceptivity or visual analytics could also help brigades more understand group dynamics and speaker engagement. These advancements would not only enrich stoner experience but also position Live Meeting Scribe as a important productivity tool in professional and academic settings.These future upgrades will enable druggies to gain deeper perceptivity from their meetings and foster more informed decision- timber.

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