Software Requirement Specifications

Topic: AI Meeting Summarizer

1. Introduction

1.1 Purpose

The AI Meeting Summarizer aims to transcribe and summarize meeting discussions automatically using natural language processing (NLP) and machine learning (ML) techniques. The system will provide concise, structured summaries of key points, action items, and decisions made during meetings.

1.2 Document Conventions

This document follows IEEE SRS standards, using structured numbering and clear sectioning.

1.3 Intended Audience and Reading Suggestions

This document is intended for project stakeholders, including developers, testers, and end-users who require an understanding of the software's functionality and requirements.

1.4 Scope

The AI Meeting Summarizer will process audio recordings or live meetings, transcribe speech into text, analyse the content, and generate structured summaries. The system will support multiple languages, integration with meeting platforms (e.g., Zoom, Google Meet, Microsoft Teams), and customizable summary formats.

1.5 References

- IEEE Software Requirements Specification Standard (IEEE 830-1998)
- NLP and Speech Recognition Research Papers
- Python Libraries: Speech Recognition, Transformers, NLTK, GPT-based Models
- Cloud AI Services Documentation
- Privacy and Security Guidelines (GDPR, HIPAA)

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2. Overall Description

2.1 Product Perspective

The AI Meeting Summarizer is a standalone application with potential cloud-based integration. It will utilize Automatic Speech Recognition (ASR) for transcription and NLP models for summarization. Additionally, it will include AI-driven entity recognition and sentiment analysis to enhance the summary insights.

2.2 Product Functions

- Record or accept uploaded meeting audio.
- Convert speech to text using ASR.
- Identify speakers and segment conversations.
- Extract key points, decisions, and action items.
- Generate summaries in various formats (bullet points, paragraphs, action plans, etc.).
- Provide an interactive UI for users to review, edit, and download summaries.
- Implement keyword-based searching for past meeting records.
- Support multi-user collaboration and feedback annotations on summaries.

2.3 User Characteristics

- **Meeting Participants:** Require accurate summaries for documentation.
- **Project Managers:** Use summaries for tracking action items.
- **Researchers & Analysts:** Utilize extracted insights from discussions.
- **Developers:** Work on AI model improvements and feature enhancements.
- **Legal and Compliance Officers:** Ensure meeting summaries adhere to regulatory standards.

2.4 Constraints

- Real-time processing speed may vary based on internet and hardware resources.
- Accuracy may depend on background noise and speaker clarity.
- Compliance with data privacy laws (GDPR, HIPAA) must be ensured.
- Requires high-quality microphones for optimal speech recognition.
- Storage and retrieval of large meeting data require efficient database handling.

2.5 Assumptions and Dependencies

- Cloud storage may be required for audio processing.
- Integration with third-party APIs (Google Speech-to-Text, OpenAI GPT) may be necessary.
- Users should have an internet connection for online processing.
- User permissions and role-based access controls must be implemented.

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3. Specific Requirements

3.1 Functional Requirements

1. **Audio Input & Processing**
    - The system must support live audio capture and file uploads (.mp3, .wav, .m4a).
    - It must allow users to start/stop recordings.
    - Background noise filtering should be implemented.
2. **Transcription**
    - Convert speech to text using ASR technology.
    - Identify different speakers (speaker diarization).
    - Provide real-time transcription preview.
3. **Summarization**
    - Extract key points using NLP techniques.

    - Generate structured summaries (action items, highlights, timestamps).
    - Provide summary length options (brief, detailed, full transcript).
    - Implement sentiment analysis for meeting tone identification.
4. **User Interface (UI)**
    - A dashboard for viewing and editing transcripts/summaries.
    - Export summaries to various formats (PDF, Word, JSON, plain text).
    - Include a keyword-based search function for past meetings.
    - Support collaboration tools such as tagging users in summary notes.
5. **Integration**
    - Connect with Zoom, Google Meet, and Microsoft Teams.
    - API support for third-party applications.
    - Support integration with project management tools like Jira, Trello, and Slack.
6. **Security & Compliance**
    - Ensure data encryption and secure storage.
    - Provide user authentication and role-based access control.
    - Implement logging and auditing of user activities.
    - Comply with GDPR and HIPAA regulations.

3.2 Non-Functional Requirements

- **Performance:** The system should process audio within a 1.5x real-time factor.
- **Scalability:** Support multiple users and concurrent meetings.
- **Reliability:** Ensure 99.9% uptime for cloud-based solutions.
- **Usability:** The UI should be intuitive, with minimal learning curve.
- **Maintainability:** Code should be modular and well-documented for future enhancements.
- **Portability:** Should be accessible via web, desktop, and mobile applications.

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4. Appendices

- **Appendix A:** Glossary of terms (ASR, NLP, GPT, etc.)
- **Appendix B:** Example summary output formats
- **Appendix C:** Compliance regulations
- **Appendix D:** System Architecture Diagram

Appendix A: Glossary of Terms

- ASR (Automatic Speech Recognition): Technology that converts speech into text.
- NLP (Natural Language Processing): AI-driven text analysis technique.
- GPT (Generative Pre-trained Transformer): AI model for language understanding and generation.
- More on NLP and ASR: https://arxiv.org/list/cs.CL/recent

Appendix B: Example Summary Output Formats

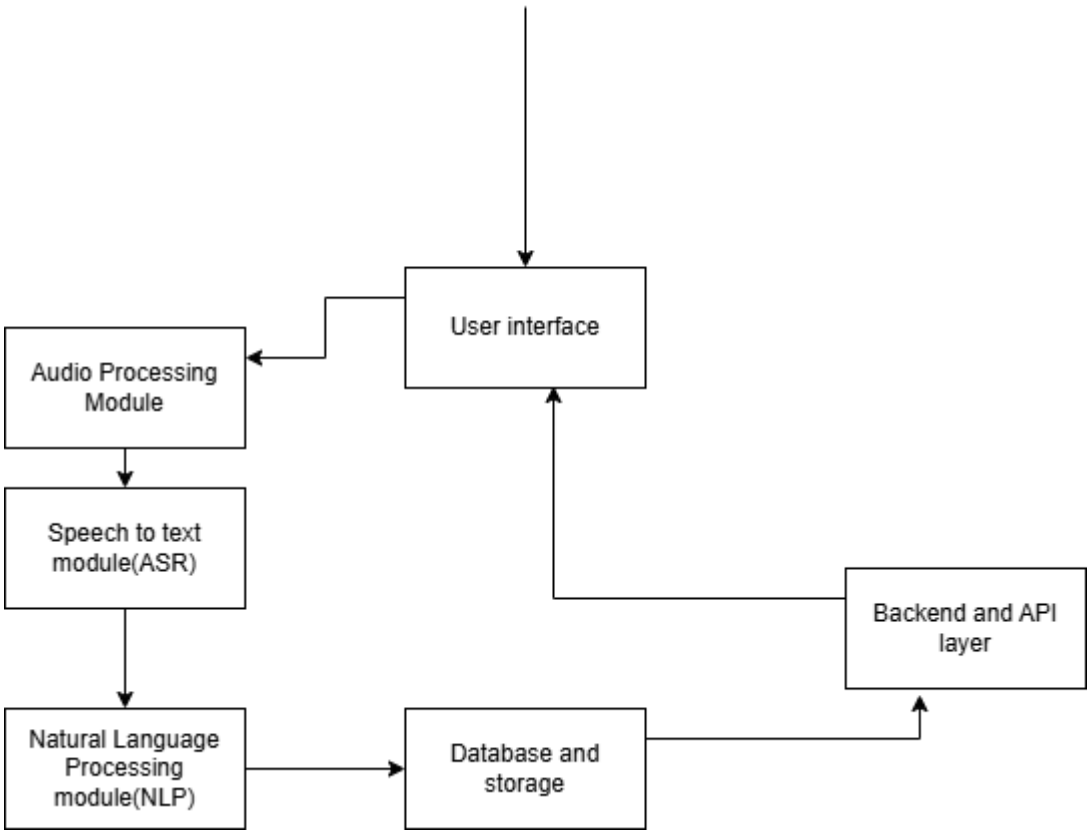
- Bullet Points:
    - Key decisions made
    - Action items assigned
    - Major discussion points
- Paragraph Format:
    - A structured summary written in full sentences

- Action Plan:
    - Task-based breakdown of meeting conclusions
- More on AI-based summarization: https://huggingface.co/docs/transformers/index

Appendix C: Compliance Regulations

- GDPR (General Data Protection Regulation): Protects user data privacy in the EU.
    - Learn more: https://gdpr.eu/
- HIPAA (Health Insurance Portability and Accountability Act): Ensures confidentiality of healthcare-related data.
    - Learn more: https://www.hhs.gov/hipaa/index.html
- CCPA (California Consumer Privacy Act): Data protection and rights for California residents.
    - Learn more: https://oag.ca.gov/privacy/ccpa
- IT Act 2000 (Information Technology Act, India): Governs electronic transactions and data protection in India.
    - Learn more: https://www.meity.gov.in/content/information-technology-act-2000
- DPDP Act 2023 (Digital Personal Data Protection Act, India): Regulates data protection and privacy in India.
    - Learn more: https://www.meity.gov.in/content/digital-personal-data-protection-bill-2023

Appendix D: System Architecture Diagram



References

- IEEE Software Requirements Specification Standard (IEEE 830-1998): https://standards.ieee.org/standard/830-1998.html
- Python Libraries:
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  - Transformers - https://huggingface.co/docs/transformers/index
  - NLTK - https://www.nltk.org/
  - OpenAI GPT - https://platform.openai.com/docs/
- Cloud AI Services Documentation:
  - Google Speech-to-Text - https://cloud.google.com/speech-to-text/docs
  - AWS Transcribe - https://docs.aws.amazon.com/transcribe/
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