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My Buddy App: Communications between Smart Devices through Voice Assist

Ms. Gayatri Patel[1], Ms. Kajal Patil[2]

[1,2]*Assistant Professor at Babu Madhav Institute of Information Technology*

Abstract - *The use of the two chatbots for having natural conversation with each other. In future, it can be widely used because there is no requirement of human to provide commands to the chatbots for particular task. For the communication, the automatic questions answering are generated using Simple methods (stopwording, porter-style stemming, etc.) typically give in noteworthy improvements, while higher-level processing (chunking, parsing, word sense disambiguation, etc.) only give up very minute improvements or yet a reduce in accuracy. But the method is different from the NLP techniques which have been used for proposed system.*

Key Words: Artificial intelligence, natural language processing, question-answering voice assist, chatbot, Speech To-Text, Text-To-Speech, Automatic Speech Recognition, Voice Command Device.

1. INTRODUCTION

1.1 Overview of Artificial Intelligence

According to the father of Artificial Intelligence, the John McCarthy, it is "The science and engineering of making intelligent machines, especially intelligent computer programs". It is a branch of making computer devices, a computer-controlled robot, or software that think intelligently, in the similar manner that the intelligent humans think.

Artificial intelligence is in the context of a human after all humans are the most intelligent creatures we know off AI is a broad branch of computer science and the goal of AI is to create systems that can function intelligently and independently humans can speak and listen to communicate through language this is the field of speech recognition and much of speech recognition is statistically based hence it's called statistical learning humans can write and read text in a language this is the field of NLP or natural language processing.

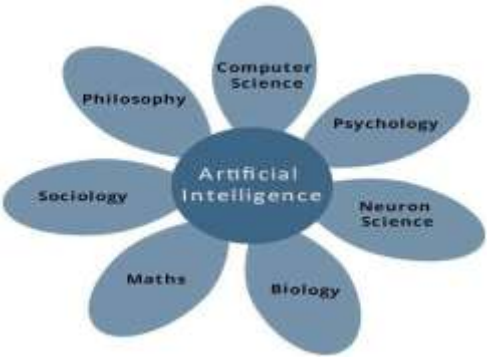

Figure 1 Components of AI

1.1.1 Application of Artificial Intelligence

AI has been developed in various fields such as:-
1. Gaming
2. Natural Language Processing
3. Expert Systems
4. Vision Systems
5. Speech Recognition
6. Handwriting Recognition
7. Intelligent Robots

1.1.2 Techniques of Artificial Intelligence

In the real world, the artificial knowledge has some unwelcomed properties –

- Its volume is huge, next to unimaginable.
- It is not well-organized or well-formatted.
- It keeps changing constantly.

AI Technique is a way to organize and make use of the knowledge efficiently in such a way that –

- It should be perceivable by the people who provide it.
- It should be easily modifiable to correct errors.
- It should be useful in many situations though it is incomplete or inaccurate.

AI techniques make higher the execution of speed of the complex program it is equipped with.

1.2 Overview of Natural Language Processing

Natural Language Processing (NLP) involves machine or robot to understand and process the language that human speaks. It is requisite when you want an intelligent system like robots to carry out your commands

The field of NLP involves making computers to achieve useful tasks with the natural languages used by humans. For processing the same the input and output of an NLP system can be –

- Speech
- Written Text

The two main components of NLP are:-

1. Natural Language Understanding
   - It maps given input like some spoken or typed sentence to useful representation
2. Natural Language Generation
   - It is the process of producing the meaningful phrases or taking some formal representation working out a way to express it in a natural language (e.g., English)

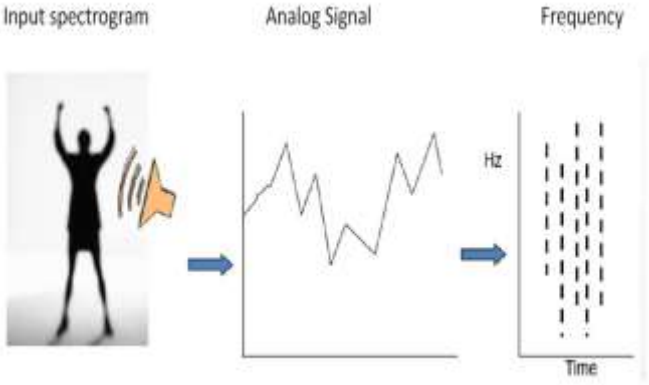

Figure 2 Understanding Speech Recognition using NLU

Behind these process the following steps are performed in the NLP:-

Lexical Analysis – It involves analysis of words where words are most fundamental unit. The core work of this analysis is to divide the whole chunk of text into paragraph, sentences or words.

Syntactic Analysis (Parsing) – This process of analysis which is considered a sequence of words usually a sentences and finds its structure. This analysis decomposes a sentence into constituents/words and identifies how they are related to each other.

Semantic Analysis – This process is associated with the meaning of a language. The idea of this analysis is to take natural language sentences and map them onto some representation of meaning.

Discourse Integration – This process involves attempts to interpret the structure and meaning of even larger unit.

Pragmatic Analysis – during this, what was said is re-interpreted on what it is really meant. It involves derive those aspects of language which require real world knowledge.

1.2.1 Application of Natural Language Processing

The mostly widely used applications of NLP are:

- Machine Translation
- Database Access
- Information Retrieval
  - Selecting from a set of documents the ones that are relevant to a query
- Text Categorization
- Sorting text into fixed topic categories
- Extracting data from text
  - Converting unstructured text into structure data
- Spoken language control systems
- Spelling and grammar checkers
- Question Answering

1.3 Problem Definition and Motivation

As now days , the NLP who can recognize the voice input and the speech understanding application has increase the level of the NLP. Now a days, the voice assist has become so famous which can recognize the voice of human and respond accordingly. It may be used as a text-only interface/spoken dialog system. There is a one challenge that to communicate two spoken dialog system with each other.

Because of all this reason, the chatbot which can communicate with another chatbot easily without need of human voice is the solution of the above problem. The chatbots which are famous cannot communicate with other chat bot is the main problem. This will motivate us to do research in Voice Assist.

1.4 Introduction of Voice Assist

Nowadays, the voice assist is widely used in smart devices like mobile, laptop, TV, etc. in the world. The voice assist is also said to be Intelligent Personal Assistant (IPA). The use of voice assist is to perform the task on basis of command given by the user input, location awareness and ability to access the other online information sources. The voice assistant does generate the question or provide the answers automatically. However, the work we present in this article is basically focused on the generating questions in proper manner with grammar and making communication between two voice assist.

With this operation in hand, we have performed the depth research of the available various voice-assist strategies, techniques. The voice assist are different for many of the services of the web where workloads currently has been present in modern WSCs (warehousescale computers).

Chatbots are the virtual assistant that programmed for providing automatically answers to the user request.

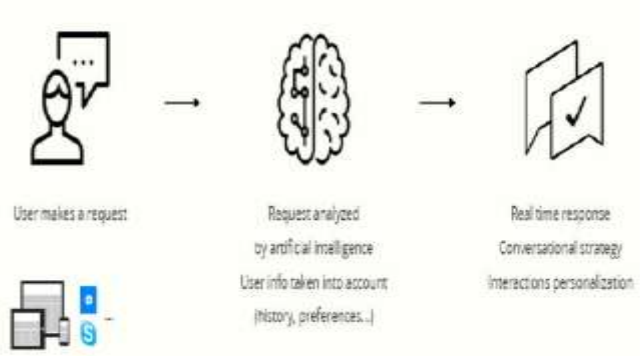

Figure 3 Chatbot flow

1.4.1 Advantages of Voice Assist

The advantages of voice assist are-

- User Satisfaction
- Customer service enhancement
- Simplify employees life

The other advantages related to voice assist are-

- Precise comprehension of sentence
- Rare misunderstanding
- Easy to set up

Doesn't need a correct grammatical sentence to understand.

1.4.2 Limitations of Voice Assist

There is number of advantages of voice assist, as well as its have some limitation like,

- Complex configuration of knowledge base
- Written sentence should be grammatically correct.
- High CPU and memory costs
- Lots of misunderstanding
- Excessive rules are complex may be to establish it.
- Necessary adjustments for different language grammar's.

1.4.3 Applications of Voice Assist

The widely used applications of voice assist are:-

- Siri
- Cortana
- Amazon Echo
- Google Now

1.4.4 Research Objective

The main objective is to make two spoken dialog systems talk to each other efficiently without need of the human command for their particular task. For creating a flawless and interactive interface using NLP between humans with machines which will continue to be a top most priority for today's and tomorrow's gradually more cognitive applications.

2. BACKGROUND STUDY

The Artificial Intelligence, the sub domain of A.I i.e., Natural Language Processing and Question Answering using Voice Assistant are the widely and recent area where the researches are going on trends.

2.1 Background study of Artificial Intelligence

A computer science branch which creates the smart machines devices as intelligent same as human. In the early 1945-1965, the first focus of AI research was on modeling the human brain and that was impossible. The first person who termed the first artificial intelligence is John McCarthy. After that the research was shifted to using games like noughts and crosses, drafts to create "AI" system successfully.

Figure 4 Tic-Tac-Toe game

In 1965 Researchers agreed upon the programs of game playing could not pass the test namely the Turing test and then the focus is shifted to natural language processing. In 1966 the first natural language processing program was made by ELIZA that responds to user's voice by asking questions based on the previous responses .In 1972 the PARRY make a prototype conversation model with a partner who is paranoid person which seems odd but that program was developed by a psychiatrist doctor. In 2000 robot pets was introduced which is interactive and made commercially available for all. MIT has displays Kismet, a robot which expresses emotion through face. A robot was made namely Nomad which has explore the regions and local meteorites of Antarctica.

The Goal of AI is to make the expert system which produce the intelligence behavior, learn the instructions, demonstrate the work, explain the instruction, and give advice to users and also to implement intelligence in machines same like human.

2.2 Background study of Natural Language Processing

The language processing system is a system which takes input the number of words or sentences and produce strings as their output. The nature of that output is depending on the task. The first use of computers was started in 1950s to manipulate the natural language to automate the translation between Russian and English languages. In early 1960s, the natural language processing were started to examine in an ad-hoc manner. The system is properly worked on pattern matching and derived representation of meaning.

The actual developments in NLP was started in the early & mid 1970s as system started to use different techniques or approaches like LUNAR, SHRDLU. During 1990s NLP have focused on specific, limited domains with some success or attempted to provide understanding of general natural language processing ability with less success. A major aim in contemporary language processing research is to generate the systems which work with complete threads of discourse. Successes in this area are currently limited.

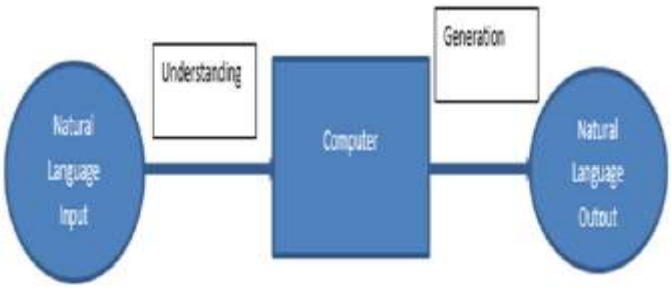

Figure 5 NLP

2.3 Background study of Question- Answering

Question answering implementation is a computer program that may construct the answer on a basis of queries a structured based database of knowledge of information. In 60s and 70s SHRDLU was a commercially successful question answering

system programmed by Terry Winograd. It has successful completed the operation of a robot of a toy world, and offers the possibility to ask the questions related to the world to the robot. The main strength of the system was the choice of the sub domain and the set of rules of physics of world that were easy to encrypt in a computer program.

In 1970s, the system was developed on the base of the Knowledge and information. This system provides the interface to the expert system produced more reproducing and valid responses on basis of the Knowledge. Recently, specialized NLP based Question Answering systems have been developed like EAGLI for health monitoring.

2.4 Background study of Voice Assist

Some research on voice assist has been recently carried out where it is noticed that the Cortana is only one voice assistant which performs the basic functionality using inbuilt set of commands. Other Voice assistant like Apple's Siri, Google's Google Home, etc. requires the network connectivity to perform task. The Voice Assist is also known as Intelligent Personal Assistant. Some IPAs may present business services, like calendar and meeting reminders while many offer essential services, like health monitoring and alerts via special applications. In general, an IPA will answer queries and perform actions via voice commands using a natural language user interface.

The voice assist is made to make the hard and tedious work of the user easy by the simple voice command only. The recently voice assist which are used by the people over the world are: - Siri, Cortana, Google Now and Amazon Echo. Some research on voice assist has been recently carried out where it is noticed that the Cortana is only one voice assistant which performs the basic functionality using inbuilt set of commands. Other Voice assistant like Apple's Siri, Google's Google Home, etc. requires the network connectivity to perform task.

2.4.1 Siri

Siri is an "intelligent assistant" which is in- built that enables Apple iPhone 4S user and different newer iPad and iPod devices. It speaks a natural voice commands and accordingly the mobile devices and the apps operates. The User speaks commands and the Siri receives this audible and make it confirms which will help to send messages, set reminders, operate iTunes and many more.

Siri can work transversely multiple iPhone and iPad apps as needed in order to accomplish its tasks. It also supports extended dictation, which is used to enable users to have their words translated into text and that can be used in e-mail and text messages, Facebook status updates, and tweets, note-taking Web searching and similar operations.

Siri also features significantly in the Siri Eyes Free and iOS in the Car technologies from Apple that provide voice command support of a car's audio system or in-vehicle infotainment system.

Figure 6 Siri

2.4.2 Cortana

The another digital assistant program named Cortana is also similar to Siri, as it responds to natural language spoken and can perform a wide range of task which is used by the end user in organization. Tasks may include setting of reminders, scheduling calendar events, calculating mathematical problems and also conversion of different tasks like measurement and money.

End users can manage what information Cortana can access. If the user does not want to use Cortana at all, the program can be turned off. Because Cortana's memory is nonvolatile, user preferences the program gathers are available if and when the user decides to turn Cortana back on later. It also saves user preferences in a storage area which is often called as Notebook.

If there is a use of Windows smartphones, Cortana uses Bing search engine which can also answer the questions or send/rad text messages. At first the user need to launch the Cortana app or search for the icon or an active listening feature allows user to simple say "Hey, Cortana" which will launch the program without the physical touch to the phone.

On Windows 10 desktops, Cortana be able to open programs, find files, and read or send email messages. Users can moreover type a request to Cortana or turn on the microphone and converse to the program. Cortana also integrates with Microsoft's new Web browser, Microsoft Edge, and Internet Explorer (IE) where Microsoft delivers Cortana's updates independently from Windows 10 operating system updates so Cortana can receive updates more frequently.

Figure 7 Cortana

Cortana was initially developed for Windows Phone 8.1 and is named after a female artificial intelligence (AI) character in Microsoft's Halo which was a video game series. Cortana can work multiplicity with Universal Window application as well as third party application (Facebook, Twitter) and has an application programming interface (API). With this the administrator can also make use of that API to tailor their lines of business or any in-house app which will interact with Cortana.

2.4.3 Amazon Echo

A device from Amazon.com combines a wireless speaker, music streamer and virtual assistant in one unit. This device was introduced in 2015, the Echo speaker connects to a music source via Bluetooth and it also streams music from the user's local music collection, Amazon's libraries, iHeartRadio and TuneIn.

It is always connected via Wi-Fi. When some of the Echo's seven microphones hear "Alexa" from any of the area of rooms, it wakes up and emits the signal that has received in the form of audio and then waits for the verbal question by the user.

Figure 8 Amazon Echo

In 2016, Amazon added two related products. Echo Dot is a speaker less version of Echo that requires hook up to Bluetooth speakers. Dot does not act in response to the Alexa "wake up" word; but for that a button must be pressed. Amazon Tap is additional like the regular Echo but it is available only for music, weather and news. The Echo's "far-field" voice recognition lets people who verbally command the unit from a distance.

2.4.4 Google Now

Google Now, introduced by Google says helps you to bring the right information at just a right time. The idea behind this is that it will use information about you which is already timely delivered by you which can be based on schedule, locations you share or current location, hobbies, time of the day and many more.

Google Now presents you with this information using what they call Cards, and Android which will notify you when a new Card pops up which is based on your settings. For example, Google Now hit me with this card during the Yankees/Red Sox game because it knows the Yankees are my favorite baseball team. It also provide you information which may be helpful throughout the day including weather forecast, traffics, any appointments made, public transit ,sports and many more.

Google Now will use you previous searches to determine which teams you're interested in and present you real time scores of those games. You can effortlessly manage teams in the Settings, in case Google picks up a team which you don't really care for.

Weather is probably pretty self-explanatory which will get your location and give you the current conditions as well as the five-day forecast. There is an option available which is always displayed in this card or which can only be displayed in the morning or in the evening (for the next day's forecast).

Equally Public Transportation and Places Nearby are based on the location reading from your device's having GPS. Public Transportation will give you schedules when you're near a Bus or Train station, as well as 'when traveling.' Places Nearby will show you exactly that is notable places in the area.

When talking about appointments and traffics they are stuffs going on the daily basis. Google Now will make you possible for making appointments where it can grab you a next appointments from your calendar and also display's it as card when the appointment is been approached. With this, if travel is required, Google Now will also give you traffic reports and linking of the directions too.
It also provides information about the flight about the status as well as the traffic to the airport. This can be done by Google by grabbing the flight information sometimes you have searched in Google search engine. With this it also grabs your location which can be based on different criteria. The criteria may include: you visited some place with different language, with different currency or may different time zone. Wherein translation, currency and time back home is considered to be the most usage of the functionalities. Thus, the idea behind Google is to provide a personal assistant which is done using your habits and search history and hence can be an fascinating concept.

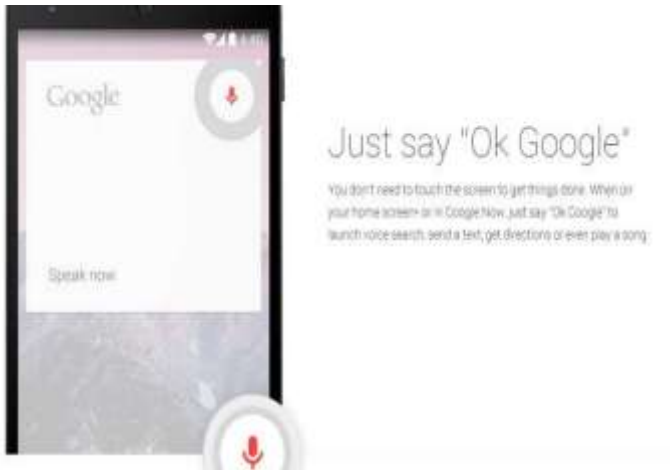

Figure 9 Google Now

2.5 Comparison between Siri, Cortana, Amazon Echo and Google Now

Table 1 Voice Assist Comparison

	Siri	Cortana	Amazon Echo	Google Now
Developed	Siri was made by Apple.	It was made by Microsoft.	It was made by Amazon Echo.	Google Now was developed by Google developers.
Origin	It was the first personal assistant, debuted in the iPhone in year of 2011.	It launched in 2014 in, named as "Halo."	Alexa is also known as Amazon Echo. The name Alexa is given by Amazon. It gave the PDA for its Echo home device, which widely sell in June 2015.	In year 2012, Google gave answer to Apple's Siri by adding Google Now in phones. Google's AI provide advance features this year with Google Home, an Echo competitor, and a new message app called Allo, both can bear a voice command helper known named as Google Assistant. It's considered as engine for Now.
Function	Siri was made widely opened for third – party made apps on this year when the iOS 10 has arrived. It also allows the outside developers other than developers of Apple to provide its capabilities like hailing the Uber, which is the important achievement of the consumers of AI.	Microsoft calls Cortana a "digital agent." It can handle basics like controlling calendars, getting weather and taking dictation on an email.	In starting when it was introduced Alexa provides the limited uses, it automatically responds from the home speakers to requests for task like weather and news. Alexa finds a radio station automatically from TuneIn. It's an Amazon pitchwoman through, so it will take input as a command like remembering your shopping list, etc.	Google Assistant will acts such as Siri or Cortana or Amazon Echo, which will call up the information and according it will perform tasks like searching and providing directions. Of course, Google taps into its own knowledge graph to retrieve the relevant information for consumers, which gives it an advantage as it expands capabilities.
Upgrades	Siri is getting smarter with Apple TV. A viewer can ask or provide command it to pull up a live stream from inside Apple TV apps. It also is embedded into Apple Car Play for hands-free control of key systems like navigation, music and messaging. And Siri is taking control of the homes through Apple Home Kit.	Microsoft has put Cortana into its Edge web browser, which means it's there to help complete online tasks such as making reservations or looking for discounts while shopping. Cortana also works with Google Android and Apple iOS devices. Microsoft wants Cortana to be everywhere, including of	This fall, Alexa can connect with Amazon's TV device for controlling the streaming video. And it has made the big leap from only simply taking dictation around shopping lists to now placing the orders. Alexa also has a program to control the home environment. The device has been hacked by Tinkerers to perform functionality like to start the Tesla cars remotely.	Assistant can perform tasks like finding flights. The assistant also syncs with Chrome cast, giving people voice control over their digital TV experience.

		course its own ecosystem, from the Xbox to Skype to LinkedIn.		
Marketing	In the last past years, Apple has made up Siri to talk-to-TV capabilities shown in TV commercials. It's also relied on stars like Zooey Deschanel and Cookie Monster in work done by Apple agency.	Microsoft's most memorable Cortana commercials are the ones that go directly after Siri, something it has done a few times over the years in spots.	The company is running an ambitious series of 100 digital vignettes called "Alexa Moments," 10 seconds each, to show its versatility. Tool of North America is the agency.	Google has promoted its new phone named as Pixel phone containing TV spots by telling it the first phone which having Assistant. Droga 5 is the agency.

3. LITERATURE REVIEW

In research paper by G. Angeli, N. Nayak and C. D.Manning proposed a review on combining the logic and providing the shallow reasoning for generating Question Answering.

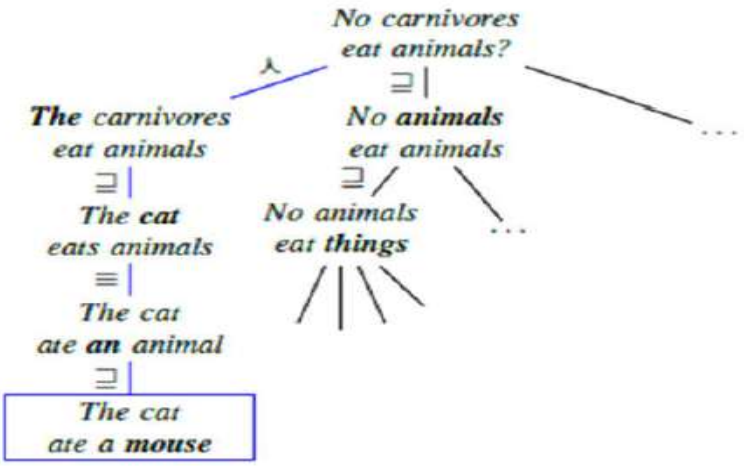

Figure 10 Natural Language Searching

An illustration of Natural LI searching for a candidate premise to support the hypothesis at the root of the tree. We are searching from a hypothesis no carnivores eat animals, and find a contradicting premise the cat ate a mouse. The edge labels denote Natural Logic inference steps.

They have described about the approach that incorporates the both signals on framework on the depends on natural logic. And also they have made the natural language more robust for communication by question answering by running the interference of trees, deletions and incorporating evaluation for entailments when the support could not found. And at last, it shows the relational between entailment and meronymy can be incorporated to the natural logic. It also allows the open type question answering achieving strong results on the basis of corpus. [5]

In Ariklturri, it is a question generator which helps teacher to conduct test not manually but by using these software to generate questions by putting storing the text into corpus. Using Ariklturri, it will reduce the time of generating questions papers. In this paper Ariklturri generates question of four types: Fill in the blanks, word formation, MCQ and error detection and correction by using NLP tools. It also provides the answer of that particular question, so the task of the teacher will reduce for the generation of examination paper and the assement will be also done automatically done. [6]

The paper NLP (Almost) from Scratch generates a neural network prototype or architecture and algorithm that perform various tasks of NLP such as speech tokens, chunking, etc. It achieves versatility using trying to avoid the specific task for getting knowledge. In this paper it represents the minimal requirements of tagging and good performance. [7]

The paper NLP in Information retrieval uses techniques to retrieve the information from the corpus. It uses two method which is Simple method where stop wording ,etc. are done that provides the important improvements and another is Higher level which consist of parsing ,tagging, chunking ,etc. that provides minor important or decrease the accuracy. In this review paper, it suggest that NLP needs the optimized for IR to be impactive and the information retrieval by the document can be done easily. [10]

The research paper published by J. Hauswald, M. Laurenzano, Y. Zhang, Cheng , Austin Rovinski,A. Khurana, R. Dreslinski, T. Mudge, V. Petrucci1, L. Tang, J. Mars shows the work about the Sirius which is an IPA(Intelligent Personal Assistant) application same like Ok Google, Siri. It is made for recognizing speech, for generating questions- answers and also for the monitoring or visioning of computer. The main aim of this application is to measure the performance, power and cost of the hardware based application. [1]

In the research paper by Rajani S, M. Hanumanthappa, and the semantic analysis is the most precious part of NLP. The analysis provides the perfect meaning of the words and sentence and shows the meaning in the meaningful manner. In this paper, the investigation is done on the works that have been done in the semantic analysis .It divides into two parts: - first is LSA and second is ontology. The LSA is mostly used for automatic evaluation instead of manual evaluation and also used for extraction of meaningful sentence. Another technology is ontology technique in which it extracts the structural information from the non-structural data from the corpus. [2]

The research paper by K. Mazidi and P. Tarau presents a quick approach to generate automatic question that increases the accuracy of the questions perfection than compare to the random question. It accepts the almost all the automatic generating question using NLP techniques. They have generated the algorithm Decon Structure which checks the availability of the question and also it provides the interface to accept the question easily by the mostly used NLP system. [3]

The review paper by A. Chopra, A. Prashar, and C. Sain has detailed explanation on NLP. It shows about the interaction of human with computers. It processes the language in the backwards and produce the optimized output. It also focuses on the application of the NLP where it contains the information retrieval, summarization and generation of question- answering. The information is retrieve in form of physical copy, reports and papers and also in soft copy. The system should be capable of retrieving information stored in the computer. The NLP is a tedious task to develop the system and also to evaluate the system for providing maintenance or to represent the reasoning theories. [8]

The research paper by P. Rajpurkar, J. Zhang, K. Lopyrev, and P. Liang introduced the Question Answer for Stanford Dataset which provides the large dataset to store the whole comprehension and generate the question on it. Mostly it provides the generation questions on the basis of the Wikipedia blogs or articles to copy it and generate the question based on the article. In this paper it also shows about the performance of generating the model, against the human and the need of the improvement. And mostly the dataset is available as free it will store the more comprehensive models. It provides the interface between the linguistic and logistic regression model and the manual performance. To fill the other gap is a tedious task but the efforts of generating model will provides the important impact in learning comprehension.[9]

The research paper by C. Manning, M. Surdeanu, J. Bauer, J. Finkel, S. J. Bethard, and D. McClosky has suggested the design and the proper use of the Stanford Toolkit which provides the analysis of the proper language processing. The main benefit of this toolkit is that the researchers community can use and also the other government user of the open source NLP tools. They have provided a simple, effective design that can be used by any normal people for processing of the language. [4]

4. PROPOSED APPROACH

In this work, I will employ proposed algorithm for doing communication between two chatbot Device. As we have explained in previous chapter, there are many methods and way for communicating with humans through voice assist. There is a challenge in recently widely used voice assist like Siri, Cortana, Amazon Echo, and Google Now that they cannot communicate with other chatbot device without the presence or the voice commands of the humans. To overcome above limitations or challenge we proposed an algorithm which is work for doing communication between two chatbot devices. To overcome above limitations or challenges a My Buddy app communication between two smart devices is proposed a method will provide the existing functionality of existing voice assist and also it provides the extra functionality of communication between two chatbots.

4.1 Proposed algorithm

In this algorithm I perform the conversion of text message into the voice and conversion of voice message into the text for communication between two chatbot devices. Algorithm goes in to following steps:

1. Take input from first device as a voice message.
2. This voice message is recognize by second device using voice recognition system.
3. Convert voice message into simple text form.
4. Analyze text message using created method.
5. System will understand text message and generate appropriate response.
6. Generated response text message will be converted into voice message.
7. Response voice message send to first device.

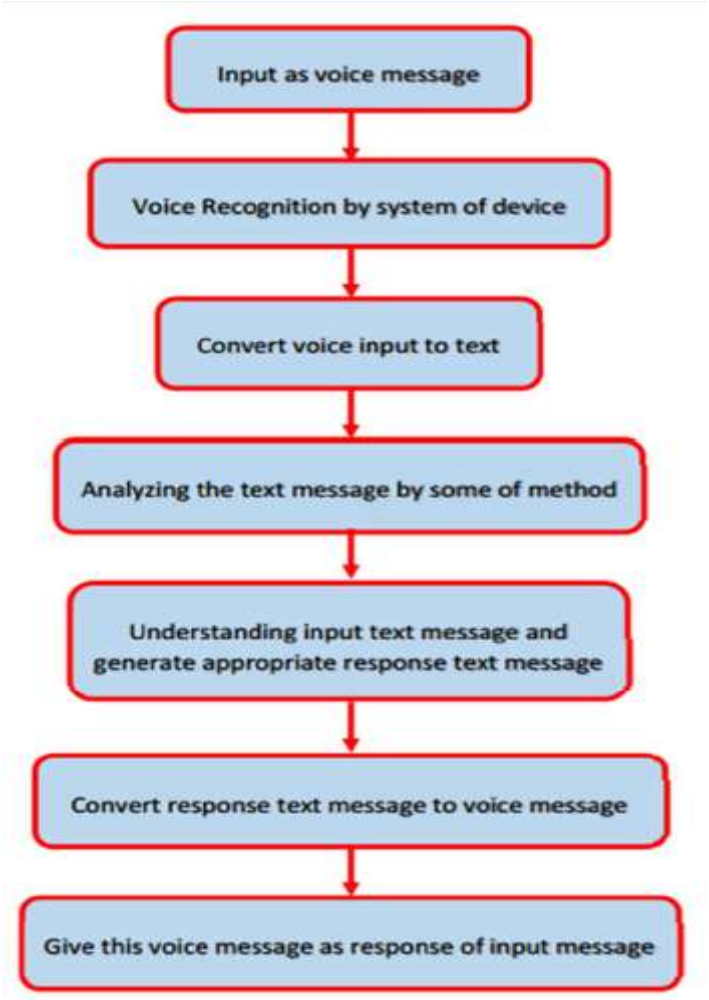

Figure 11 Algorithm

4.2 Workflow of algorithm

In previous sections I define the proposed algorithm, in this section I define how it's actually work? What value of all the required data member of the algorithm. The briefly describe bellow:

1. Take input from first device as voice message. This voice message gives as input to second device, when the system device gives input prompt for voice.
2. This voice input message take input from the input prompt for voice. Device use in-build voice recognition system functionality to recognize voice of first device.

3. Device need to convert this recognize voice input message into simple text form for easily to understand system of first device. So that we can use some in-build library of that platform which is used to convert input voice message into simple text form. It means, we use voice message-to-text message conversion.
4. We can get now text message as input message. Device can use this message as input for our system method and analyzing on it. During the analyzing process, we can use this message and compare or match this message with our system's messages which are already provide by our system using some of comparison method of text.
5. Here, we can understand input message using analyzing process and generate appropriate output text message based on input text message using our system method.
6. This output text message sends as a response message of input message in voice form of first device. We need to covert this text message into the voice message. So that we can use some in-build library of that platform which is used to convert output text message into voice message form. It means, we use text message-to-voice message conversion.
7. This voice message give as output voice message or response message deliver or send to device by another device. Now here this response message as input message for first device. So then understanding this message to perform all steps by first device.

5. RESULT AND ANALYSIS

From above we can show design algorithm. To perform it we can first required the some data and sample collection of existing technology and algorithm problem and limitation. For that in this section we analyze the existing technique and algorithm.

5.1 Analysis of Different Voice Assist

The voice assist is made to make the hard and tedious work of the user easy by the simple voice command only. The recently voice assist which are used by the people over the world are: - Siri, Cortana, Google Now and Amazon Echo. Some research on voice assist has been recently carried out where it is noticed that the Cortana is only one voice assistant which performs the basic functionality using inbuilt set of commands. Other Voice assistant like Apple's Siri, Google's Google Home, etc. requires the network connectivity to perform task.

5.1.1 Analysis of Siri

Siri is the simple voice commanded assistant available for the users of the Apple. It is design to provide a good interface to interact with the iPhone or any Apple smart devices by providing voice command and getting response back. It basically works on the sub areas of Artificial Intelligence and Natural Language Processing which contains three components- interface, awareness of context and the service of delegation. It first takes the input of number of words one by one by the interface to hear and understand the proper meaning by using machine learning. During the machine learning the awareness of context start working to provide the output by predicting the words which you have said by using keywords which have been used , the habits and the choice of language is also the important factor for providing output. The mostly used commands to give input it automatically adapt that things and provide the personalized result. And at lastly, the delegation of service is important to use the in-built app of iPhone or other Apple smart device. The important task of the Siri is firstly to transcribe the human speech into the simple text by using Automatic speech recognition that will separate the questions, dictations and commands. After that it will convert the text into the phrased text using NLP tools. Then after by using question answers and analysis of the intent it will analyse the text and commands.

The technology of data mash up will provide the interface to the third party web based services such as searching, performing actions, etc. The produce output of the third party interface will convert into natural text and that text will convert into speech using TTS.

5.1.2 Analysis of Cortana

Cortana works only in the Windows Phone and Windows 10 OS. It provides the features of opening inbuilt app, setting the remainders for day-to-day, responding the user's voice by gathering information from Bing search engine. Cortana gets activated by saying "Hey Cortana" using microphone feature of smart phone or by typing command. The settings of the Cortana can be changed manually so that it can responds to your voice commands or text based commands. It provides the searching facility so that any documents from desktop or from Drive can be easily found. It can also check your emails using Notebook and provide notification before you check your email.

5.1.3 Analysis of Amazon Echo

Amazon Echo looks like a Bluetooth speaker which is in cylindrical shape and it is already present in it. That in built speaker is a rounded speaker which plays music and other audio file. It also can recognize the voice same as the smart devices and it can control the computer which is shown in the movies and the shows. By the commands you can ask to play music, can add to-do list, also to forecast whether and many more. In your home, if the devices which are compatible then that devices can be also controlled using commands.

This system is makes your work so ease that the work can be complete without touching anything physically and can controlled the devices using the voice commands easily. It connects you to Internet network through your Wi- Fi. It always remain active and wait for take input the number of voice commands and processed further for natural language voice recognition processing where it send the command to the service in cloud namely Alexa Service where it understand the meaning of the command and return back the response .

This device contains the many number of microphones that can listen the voice from the room in which you are present over the music and any instrumental file. This system has been updated at regular period of time in which it provides the other developers to provide the future enhancements.

5.1.4 Analysis of Google Now

Google Now is a service which came in picture to compete with other voice assist like Siri. It has a feature of providing the information service. It will provide the exact data by knowing what you want or by knowing the location. The main aim is to provide searching facility easily without using text or doing manually searching. The recognition of Speech is difficult task where anyone has done the searching using voice can knows well. The solution of the problem is, the Google has adapted the different approach to replace the existing approach for understanding the spoken words. Google shift to another approach that is neural network which is more efficient to understand the speech.

The neural network consists of small system that works like the neurons. As shown in the above figure, the process starts with the neuron which looks simple which is looks like different colour. If from the word something gets matches then it would fire the signal or event. Now further on second step it will concentrate on the neurons to set which are partitioned in the first layer due to the firing of event. As you go at the very uppermost layer there will be a neuron which got trained 15.08 % for that particular time. By using this approach it reduces 20-25 % error generation rate in this model. By using this approach the problem of recognizing speech has been solved in any condition like different voice, unusual noise, other microphones etc. due to network was available to catch automatically how to manage the situation.

5.2 Output Analysis

In this section, I have describe about the output of the own created voice assist and shown the work of the voice assist. They have described below:

- Text to Speech Recognition
    - By clicking on the Text to Speech button it need the input of message in a text formant and it will automatically recognize the text and that recognized text will be pronounced or speak by the voice assist .
    - Another thing is also shown that you can open the in-built app by selecting any one app from the list of in built app that has automatically generated.

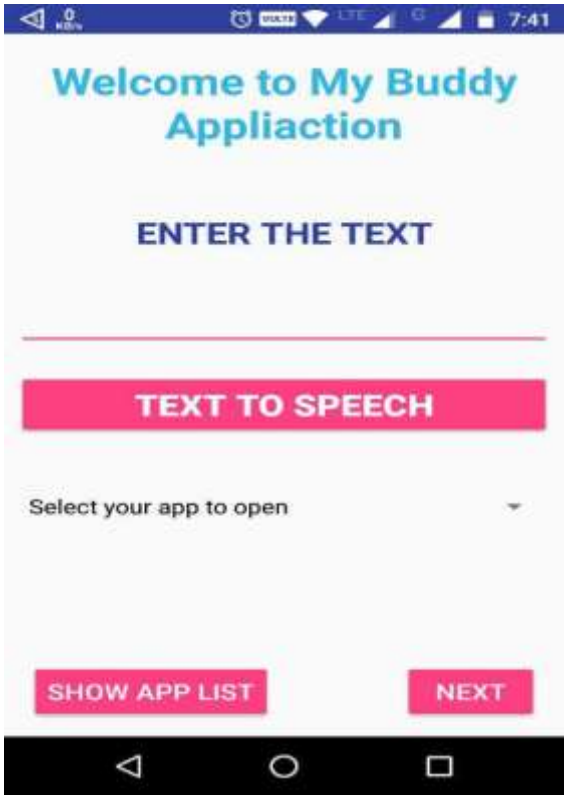

Figure 12 Text to Speech Recognition

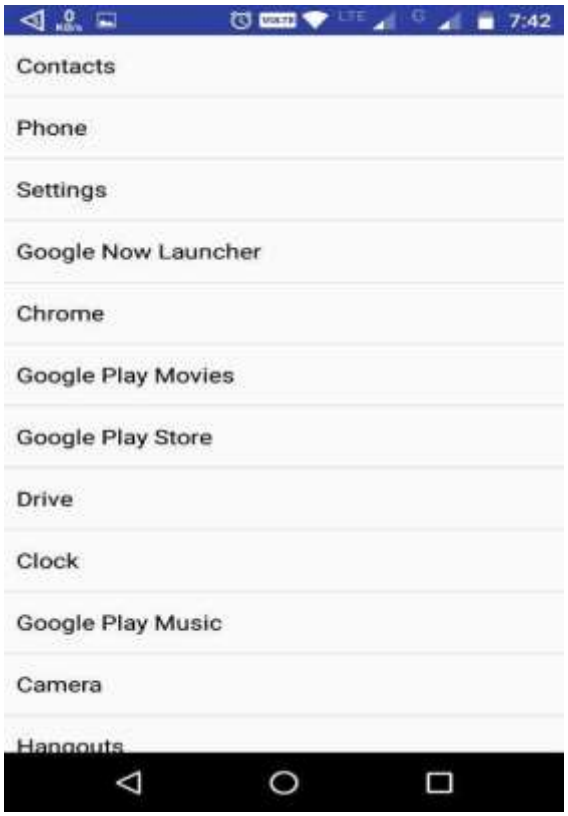

Figure 13 In-built app list

- Speech to Text Recognition
    - Clicking on the button of speech to text it will prompt a voice assist dialogue to speak a message and then the voice assist will recognize that message using automatic voice recognition or speech recognition and display the message in the text format on the screen where the text box under the here your text is displayed on the screen.

Figure 14 Speech to Text

- Human Communication
    - When the user clicks on the start communication button, the communication will be done between the human and the chatbot where the human has to provide command by using first key word “open” to open any application or you can just provide the number of words as a input and it will response back by providing searching or opening the application through voice.

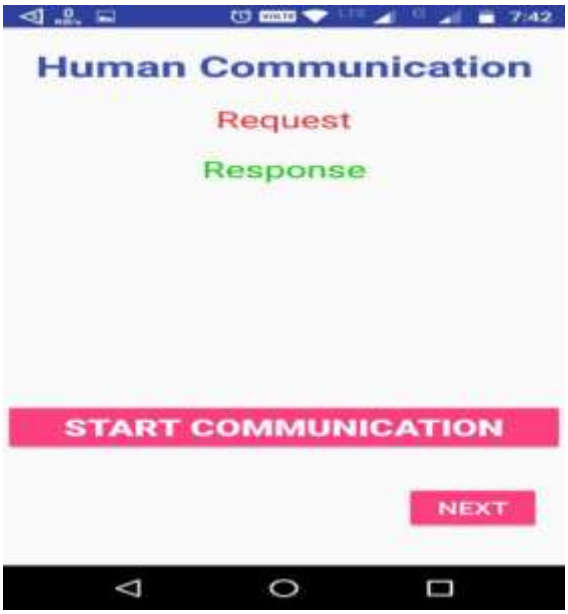

Figure 15 Human Communication

- Chatbot Communication
    - It shows about the communication with two chatbot, firstly you have to set one chatbot as a sender and another chatbot as a receiver.
    - After that the sender chatbot will provide the input message in form of voice of chatbot to another chatbot and that chatbot will respond back to the input message in form of searching or in form of question answering with each other.

Figure 16 Chatbot Communication

5.3 Report Analysis

Table 2 Report of chatbot Communication

Input Message	Output Message	Percentage
Hello	3	43%
How are you?	1	14%
Goodbye	3	43%

This report shows about the communication between two chatbot devices. On the basis of the input message like Hello, How are you? , Goodbye through the voice of chatbot will generate the number of output like Hello, How are you? , which is fixed on the input. And at last it shows the number of percentage generated output message generated by chatbot device.

6. CONCLUSION AND FUTURE EXTENSION

In this work, I have recently developed an application for opening inbuilt applications and for communicating with other voice assist in proper manner which uses Google's speech recognition engine. The main aim of application is to use voice of voice assist to access smart phone instead of using user's voice command. . As it integrates most of the mobile phone services for daily use, it could be useful for getting a more convenient life and it will be helpful for those people who have disabilities for using smart phones through voice.

In this application user is able to access the services of smart phone without their voice command and without their presence. Using this application deaf person or the person having less knowledge about smart phone or how to access the smart phone can easily access the phone with their voice of voice assist in the mentioned works, the authors present different methods for

the automatic generation of language questions based on NLP techniques. However, mostly in all of them the techniques and the architectures are focused on a similar and single question type which is open domain question answering.

Some experiments are also carried out during the process of implementation of the application or system that have proved the NLP tools and techniques used in this process for generating question determine the response of generated answer. In this work we have also shown the researches on the techniques and working system of different voice assist like Siri, Cortana, Google Now and Amazon Echo. We have also presented the report of question generation where it shows that a single question can get more than different response by repeating same question. Those results which have been generated shows that generation of question and respond regarding is good. And also it shows the flow of the communication in between two chatbot devices.

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