

Personal Assistant Using HMM Algorithm

G.Karthik
Department of Computer Science and
Engineering
Dr.Mahalingam College of Engineering
and Technology
Pollachi,Coimbatore,India
riokarthy@gmail.com

S.Santhiya
Department of Computer Science and
Engineering
Dr.Mahalingam College of Engineering
and Technology
Pollachi,Coimbatore,India
santhiya.cs98@gmail.com

C.Sindhu
Department of Computer Science and
Engineering
Dr.Mahalingam College of Engineering
and Technology
Pollachi,Coimbatore,India
sindhu.dinu10@gmail.com

C.Mano Sundari
Department of Computer Science and
Engineering
Dr.Mahalingam College of Engineering
and Technology
Pollachi,Coimbatore,India
mano45229@gmail.com

Abstract— The major purpose of an automation system is to reduce human labor, effort, time and errors. Personal assistant can do all the basic functions expected by the humans such as Personal diary making and travel guidance kit. Personal diary is vital to keep tracking and monitoring of the daily life activities. To enhance this, system focuses on making a diary for yourself by just narrating the day's activity to the assistant. It can manage meetings and act as a planner to schedule our upcoming events personally. Proposed system uses HMM algorithm for STT (Speech to Text) and TTS (Text To Speech) conversion process. Personalization is the additional feature of the system to keep data secured and private. We use face recognition, so that it will recognize the face and store their data into their account. If any third person try to access our system they can't access data in our account. Travel guidance kit helps to keep track of any location, its traffic status, current issues and tourist spots. It also keeps track of tactile information of turn -by-turn navigation that can reduce the distraction by decreasing the amount of interaction with the device and can improve map-based navigation in virtual environments and real-world. Proposed system keeps track of personalization and travelling kit for effective monitoring and analyzing of the daily life activities using HMM Algorithm.

Keywords— personal assistant, HMM algorithm, travel guidance kit, diary maker

I. INTRODUCTION

A personal assistant, also referred to as Personal Aid (PA) is a job title describing a person who assists a specific person with their daily business or personal tasks. Personal Assistant helps the human begins to write down your thoughts, feelings, memories and personal impressions about life can be healing and teach you to know yourself better. The main idea of our project is to perform the process of diary making and it helps us in self-analysis and speech processing.

Speech processing has been an area of interest for the last four decades, but the last decade has witnessed significant progress in this area of research has been possible mainly due to the recent advantages made in the powerful and efficient speech processing techniques such as vector quantization, Hidden Markov Model etc. Here we have used the Markov Model for predicting the command that we have given via the microphone as input to our system, and for the output it segments the sentence into words and then check the words in the data set for its converted speech signal. Using voice recognition, we can convey our needs to the assistant and it allows us to play music, search information and all the common functions of a personal assistant. The performance of speech recognition systems is usually evaluated in terms of accuracy and speed. Speed and accuracy is usually rated by means of Word Error Rate (WER). However, speech recognition is a very complex problem. Vocalizations vary in terms of accent, pronunciation, articulation, roughness, nasality, pitch, volume, and speed. This project tries to overcome these problems. Personal Assistant should be monitor the daily activity of the user and also help the user to track their details. Face recognition has a wide range of applications in which personal identification is required. Approaches using the Karhunen-Loeve Transform (KLT) or the Principle Component Analysis (PCA) for face representation and recognition have achieved impressive success.

Major focuses on this project is Travel guidance kit. It will guide visitors to the place with information about: current location, attractions nearby, and details about specific buildings. Rich multimedia support has been incorporated into the system to provide extra features to enhance the self-guided tour. We describe the design and implementation of the application, and in

particular focus on the context-sensitive features of the system.

II. METHODOLOGY

A. Existing Systems

In the existing system the query is either given as text or speech. The information or message is converted into query and passed it to the query parser. A query parser, simply put, translates your search string into specific instructions for the search engine. It stands between you and the documents you are seeking, and so its role in text retrieval is vital. Sometimes it may fail to perform its function with accuracy. Yet, a search application cannot reach its peak performance without intelligent query parsing, which allows for relevancy customization, additional security-trimming, and taking input from user interface variables or outside data sources. Query parser does the following: identify what to search for, parse the query language itself, provide access to search engine features. The basic operation performed by the query parser is searching the information. The role of a PA is to free an executive's time from organizing and administrative tasks so that they can spend maximum time on strategic tasks. Responsibilities typically include:

- Acting as a first point of contact: dealing with correspondence and phone calls
- Managing diaries and organizing meetings and appointments, often controlling access to the manager/executive
- Booking and arranging travel, transport and accommodation
- Organizing events and conferences
- Reminding the manager/executive of important tasks and deadlines
- Typing compiling and preparing reports, presentations and correspondence
- Managing databases and filing systems
- Implementing and maintaining procedures/administrative systems
- Liaising with staff, suppliers and clients
- Collating and filing expenses

By handing all that organization over to a VA, people would get on with their own work and simply wait for the options to pop up.

1. Have a Choice

A Virtual Assistant can take away all that frustration, tackle the research and provides the

comprehensive outline of all the options. These will be within the budget specified, the time-frame needed, and will have all that extra information like heavy traffic notification, petrol bunk availability, etc.

2. Get the Best deal

It's easy to compare prices and ensure that you get the very best deals available. If there's even the slightest possibility that the price could be beaten elsewhere, a VA can pick up the phone and negotiate with companies on your behalf

3. Can React Quickly

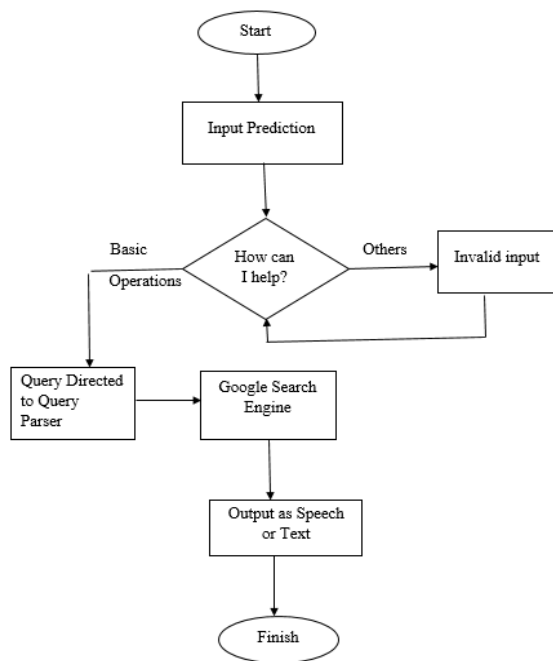
If a business meeting gets re-scheduled, or the family holiday needs to be postponed, it can be extremely time-consuming dealing with each operator to make changes or cancellations, not to mention making sure you get money back when possible. A quick email or phone call to your VA to re-arrange on your behalf will get it over and done within a matter of minutes.

Following are some of the advantages of using Personal dairy maker:

- Huge amount of information is being generated by online websites and is primarily consumed by users browsing the website. Websites have used HTML and XML based technologies to render the content on the user's screen and let the user make decisions based on his interpretation of that content.
- Availability of this information coupled with its overload on users has created a need for applications that can act as a conduit to interface users to the digital world by using the online information for the benefit of its users, with a minimal intervention from the users.
 - Instead of having separate applications for every day information such as train timings, weather conditions, sports scores, news etc., it would be greatly useful if an application would take over this task and present the information to its user when requested or for any urgent scenarios as alerts to the user.
- This leaves the burden of breaking the tasks for a user's intention to complete a task solely on the user. In a way, user needs to manually manage the workflow of the system as well as data transformation and data flow by using multiple sets of applications to complete one task.
- Miscellaneous tasks to support their manager, which will vary according to the sector and to the manager's remit, e.g. completing some corporate governance reporting (to ensure that the business is being run properly and complying with legislation and regulations) or conducting research.

Already, existing personal assistant behaves as a personal helper in business point of view. The existing system does not move so

personally and completely help in analysis. The input and output can be given as voice and text. The input is passed to the query parser. Query parser performs the searching operation and returns result. That result is converted into action if required.



1. Existing System

In figure 1, the flow of existing system is shown. The input from the user is given in two form. One type is through text. The text given is recognized and the further process is continued. The second type is through voice command. Speech is recognized by the system and the further process is continued. Speech is the most preferred type of input. Thus, the input is recognized and the command requested is by the user is performed. If the user requests for irrelevant task that is not provided by the personal assistant, the input is considered as irrelevant input and it asks for input again. If the user requests for the performance available, the query is directed to the query parser and the task is performed. For tasks like searching the output is fetched from the google search engine and given as voice or text command. Voice output is preferred by the user.

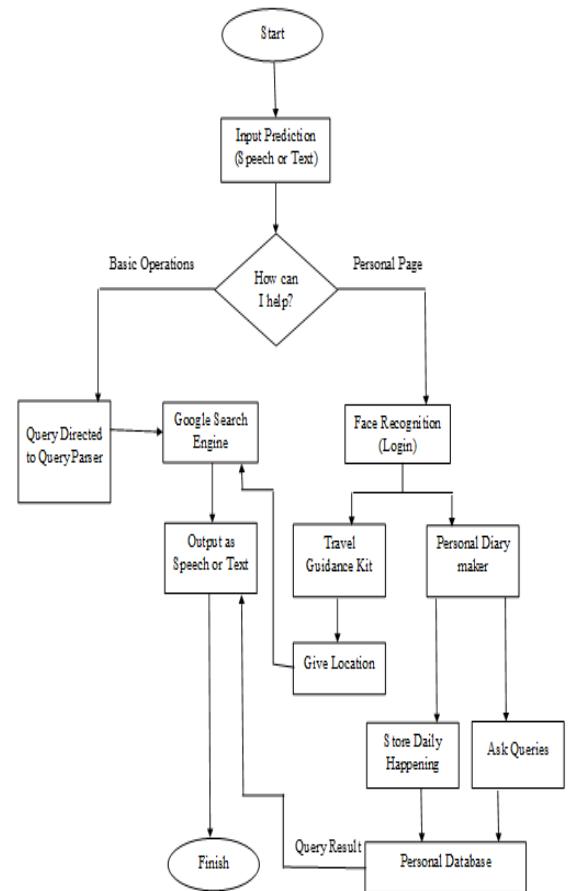
B. Proposed System

A **virtual assistant** is a software agent that can perform tasks or services for an individual. Sometimes the term "chatbot" is used to refer to virtual assistants in online chat.

Virtual assistants make work via:

1. Text
2. Voice
3. Image

With the growing number of online travel research tools, it's possible for Virtual Assistants to source fantastic deals on flights, accommodation, car hire, transfers, and activities that at one stage only a travel agent could have obtained.

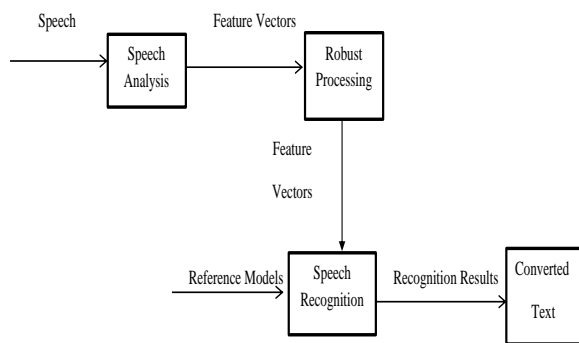


2 . Proposed System

A. Speech to Text using HMM algorithm

A Hidden Markov Model (HMM) is a statistical model in which the system being modelled is assumed to be a Markov process with unobserved (hidden) states. An Hidden Markov Model can be presented as the simplest dynamic Bayesian network. A Hidden Markov Model is a collection of states connected by transitions, as illustrated in figure 3. It begins in a designated initial state. In each discrete time step, a transition is taken into a new state, and then one output symbol is generated in that state. The choice of transition and output symbol are both random, governed by probability distributions. The Hidden Markov Model can be thought of as a black box, where the sequence of output symbols generated over time is observable, but the sequence of states visited over time is hidden from view. Therefore, it's called a Hidden Markov model. The implementation of speech to text is implemented using this algorithm.

The information given by the user is recognized by the system.



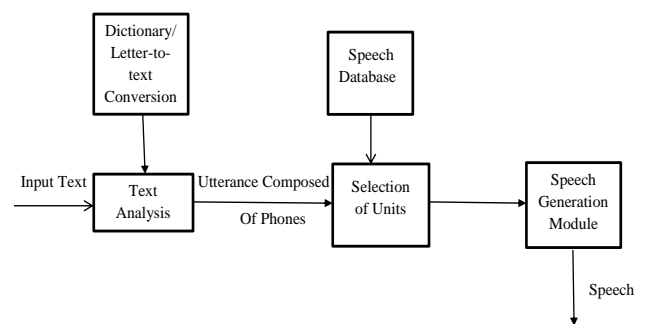
3. Speech to Text

When a speech is given as input the speech will be analysed. After analysing speech it will be set to Robust Processing which is done with the help of feature vectors. The result from Robust Process will be sent to Recognition phase where the words will be identified and recognized. During this phase Reference models will be integrated to recognize the speech. The results from the recognition phase will be analysed by the assistant.

When input as given through voice it will be analysed by the assistant i.e the assistant will analyse and predict what is the words spoken by the user. It will not only analyse the input given through speech it will also analyse the input given as text. When a user type what they need through key board or through touch pad via mobile phone, the assistant will also analyse using the database feeded for it.

B. Text to Speech using HMM algorithm

TTS (Text-To-Speech) systems generate speech equivalent for the text given as input. Though generation of speech is with moderate complexity, the aspect of introducing naturalness with the expression of the speaker is a big challenge faced in TTS. The personal assistant has the capability to convert the text entered into speech. In the task of searching informations it will fetch the information and give it as text output and voice output. People prefer voice outputs. So this process helps in the process of easy understanding of the task by the user and it brings in live interaction. Live interaction is the basic requirement for the assistant's success. It is achieved only through text to speech and speech to text methods.



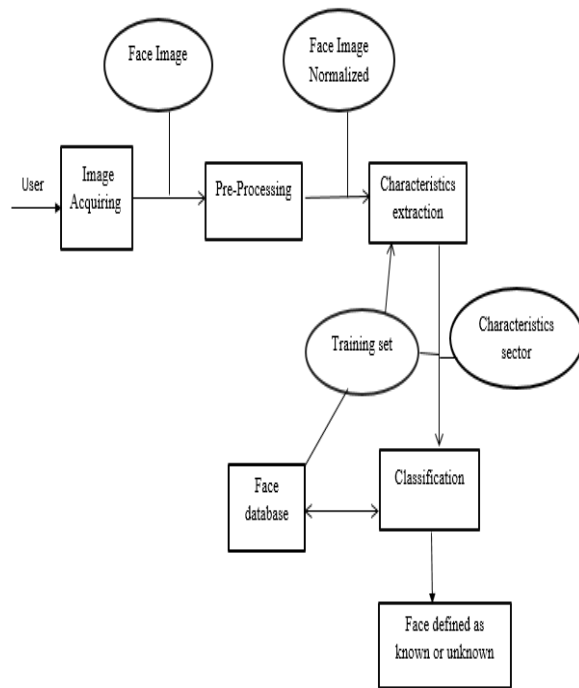
4. Text to Speech Process

In this process, input text will be analyzed using dictionary/letter-to-text conversion. The utterances containing phones will be analyzed in selection of unit block which is done with the help of speech database. The unit selected will be given as input to speech generation module which generates speech as output from the given input text.

C. Face Recognition using HMM algorithm

Face recognition is one of the most important applications of biometrics-based authentication system in the last few decades. Face recognition is kind of recognition task pattern, where a face is categorized as either known or unknown after comparing it with the images of a known person stored in the database. Face recognition appears to offer several advantages than other security systems. Facial recognition systems based on faceprints can quickly and accurately identify target individuals when the conditions are favourable.

Currently, a lot of facial recognition development focuses on smartphone applications. Smartphone facial recognitions includes image tagging and other social networking integration purposes as well as personalised marketing. Face recognition presents a challenging problem in the field of image analysis and computer vision and as such has received a great deal of attention over the last few years because of its many applications in various domains. Face recognition techniques can be broadly divided into three categories based on the face data acquisition methodology. Methods that operate on intensity images those that deal with video sequences and those that require other sensory data such as 3D information or infra-red imagery. Face detection always gives the appropriate output.



5. Face recognition Process

Image from the user is preprocessed to extract characters using normalization of face image and training set from face database. The extracted character will be classified using characteristics sector and the result will be feed to face database for developing they training set. The result from the classification will predict whether the input face given is known or unknown.

A. Map Integration

Map integration is done to perform the functions of travel guidance kit. This helps to identify the location of the user and provide the necessary data. GME is used for integration of map.

B. User Interface Design

User interface design for mobile application is designed in such a way that is interactive and simple. User interface is designed using angular.

C. Diary Making (Storing in Database)

The data of the user is stored in the Google cloud platform. The data is stored as the user tells the days happening to the assistant thus writing a diary for the user.

D. Mobile Application

The final output is the mobile application with all the operations integrated. This application can be installed in the mobile phones and used as our personal assistant.

IV.RESULTS

Thus, the personal assistant which performs the basic functions like playing music, fetching information, finding weather and many other tasks has been developed. The major focus of our project to implement personal dairy maker and travel guidance kit is also accomplished. Hidden Markov Model is the algorithm used for speech recognition and face recognition. The concept of personalization is accomplished by face recognition. The Personal assistant identifies the user using face recognition and fetches the dairy record for the user. The dairy record is fetched from the database. The user can record and store the daily happenings and the self-analyze the report. It helps the user to have a track of their daily activities. Future will like making an appointment, planning a day's activity can also be done and stored in the record. The next concept of travel guidance kit is performed by providing the traffic condition, tourist places, weather condition and other important facts about that place if the place is specified to the assistant. It helps in visiting the place with all details in hand. It can also predict the weather of a place for the next two days. Thus, the idea of personal dairy making, and travel guidance kit is executed in our project.

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