INTELLIGENT AI BASED VOICE ASSISTANT

[1]Dr.S.Brindha, [2]Ms.S.Nimrukthi, [3]Ms.M.Mubashira Khatoon, [4]E.Rajasurya, [5]T.Stenson

[1]Head of the Department, [2,3,4,5]Final Year Student
[1,2,3,4,5] Department of Computer Networking
[1,2,3,4,5]PSG Polytechnic College, Coimbatore, India

Abstract: A chat-bot is an artificial intelligence-based assistant which can have two-way interactive communications with humans. It can help them find answers to their questions, accomplish small tasks such as providing data on the users' questions, and suggest places such as diners, hospitals, malls, and so on, based on their preferences. In the domains of robot systems and natural language processing, intelligent chat-bot systems are becoming increasingly popular. Artificial intelligence is increasingly being implemented in Chat-bot systems, which are often used in dialogue systems for various practical reasons such as customer support or information acquisition, as natural language processing. The objective of this paper is to demonstrate how to develop a Chat-Bot using Rasa.

***Index Terms* - Chatbots, Rasa, Open source, Entities, Intents.**

I. INTRODUCTION

Intelligent Voice Assistants are conversational AI voice tools based on understanding human language and experiences. Their basic functioning depends on voice and text recognition. Some of the best examples of voice assistants are Amazon Alexa, Apple Siri, Google Assistant, Microsoft Cortana and Samsung Bixby. An AI Voice Assistant is nothing but a synthetic voice that turns text into human-sounding speech with the help of task-based algorithms. It also has the ability to store user information that might help in driving the conversation further and help in future conversations. We need Voice Assistant to improve customer engagement, to have advanced search capabilities, to enhance e-Commerce marketing, to eradicate language barriers and to saves time by automating repetitive tasks. Voice assistant usage is currently growing in cars and other settings where users rather not be looking and interacting with a screen.

1.1 Smart AI based Voice Assistant

Traditional Voice assistant is built with the help of Natural language understanding (NLU) where it helps to understand what people are saying in both spoken and written language but while using this Nlu based voice assistant there are many stumbling blocks comparing to smart AI based voice assistant such as it requires more time to train, may not show the context, may require more keystrokes and it requires clarification dialogues. Due to these ambiguous or unclear inputs it may leads to misinterpretation. Smart AI based Voice assistants boast broad compatibility to give you seamless control over disparate technology, and, by extension, over the comfort and security of your home. It is a piece of software that responds to spoken commands and communicates with the user audibly.

1.2 Existing Chatbots

The development of Artificial Intelligence chatbots went one step further. Chatbots form conversations with people through text messages, a virtual companion that is integrated into mobile apps, websites, messengers and help companies address customer queries. Chatbot technology is over 50 years and the timeline of their evolution are:

1966- Eliza: Eliza was the first step in chatbot development and created to show how communication between humans & machines can happen.

2001-SmarterChild: SmarterChild was an intelligent chatbot that was distributed widely across the world's most popular instant messaging platforms and SMS services.

2006-IBM Watson: It used natural language to function and has become a core system that has helped doctors in detecting lung cancer.

2010-Siri: Siri was the first intelligent personal assistant that converses with users who initiate voice queries through natural language processing.

2016-Messenger bots: Facebook Messenger has become the biggest example of chatbot conversations.

2017- Woebot: Woebot was developed to interact with and treat patients affected by depression.

II. FUNCTIONING OF A VOICE ASSISTANT

Voice assistants are passive listening devices that listen to the user and respond through verbal commands. "What's the weather?" a user can question, and the voice assistant will respond with the weather forecast for that day and location. "Tell me a story," they may say, and the helper would immediately begin telling a story.

Passive listening means the device always hears what's happening around it, which raises privacy concerns. These concerns have been highlighted by smart devices serving as witnesses to crimes. As mentioned in Figure 1, the first step is User Interface this is where the user interacts with the application and finds out what the user's expectation is and supports efficient responsively which helps to improve the conversational rates which anticipates and satisfies the user's needs. The next step is AI software this helps to ease the machine learning process and facilitate in building the models. In this paper we have used RASA as the AI software. Python module is used to create a voice assistant module and navigation module then after these inputs the chat bot produces an output through text to Speech converter and produces a User Interface module (UI), the point of human-computer interaction and communication in a device.
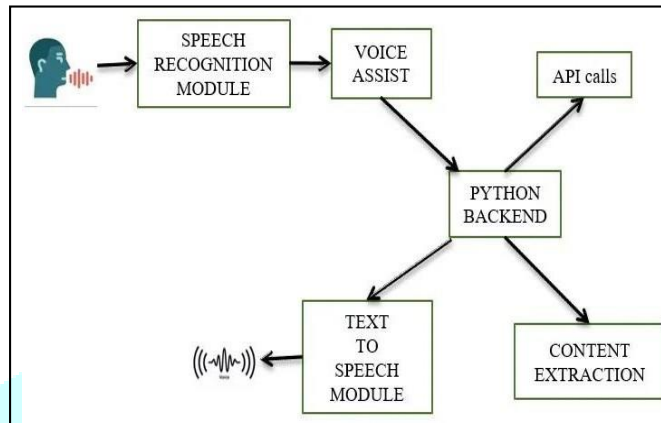
Figure 1.Working of a Voice Assistant.

2.1 BENEFITS OF INTELLIGENT VOICE ASSISTANT

Artificial Intelligence Voice Technology is unquestionably the next big thing. Companies are incorporating AI conversational bots at a faster rate than in the past. When corporations integrate voice technologies into their infrastructures, they receive the complete package: better economics, efficiency, and productivity.
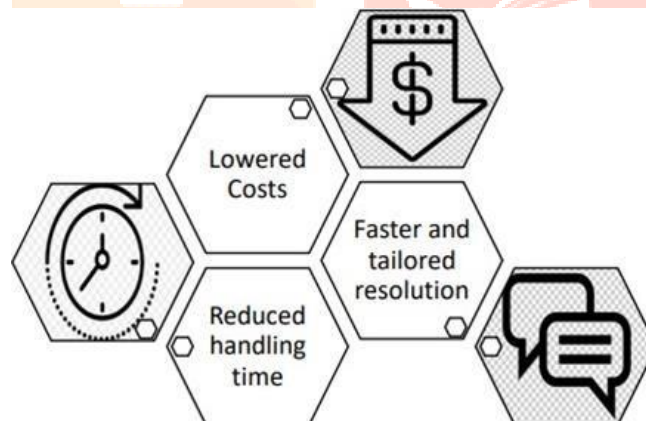
Figure 2. Benefits of a Voice Assistant.

Enhanced customer convenience: Using Voice Assistant is a simple approach to assist customers with their questions while also providing the ease of conversing with someone in their own language. Customers can communicate with the Voice assistant in the same way they would with a real agent. All without the need for ongoing human interaction to answer the same queries repetitively.

More rapid and tailored resolutions: Voice Assistant can be used around the clock to answer questions and aid customers in making educated decisions. They can build on past talks to provide personalized responses and resolutions that are suited to the user's specific needs. Users can use AI voice assistants at any moment to obtain immediate answers to their questions.

Lower expenses: An AI Voice Assistant can support the implementation of high support ticket volumes by answering numerous users at the same time without the need for support employees to be trained and equipped. In the long term, the reduced requirement for human resources can save you a lot of money.

Accuracy and precision: Voice Assistant is driven by artificial intelligence that learns from prior encounters in real time. This allows Voice Assistant to consistently answer a higher volume of search questions. Voice assistants, which are based on cutting- edge AI algorithms, are incredibly exact and accurate in their responses.

III. TRADITIONAL VOICE ASSISTANT VS SMART VOICE ASSISTANT

In Artificial Intelligence, Traditional voice assistants and chat bots are two important things that are used interchangeably too often even though they mean two different things. The only similarity between these two programs is that they are both built to make the lives of humans easier through conversations. Traditional voice assistant is a type of software commonly used as an information acquisition interface.

TRADITIONAL VOICE ASSISTANT	SMART VOICE ASSISTANT
Rule based program technology is used.	Machine learning technology is used.
Assists businesses and customers.	Assists users with everyday tasks.
Acts based on manually crafted rules.	Understand a wide variety of ways in which a person can ask a question without being explicitly trained on every utterance.
Natural language processing is only used to implement.	Natural Language processing, Natural Language Understanding and also Artificial emotional Intelligence is used to implement.
Conversational user interface is used.	Chat like interface and Voice Commands is used.
Serves as an experimental platform.	Engages in casual or fun conversations.
Channels used in are: • Websites • Support portals • Messaging channels • Mobile applications.	Channels used in are: • Mobile Phones • Laptops • Smart speakers and interactive devices.
Support bots have a conversational user interface (CUI) which is a chat-like interface that enables customers to converse with the chatbot via messages.	Virtual assistants have a chat- like interface but also can function without an interface when activated using voice commands.
Difficult to scale.	Understands spelling mistakes and short terms.
To optimize the bot performance companies, have to explicitly update rules.	Easy to bootstrap training with data.

Table 1. Comparison of Traditional and Smart Voice Assistant

Chatbots are artificial intelligence-powered conversational agents that casually employ natural language processing to interact with users. Users converse with a chatbot through the chat interface or voice, just as they would with a human. Chatbots interpret and process the user's words or phrases and respond with a pre- programmed response. Clients benefit from this product because it is an automated program that interacts with customers like humans and costs little to nothing to use.

As a result, we have incorporated that Artificial Intelligence- based voice assistants are rapidly evolving. A smart voice assistant is a digital assistant that uses natural language processing, language processing algorithms, and speech synthesis to listen to specific language commands and provide relevant information or execute specific functions as defined by the user. Industries are enabling them to provide maximal capabilities, such as speech recognition and natural language processing advancements.

It will allow them to comprehend and carry out their requests. By listening for specific keywords, voice assistants can deliver relevant information linked with specific requests, commonly referred to as intents, stated by the user.

IV. IMPLEMENTATION OF RASA

Rasa can be implemented in Ubuntu, Windows and Mac Os also. In this paper we have implemented Rasa on Windows. To install RASA on windows, the initial step is to create a Virtual Environment. So, we are creating a virtual environment in our windows using "virtualenv". After installing the virtual environment, we need to create another virtual environment named my_env.Next, we need to activate our Virtual environment we have created. Our virtual environment is successfully created and activated. Next, we need to install the RASA on our my_env.

• **Initialize a new project**

Here we will initialize our project and we can train the initial mode while initializing.

```
rasa init
```

Figure 6. Initializing a new project

While initializing a new project several new default files will be created. As mentioned in the Figure some of the important file structures are explained below.

- *Training Rasa*

We can train our model based on the data we provide accordingly. When we run the below code in the terminal, rasa will start to train both Nlu and core model and then stores the trained model in the model's folder.

Figure 7. File Structures

nlu.yml: This file contains the possible messages from the user and the corresponding intent. This file is used for creating the intent classification model. Whenever the user inputs a message, the classification model automatically classifies the intent of the message.

Figure 8. Rasa Nlu

actions.py: This is the python file to run the custom actions. This file can be used for an API call or database querying. When the action is action_hello the below code will execute and dispatches the text "Hello" as a reply.

Figure 9. Actions.py

So, as we can see we have given a input "hi" and the output we got is "Hey! How are you?". This is how the Rasa chatbot works. The user can add any kind of inputs and get the same output the user expects. As explained above how to train a Voice assistant through Rasa we have created a chatbot through Rasa and trained it accordingly as it can respond to any questions related Computer hardware.

Figure 10. Training Rasa

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