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PROJECT PROPOSAL

Automation of Minutes of Meeting

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Abstract

Meetings are essential for sharing information, understanding different perspectives of problems and their solutions, collaborations, assigning tasks, and taking feedback and explanations. One of the challenging aspects of all sessions is to create minutes of the meeting. The advent and advanced voice recording technology and voice to text transcription technology enable us to think of an automatic tool that generates the minutes of the meeting automatically by recording the session. This final year project is a product that automatically makes minutes of the meeting with annotated text from the discussion of the persons involved in the meetings. Minutes of the Meeting (MOM) is an AI-powered voice note application for automated note-taking and summary preparation for in-person meetings. MOM is a voice and document collaboration app that delivers Enterprise Meeting Assistant - EMA MOM's EMA will join your session and record the meeting, observe the speaker, and extract essential pointers from the attached documents. MOM will require some facts regarding Meeting such as Meeting Chairperson, other attendees, the agenda of meeting to automate the meeting's summarization. MOM will use these references to generate the Minutes of Meeting which one can share with the concerned persons and add in the record. Apart from summarizing the meeting, MOM clumps the meeting points according to the agenda of the meeting, and one can easily recall the update on a specific program. Also, it will assign tasks to attendees, which will help the manager to take followup. MOM uses speech to text for producing the meeting transcript. National Language Processing and heuristics Techniques for highlighting the critical point from meeting transcript and attached documents, clustering the talk according to agenda and assign tasks to attendees. MOM also guarantees data protection, which is recorded during a meeting.

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Chapter 1

Introduction

Every organization holds regularly scheduled meetings as part of the routine work. For them, it is one of the ways to keep each other updated with work matters and a way of keeping track of individual and teamwork progress through a healthy discussion. The minutes of the meeting are recorded to make the meeting productive.

Meeting minutes keep a record of what was done or talked about at a meeting, including any decision made or action taken. Typically, a secretary or assistant records a meeting, but any appointed individual can do it. Meeting of the minutes comprises of date, time, and location of the meeting, the purpose of the meeting. Minutes also include names of attendees and those who were unable to attend and agenda items. Decisions that were made and actions that need to be performed are an integral part of the document. The meeting's report also includes deadlines and assigned personnel and tasks.

Although it may appear like recording meeting minutes can take a lot of time, they will help you save time and money. Meeting minutes provide a written record of what was discussed and agreed at a meeting. This document will bring every attendee on the same page. If in case someone fails to attend the meeting, still it will be able to get aligned with the team. It also offers legal protection in some cases. The minutes of the meeting also acts as a measuring stick. With high-grade meeting minutes, the company makes sure everyone knows the things that were decided and what needs to be achieved by what date.

Technology is getting advance and have automated several tasks, so we aimed to digitalize the Minutes of the meeting generation. Formulating meeting minutes using technology can be a fast and easy way of recording resolutions. As a critical legal document, consideration should be taken to ensure the effectiveness of the decisions and legal compliance.

There are multiple benefits of using technology to generate meeting minutes. An intuitive document creation process which assists a business to turn its mind to relevant aspects of the decisions, thus helping with the creation of legally capable resolutions. Proficient drafting of templates, making the formulation effortless. Professional formatting, advancing clarity of the recommendations made. The solution is obtainable 24/7 for assistance. A quick and effortless solution, which makes the contemporaneous and reliable recording of the decisions more likely. The result is fine document - Minutes of the Meeting.

Chapter 2

Project Overview

2.1 Significance of the Project

Every enterprise, either small or large, organize meetings daily. For instance, in a software house following the agile sort of software management methodology, daily scrum meetings are held to discuss the progress and further plan of action. The minutes of the meeting method is the way to note down the key insights of the meeting, including the previous development and proposals for an agenda. The primary purpose of this project is to not only automate this essential process of enterprise meetings but to present it in an improved manner as compared to human power. This application will tend to provide these minutes of the meeting concerning the terminologies the enterprise is built. The main focus of this application is to minimize the exploitation of human energy in doing an excessive amount of work daily for creating minutes of the meeting.

2.2 Description of the Project

MOM will provide a complete automated solution for the professional world. As a system, audio and video recordings will be given as an input with some metadata supporting the meeting points. For instance, the meeting documents. MOM will also require the agenda of the meeting and its participants. In this manner, the MOM can target generating the minutes concerning the terminologies of the meeting in a contextual way.

Furthermore, the instruments to capture audio and video data are to be pre-installed in the meeting room. Whenever an individual starts to speak the system detects it through the gestures and starts to record. This system will be an amalgamation of relevant Computer Vision, Machine Learning, and Natural Language Processing techniques. For instance, to detect who is speaking an efficient Computer Vision Algorithm is required. Similarly, Machine Learning and Natural Language processing techniques will provide near-optimal contextual information. The three mediums of data, namely audio, video, and meeting documents, will validate the results. This data will minimize the inaccuracy of the meeting's minutes generation process. Moreover, MOM will provide several additional facilities that include speaker wise contribution, highlighting the key terminologies, and sharing the minutes with colleagues in one click.

2.3 Background of the Project

MOM will incorporate the research for speech detection. Moreover, the project is distributed into multiple phases, namely minute generations, integration of add ons and validations of output. Contextual models are to be used to relate the minutes to different agendas. Computer Vision algorithms will detect the person speaking through his/her gestures. The meeting documents will validate the remaining facts and figures of the meeting.

2.4 Project Category

It will be a web-based application.

Chapter 3

Methodology

3.1 Design Phase

Kanban Methodology

The Kanban method is a means to design, manage, and improve flow systems for knowledge work. The method also allows teams to start with their existing workflow and drive evolutionary change. They can do this by visualizing their flow of work, limiting work in progress (WIP) and stop starting and start finishing.

The Kanban Method gets its name from the use of kanban — visual signaling mechanisms to control work in progress for intangible work products. This will help us to assign tasks and to track the progress of the tasks.

3.2 Implementation Phase

Initially, we will pre-process the recorded audio data for noise reduction, which may hinder the further process. Then, by analyzing the audio data, we will separate the dialogues of a different person and will annotate the audio data. These annotated audios will further be converted into textual data using Speech to text mechanism. The produced separate texts will then be amalgamated sequence wise with assigning randomly generated tags to participants.

We will examine the provided metadata to improve the transcript generated. The annotated transcript will be classified into agenda discussion, the suggestion given and task assigned. Later the agenda discussion will be gathered agenda wise using a particular clustering algorithm. We will use more contextual text processing techniques to generate points. In conclusion, comprehensive Minutes of the Meeting will be the output of this whole pipeline.

3.3 Testing Phase

The main feature of the project is to extract important features from a meeting transcript. So, we will design test cases that could test how precisely it extracts the important feature. We will do unit testing and integration testing for each feature and sub-modules.

3.4 Evaluation Phase

To evaluate the proposed approach, we intend to generate some user annotated meeting data with human-created ground truth minutes of the meeting. The evaluation metrics from information retrieval, specifically for summary evaluation, is planned to be used.

Chapter 4

Experiments

In order to evaluate our proposed loss function we have used two sets of experiments. First one is based on Fraud Detection whereas the second one is based on Image Classification.

4.1 Features

1. **Transcription of Meeting Minutes:**

To transcribe audio and to summarize notes are the paramount responsibilities of the application. The application aims to reduce the bootstrapping process, which many existing commercial applications require. Also, to improve the accuracy and precision of transcribed data such that it covers all significant aspects of the meeting.

2. **Speaker Identification:**

The resultant notes are thoroughly annotated with speaker information and are time-stamped, providing a coherent flow of information.

3. **Noise Agnostic:**

Sophisticated algorithms are used to separate noise and to focus on relevant information by exploiting video channel.

4. **Exportable and Shareable:**

The application allows the resultant document to be exported in a variety of formats including PDF and HTML. The array will enable users to print and distribute or to view as a web page. Furthermore, the document is shareable across all major social sites.

5. **Secure and Private:**

The application ensures that user data is secured by encrypting all your information on our servers and by replicating them to avoid data loss. The data is not disclosed to any third party apart from the essential core libraries. We don't use any personal information other than which are required to validate the authentication. The business logic of the application does not require human intervention; thus, all meeting data is end to end secured and encrypted.

6. Synchronization:

The application will allow the synchronization of notes across multiple devices.

7. Collaboration:

Members can view, edit, and sync their notes before they document is finalized.

8. Multiple Device-Independent:

Unlike existing solutions, our application does not require various devices; only one smartphone is needed to make notes. The software then isolates the audio and identifies the speaker.

9. Persists History:

Users can view the previous notes for a specified period. Users can search through the database and acquire relevant records through the application interface.

Chapter 5

Project Feasibility

5.1 Technical Feasibility

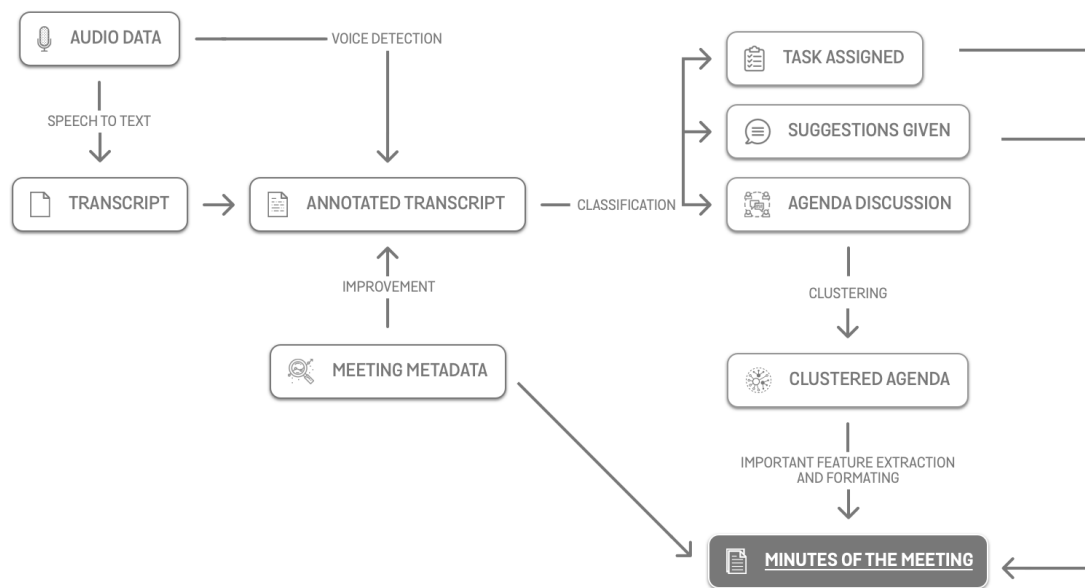
Development libraries and tools used are readily available, cross-platform, well documented, tested, and are free to use. Dependencies are kept at minimal, and virtual environments are used to maintain proper update versioning.

5.2 Economic Feasibility

Since most of the development tools are open source and services used are free of cost, the development process does not contribute to any additional charges. Most of the data used to train the model are free to use as well.

Chapter 6

System Architecture



Chapter 7

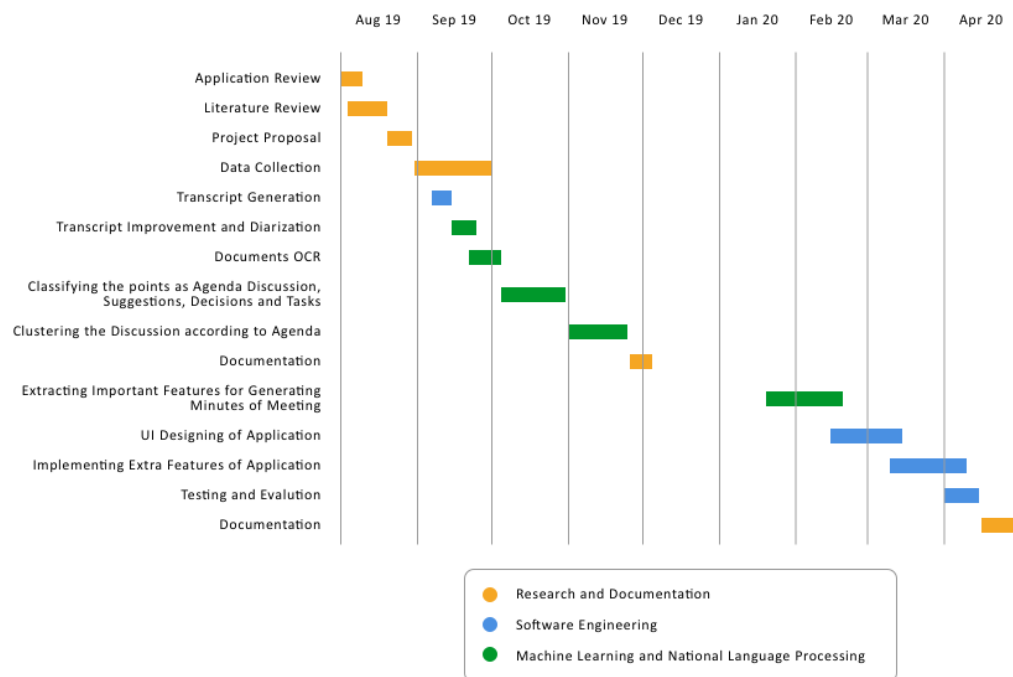
Hardware And Software Requirements

- Intel Core i7 with 16GB RAM
- Webcam for video recording
- Microphone for audio recording

- Anaconda
- Pycharm
- Visual Studio Code

Chapter 8

Project Timeline



Chapter 9

References

Research Papers

- [1] H. Hung and S. O. Ba, “Speech/non-speech detection in meetings from automatically extracted low resolution visual features”, Idiap, Tech. Rep., 2009.
- [2] H.-J. Song, J. Go, S.-B. Park, and S.-Y. Park, “A just-in-time keyword extraction from meeting transcripts”, in *Proceedings of the 2013 conference of the north American chapter of the association for computational linguistics: human language technologies*, 2013, pp. 888–896.
- [3] J. Sheeba and K Vivekanandan, “Improved keyword and keyphrase extraction from meeting transcripts”, *International Journal of Computer Applications*, vol. 52, no. 13, 2012.
- [4] F. Liu, F. Liu, and Y. Liu, “A supervised framework for keyword extraction from meeting transcripts”, *IEEE Transactions on Audio, Speech, and Language Processing*, vol. 19, no. 3, pp. 538–548, 2010.

Services, Tools, and Libraries Used

- <https://cloud.google.com/dialogflow/>
- <https://stanfordnlp.github.io/CoreNLP/>
- <https://spacy.io/>
- <https://qu Shore.io/> - for Kanban Methodology

Related Applications

- <https://reason8.ai/>
- <https://otter.ai/>
- <https://www.voicea.com/>

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