MINUTE MEETING SYSTEM USING SPEECH RECOGNITION

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2020
DECLARATION

I hereby declare that this report is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Sultan Zainal Abidin or other institutions.

______________________________

Name: AINON SAHIRAH BT MOHD JARKASI

Date: .................................
CONFIRMATION

This is to confirm that:

The research conducted and the writing of this report was under my supervision.

Name: Dr. SUHAILAN B SAFEI

Date: .............................................
DEDICATION

Assalamualaikum w.b.t, firstly I would like to express my gratitude to Allah the Almighty for his grace and the Mercy in completing my project. Then, I would like to thank my supervisor for this Final Year Project, Dr. Suhailan b Safei for being a responsible and supporting lecturer to guide and aid me towards the accomplishment of this project. Thank you for brainstorming the ideas along the solution together for me illustrate the main idea and help in understanding my project more.

Next, I would like to appreciate to all member of panels for their valuable feedback and their comment on improving my project for better purpose especially during my project presentation. All the comments and feedback help me improve a lot of my presentation skills and my project progress.

Last but not least, a lot of thanks to my beloved mother and father, family and friends for never ending support, encouragement and advice for brightening my spirit to complete this final year project. Great thanks again for all of those who are involved in my Final Year Project.
ABSTRACT

This project is about minute meeting system using speech recognition to help people who is in charge in writing to write smoothly and efficiently. Usually, when it comes to write minute meeting, you have to write or type faster to catch up all the important information but not everyone can write or type fast and give fully attention to the meeting, especially people who types or writes slowly. One of the biggest problems in minute meeting is, you can lose some important point or misunderstanding certain part in the meeting because people tend to forget what happen in the meeting. This happens when people in charge to write the minute meeting report write at the end of the day or the next day. All these problems can be solved by proposing this project because it will ease people to write the report. It is also less time consuming, because the report will be generated by using speech recognition and will be in the right format of minute meeting, they do not have to edit a lot of part. This system is a web based system that use laravel and speech recognition. At the end, they can simply check and write the minute meeting in a simpler way.
ABSTRAK

Projek ini adalah tentang sistem minit mesyuarat menggunakan pengecaman suara untuk membantu pekerja yang ditugaskan mencatat minit mesyuarat dengan lancar dan cekap. Kebiasanya, untuk mencatat minit mesyuarat, anda perlu menulis atau menaip dengan lebih cepat untuk menangkap kesemua maklumat penting tetapi tidak semua orang boleh menulis atau menaip dengan pantas dan memberikan sepenuh perhatian kepada mesyuarat, terutama sekali kepada orang yang jenis menulis perlahan. Salah satu masalah dalam minit mesyuarat, adalah kita boleh terlepas pandang beberapa perkara penting atau salah faham dalam beberapa bahagian tertentu dalam mesyuarat, ini kerana kita sebagai manusia mempunyai daya ingatan yang agak terbatas dalam untuk mengingati kesemua perkara yang berlaku dalam mesyuarat. Ianya boleh berlaku apabila orang yang ditugaskan untuk menulis laporan minit mesyuarat itu membuatnya pada penghujung hari atau pada keesokan harinya. Semua masalah ini boleh diselesaikan dengan mencadangkan projek ini kerana ia akan memudahkan orang untuk menulis laporan tersebut. Ia juga kurang memakan masa, kerana laporan akan dijana dengan menggunakan pengecaman pertuturan dan akan berada dalam format minit mesyuarat yang betul dan juga mereka tidak perlu membuat banyak mengubah terhadap minit mesyuarat tersebut. Sistem ini berasaskan web yang menggunakan laravel dan pengecaman suara. Konklusinya, mereka hanya perlu menyemak dan menulis minit mesyuarat dengan cara yang lebih mudah.
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</tbody>
</table>
CHAPTER 1

INTRODUCTION

1.1 Project Background

Meeting is a heartbeat of every company, organisation or even institution to run smoothly. It can also be seen as the way of life for an organisation or a company since having a productive meetings works a long way towards increasing the productivity level and improvement of the company itself. Generally, a meeting can be define as the planned gathering of a group of people for a specific reason.

According to Kierstin Gusberg “The 4 Stages of an Effective Meeting”, there is 4 stage meetings. One of it is preparation, or we can say that as pre-meeting is the phase where people in charge set the purpose of the meeting, date, time and place before meeting, make an agenda of the meeting. Not to forget, if available minutes meeting of pervious meeting also must be distributed before the meeting. After all the preparation is ready and confirm, secretary must send notice to call for a meeting using memo, e-mail or a letter to the participants. Secretary play a main role to make a success meeting. They in charge in documentation, informing and reminding members of the meeting and also keeps the record of the discussion and decisions for the minute meetings.

Minute of meeting is a record that can be used as references and also can be used for follow-up purpose. An effective meeting minutes it has a clear content and do
not leave out the important information. Typically, meeting minutes are recorded by a secretary or assistant, but it can be done by any appointed individual. Minute meeting are important because it make participants have same recollections from the meeting and the same idea what was being agreed. With a good minute everyone that participate in the meeting know what was decided and what needs to be achieves by what date. [3]

The secretary must pay extra attention so that they do not miss any important things that can lead to misunderstanding and miscommunication when writing a minutes of meetings and also when distribute the notice to call for a meeting. They have to make sure that all participants get the memo, email or even a letter. Because according to the Terrence Metz “common meeting problems and what you should do about them” one of the problem of the meeting is unprepared participants, they do not see the clear purpose, scope and deliverable, participants need advance understanding about the agenda of the meeting.

Hence, this system will help secretary to avoid the misunderstanding and miscommunication when writing the minute of meeting using voice recognition. To ease the secretary job, speech recognition will convert the speech into the text form. Right after that, it will be in the right format of minute meeting, so he/she can simply give it to the participants after it is being confirmed by the chairman. Along that, the secretary also give the notification about the next meeting to the participants which contain agenda, date, time and place.

1.2 Problem Statement

There are several problems that cause this system need to be developed. The problem are
a) Secretary has difficult time to write down all the important key and correct information during meeting.

b) Some people tend to procrastinate to write the minute meeting and after that they will forget what they hear.

c) Unprepared participants because lack of understanding about how the meeting will go.

1.3 Objective

Below are few objective that need to be achieved to develop this system:

a) To analyse the problem that happen in the meeting management especially handling minute meeting.

b) To design system that ease the users to prepare the meeting and write the minute of meeting.

c) To develop system of Minute meeting using speech recognition.

1.4 Scope

Admin

a) Administrators can create, update and delete users.

b) Administrators can set a level to the users.

Chairman

a) Chairman can view and edit their own profile.

b) Chairman can view their employee profile

c) Chairman also can confirm the minute of meetings
Secretary
a) Secretary can create, update, delete and search minute meeting and agenda of the meeting
b) Secretary can send a notification to notice other user about upcoming meeting.
c) Secretary also can select who will be a participants in the meeting
d) Secretary can view and update their own profile.

Participants
a) Participant can view and update their own profile.
b) Participant can see the notifications.
c) Participant can confirm the attendance.
d) Participant can view minute meeting and agenda.

1.5 Limitation of Work

There are also have some limitation go for this:

a) The system does not cover the storing audio file.
b) The format of minute meetings is fixed.
c) The text accuracy might be vary.
d) The system can only be browse on Google Chrome

1.6 Expected Outcomes

This system aims to use speech recognition to do the minute meetings, and also it will help people manage meeting more efficient.
CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter will continue with the research from the website or article that related to the speech recognition. This chapter also cover pervious research or existing system that similar to this project.

2.1 SPEECH RECOGNITION

Speech recognition is becoming part of our daily lives, we can communicate with computer in efficient ways. Speech recognition is the process that enable the recognition and interpreting of human speech into text by computers. It can also know as automatic speech recognition (ASR) or speech to text (STT). One of the key applications of automatic speech recognition is to transcribe speech documents such as talks, presentations, lectures, and broadcast news [1]. Speech is the most normal and accurate method of communication between human beings. If the speech are simply recorded as an audio signal, it is not easy to quickly update, retrieve and recycle speech documents. Then anticipated that transcribing speech will become a critical resource for the coming IT era. The accuracy of speech recognition during 1993 stagnated around 70% and it was improving the accuracy of speech recognition in 2010s when they have been proved to be effective in improving the recognition accuracy In 2016, Microsoft reported a speech recognition system reached human parity with a word error rate of 5.9% and in 2017, Google reported an accuracy of 95%. The technology improvement
indicates that machines can be as good as human beings in terms of "hearing" and now speech recognition has become a commodity [5].

2.2 Web Speech APIs

Speech-to-text web APIs is one of the way integrate speech recognition into website and application. There are few APIs for Speech-To-Text that are available:

1. Google Speech-To-Text
2. Microsoft Cognitive Services
3. Dialog flow (Formerly API.AI,Speaktoit)
4. IBM Watson
5. Speechmatics
6. Web Speech APIs.

On this project will focus on the Web Speech API. The Web Speech APIs aims to enable web developers to provide, in a web browser, speech-input and text-to-speech output features that are typically not available when using standard speech-recognition or screen-reader software. [2]. It allows web users to send speech input to web applications and the web applications use the Web Speech API to transform the speech into text. The Web Speech API is developed by the W3C Speech API Community Group. It is a recent initiative and the specification draft awaiting final commitments was published only in October 2012. There is a vendor-specific implementation of the API draft available in Chromium with version 25 or newer, despite of the specification neither being finalized nor belonging to a W3C Standards track. The goal was to enable speech recognition and synthesis in modern browsers, in other words it supports the conversion of speech to text and
text to speech. The APIs is purely using JavaScript as scripting languages of the web. [3] Five common web browser that currently being use is Google Chrome, Mozilla Firefox, Microsoft Internet Explorer, Safari, and Opera [4]. The Web Speech API is still working as draft and only available in Google Chrome (version 25+). The accuracy of using web speech API is 74% of all spoken words are correctly recognized [3] and it almost accurately transcribe what human say.

2.3 Existing System

2.3.1 OneNote Microsoft 2013

OneNote is a digital notebook that provides a single place for all of user notes and information [6], by using OneNote Microsoft 2013 you can take and organize minutes meeting effectively. When using this you can create and send a meeting request to the person that you want. It can also replay to a meeting request, change the date and cancel a meeting [7]. It can view all the meeting basic details such as date, time, location details and participants that must have in minute meeting without user insert it. In OneNote Microsoft 2013 user can convert their handwriting notes that using digital device into text. It also can email the minutes to the participants and make sure all the participants do the assignment. Below are some of the interface of the OneNote Microsoft 2013:

Figure 1
Meeting Minutes

Sunday, March 26, 2017
5:37 PM

Meeting Subject: Not Meeting ever!
Meeting Date: 2017-03-26 - 2017-03-26
Location: Johnnie's Office
Link to Outlook Item: Outlook

Invitation Message
Let's meet to discuss the upcoming team-building event. Bring your creative ideas.

Participants
- jonnie@johndoe.com [Meeting Organizer]
- Hector Villare
- John Doe
- Megan Brown

Notes

0 865 rolled out March 2015
4000 emp
Poor poor adop. Full R01 not reali. No training. Rip to learn on job.
Want video for emp training.
@ Share customer ref.
@ Send transcript.

Figure 2

Figure 3
2.3.2 Meeting King

Meeting King is a meeting documentation and task management tool that user can manage, structure, record and follow-up on the meetings. It can set the agenda, meet and get things done before, during and after the meeting. Meeting King Features are the can prepare the meeting agenda, share the documents and provide updates on task. User of Meeting King can access to the latest presentation and everyone can see the same notes and action items. It also can view recent and complete upcoming meeting or task. Below are some of the interface of Meeting King:
Figure 6

Figure 7

Type and save as Note, Decision or Task

Figure 8
2.3.3 The CALO Meeting Assistant System

CALO-MA stand for cognitive Assistant that Learns and Organizes Meeting Assistant. This paper summarizes the CALO-MA architecture and its speech recognition and understanding components, which include real-time and offline speech transcription, dialog act segmentation and tagging, question-answer pair identification, action item recognition, decision extraction, and summarization.

CALO-MA is an automatic agent that assists meeting participants. It supports
multiparty meetings with a variety of information capture and annotation tools. Meetings are recorded via client software running on participants’ laptop computers. During a meeting, client software sends Voice over Internet Protocol (VoIP) compressed audio data to the server and the data transport server splits the audio: sending one stream to data processing agents and the other stream to remote meeting participants. Other shared data (text chat, file sharing, digital ink, and collaborative text editing) is handled in a similar manner with data going from client to server and then distributed to both processing agents and other meeting participants. Finally, any processing agents that operate in real-time send their data back to the data transport server which relays the data back to the meeting participants. The system is aware of each participant’s identity. Meetings may be geographically distributed as long as there is Internet connection to the server is available. The client software captures the participants’ audio signals, as well as optional handwriting recorded by digital pens. In the meeting, a real-time transcript is available to the participants to which annotations may be attached and real-time chat via keyboard input is also supported. All interactions are logged in a database, and at the conclusion of the meeting various further automatic annotation and interpretation technologies are initiated, for later browsing via a web-based interface [10].
2.4 Summary

This chapter provides an overview of the concept of the application. Based on research that has been made it show that literature review is one of the important parts as we can use the technique from the current and existing system to develop the proposed application. The technique is chosen based on the previous articles and journal.
CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter will discuss about the methodology that is used to develop the system because software development methodology is the important fundamental part in determining the success of the project. The development of various aspects of the system can make it more comprehensive and complete. All elements associated with the system such as understanding of existing systems, data analysis, process design of new systems and processes to implement and maintain the system are included. Proper methodology can make the system more systematic and effective. The Waterfall model is selected as a guideline help to develop the system in the required time.

Besides, this chapter also describes the design of implementing the system. Design are divided into two parts which are: system design; database design. System design consists of framework design, context diagram, Data Flow Diagram (DFD) Level 0 and Data Flow Diagram (DFD) Level 1. Meanwhile, database design consists of SQL script, Entity Relationship Diagram (ERD), and database schema.

3.1 Waterfall Model

![Waterfall Model](image12)
The waterfall model is a sequential design process in which progress is seen as flowing steadily downwards (like a waterfall) through the phases of Conception, Initiation, Analysis, Design, Construction, Testing, Production/Implementation and Maintenance. Waterfall model has been chosen based on the following consideration. Firstly, project monitoring. Each phase of the development is monitored from time to time to ensure all the system module match earlier system requirement. Next, allow changes. Any changes in developing the system can be implement at every phase to improve the functionality of the system. Besides, save cost. The development of the system can save the cost because the information collected at each phase is very particular until the final test of the system. It starts with the planning, requirement analysis, design, implementation, testing, operation and maintenance. Every phase must fulfil the requirement specification. When the system is completed, it will undergo maintenance as final test.

3.1.1 Stage 1: Requirement

In this phase, all the requirement for the application were gathered by brainstorming and analysing existing systems. For this project, brainstorming is one of the best techniques to get as many ideas as possible as brainstorming also is the most effective for solving problem, generate a list of ideas. After all the ideas are generated, prioritize one idea that think the best for this solution. The resulting agreement of best idea is used for the early requirement.
3.1.2 Stage 2: Design

For this stage, the requirement that already obtained are being studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture.

3.1.3 Stage 3: Implementation/Execution

The implementation stage is begin once design is approved and accepted by user. This project is developed using PHP and MySQL.

3.1.4 Stage 4: Testing

At this stage, the systems will be tested. If there any error occurs or detected, then it must be solved at this phase and if there other change want to be made, this system need to be re-impliment back to design phase to make sure the flow of the system does not effect.

3.1.5 Stage 5: Deployment/Release

Once the bug of the system is free, the system can be released and users can use the system. When the system in ready state, it is reviewed that the system has meet all the goals, requirement and the objective for the project plan satisfactory results.

3.2 System Requirement
### 3.2 System Requirement

#### 3.2.1 Software

<table>
<thead>
<tr>
<th>No.</th>
<th>Software Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Notepad++</td>
<td>Editor to write PHP language for web</td>
</tr>
<tr>
<td>2.</td>
<td>Xampp v3.2.2</td>
<td>Act as a local server to run and test the system</td>
</tr>
<tr>
<td>3.</td>
<td>MySQL</td>
<td>Platform for the query of database</td>
</tr>
<tr>
<td>4.</td>
<td>Microsoft Office World</td>
<td>Platform for documentation</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Microsoft Office Power</td>
<td>Platform to manage the presentation slide</td>
</tr>
<tr>
<td>Point 2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>FIK web hosting</td>
<td>Act as a platform to use Laravel</td>
</tr>
<tr>
<td>7.</td>
<td>Web Browser</td>
<td>Used to view and test the code - Google Chrome -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mozilla Firefox</td>
</tr>
</tbody>
</table>

Table 1
### 3.2.2 Hardware

<table>
<thead>
<tr>
<th>No</th>
<th>Item Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1. | Laptop Acer      | • Processor: Intel® Core™ CPU N3540 @ 2.00GHz  
                  | • RAM: 8.00 GB  Operating System: Windows 10  
                  | • System Type: 64-bit Operating System, x64-based processor                                  |
| 2. | Printer Epson L360 | Print report and articles                                                                     |
| 3. | External Hardisk | • For Backup all document, coding and data.  
                  | • 1TB storage                                                                                  |

Table 2
3.3 System Design

3.3.1 Context Diagram

From the context diagram above, admin will manage the employee registration. After that, employee can manage their own profile. Secretary can manage the meeting, assign the task and also create a minute meeting and an agenda. Meanwhile, employee can be able to view minute meeting and agenda they can update the given task. Chairman can confirm the meeting and chairman can view minute meeting and agenda.
3.3.2 DFD level 0

Figure 3.4.2.2 show the data flow that consist of five processes and five data stores.

The processes are manage user, manage meeting, manage speech, manage minute meeting and manage task. The report will be generated based on the data accumulated all of those data stores.
3.3.2.1 DFD level 1

Figure 15: DFD level 1 for manage meeting

Figure shows a secretary can add meeting and also a participants. A chairman and employee can view the meeting and confirm the invitation. Secretary also can create an agenda and the chairman and the employee can view it. All the meeting, agenda and participants details will be saved to meeting, agenda and participants database respectively.
3.3.2.2 DFD level 1

Figure shows a chairman speak the content it will receive the speech and convert it into text. After that, secretary will receive the draft minute meeting, then it will send the complete minute meeting to the chairman and the employee. Both chairman and employee can view the minute meeting. All the details will be saved to the meeting item database.

3.3.2.3 DFD level 1

Figure shows a chairman speak the content it will receive the speech and convert it into text. After that, secretary will receive the draft minute meeting, then it will send the complete minute meeting to the chairman and the employee. Both chairman and employee can view the minute meeting. All the details will be saved to the meeting item database.
Figure shows the secretary will assign the task to the employee. After that the employee must update their task to the secretary. All the task details will be saved to the meeting item database.

3.3.3 Data Model

3.3.3.1. Entity Relationship Diagram (ERD)

Based on the diagram above, an entity relationship diagram (ERD) illustrates system’s entities information and entities relationship. ERD composed of three things such as identifying and defining the entities, determine entities’ interaction and cardinality of the relationship. Every box illustrate the table in database and lines refer to relationship.
### 3.3.3.2. Data Dictionary

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<th>Explanation</th>
<th>Data type</th>
<th>Size</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin Id</td>
<td>Identification of admin</td>
<td>Int</td>
<td>4</td>
<td>Primary key</td>
</tr>
<tr>
<td>Password</td>
<td>Admin password for login</td>
<td>varchar</td>
<td>10</td>
<td></td>
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</table>

Table 3.1 Employee Table

<table>
<thead>
<tr>
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<th>Explanation</th>
<th>Data type</th>
<th>Size</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee_id</td>
<td>Identification of employee</td>
<td>Int</td>
<td>5</td>
<td>Primary key</td>
</tr>
<tr>
<td>Password</td>
<td>Employee password for login</td>
<td>Varchar</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Employee name</td>
<td>Varchar</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Employee age</td>
<td>Int</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Employee address</td>
<td>Varchar</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>no-tel</td>
<td>Employee no telephone</td>
<td>Varchar</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Job scope</td>
<td>Employee job scope, Eg: chairman, secretary</td>
<td>Varchar</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Meeting_id</td>
<td>Identification for meeting</td>
<td>Int</td>
<td>5</td>
<td>Foreign key</td>
</tr>
<tr>
<td>Task</td>
<td>Task title that assign after the meeting</td>
<td>Varchar</td>
<td>15</td>
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</table>
### Table 3.2 Meeting Table

<table>
<thead>
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<th>Explanation</th>
<th>Data type</th>
<th>Size</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting_id</td>
<td>Identification for meeting</td>
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<td>5</td>
<td>Primary key</td>
</tr>
<tr>
<td>Date_time</td>
<td>Date and time for meeting</td>
<td>datetime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Location for meeting</td>
<td>Varchar</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Meeting title</td>
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<td>Chairman_id</td>
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<td>5</td>
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</tr>
<tr>
<td>Secretary_id</td>
<td>Identification for employee</td>
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<td>5</td>
<td></td>
</tr>
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</table>

### Table 3.3 Meeting Item Table

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Explanation</th>
<th>Data type</th>
<th>Size</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mom_id</td>
<td>Identification of minute of meeting(mom)</td>
<td>Int</td>
<td>5</td>
<td>Primary key</td>
</tr>
<tr>
<td>Status_report</td>
<td>Report status for minute meeting</td>
<td>Text</td>
<td>100</td>
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<tr>
<td>Decision</td>
<td>Minute meeting content</td>
<td>Text</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Agenda_id</td>
<td>Identification for agenda</td>
<td>Int</td>
<td>5</td>
<td>Foreign key</td>
</tr>
<tr>
<td>Employee_id</td>
<td>Identification for employee</td>
<td>Int</td>
<td>5</td>
<td>Foreign key</td>
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</tbody>
</table>
### Table 3.4 Agenda Table

<table>
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<th>Size</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Primary Key</td>
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<tr>
<td>Agenda_name</td>
<td>Title for agenda</td>
<td>varchar</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Meeting_id</td>
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<td>Int</td>
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<td>Foreign Key</td>
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<tr>
<td>Agenda_notes</td>
<td>Contents of agenda</td>
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<tr>
<td>Location</td>
<td>Location of agenda</td>
<td>Varchar</td>
<td>20</td>
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<tr>
<td>Date_time</td>
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### Table 3.4 Participants Table

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<td>Primary key</td>
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<tr>
<td>Meeting_reason</td>
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<tr>
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</tr>
<tr>
<td>Employee_id</td>
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<td>Int</td>
<td>5</td>
<td>Foreign key</td>
</tr>
</tbody>
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REFERENCES


