

Exploring the Impact and Functionality of Sahasa: A Personal Voice Assistant

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ABSTRACT

In today's world, Information technology has progressed and is growing very rapidly today. In the early days, computers could only perform a few tasks, but with the introduction of new technologies such as machine learning, artificial intelligence, and data analysis, computers have made it possible for computers to perform many tasks. Artificial intelligence has become very successful in recent years and has made it possible to do business. One of the applications of artificial intelligence is natural language processing, which helps people communicate with machines. For example, voice assistant. Many voice assistants have been developed and continue to be developed to achieve better performance and reduce human interaction with the machine. They are trying to create a voice assistant using python that will help the user to perform various tasks without using the keyboard. The purpose of this article is to review how the voice assistant works and how to use the voice assistant in daily tasks.

Keywords

Voice Assistant, Natural Language Processing, Artificial Intelligence and Python.

1. INTRODUCTION

Human-machine interaction was increased and made easy with the development of voice commands, which was possible due to advancement in Artificial Intelligence. In recent years, they have used technologies such as artificial intelligence, machine learning, and natural language processing to teach their machines to think better and complete tasks on their own as humans. They can communicate with their machines through virtual assistance. Due to the widespread use of smartphones in today's world, there are many voice assistants such as Siri, Google Assistant, Cortana and Alexa. Voice assistants use technologies such as speech recognition, speech recognition, and speech processing to provide a variety of services that help users operate simple machines and issue voice commands. Virtual assistants are useful for the elderly, people with disabilities or special conditions, and children who do not know how to use machines or smart devices. Voice assistant make sure that the interaction with machine is not difficult anymore and also enable them to perform Multitasking.

Basic fundamental tasks performed by Voice assistant are as follows:

- Search on Wikipedia
- Opening Websites
- Play Music
- Setting Reminder

- Open Applications
- Telling Date, Day, and Time
- Searching Movies

These are some tasks that are performed by voice assistants, they can do many more things according to their requirements. The capabilities of voice assistants are continuously increasing and are providing better performance to users. Python modules and libraries are used to make their voice assistant so that their voice assistant can run easily, smoothly and provide faster speed for executing tasks.

The main idea of their work is that users set commands for the voice assistant to complete its tasks, and then their commands are converted from speech to text. After that, the applications are processed and the voice assistant gives the content of the text and the resulting sound. Along with basic day to day functionalities they are also trying to implement complex tasks in their voice assistant to make it more advance and to make it do more than just doing basic tasks. Their program uses the least amount of system resources which minimizes the expensive system requirements also reduces threat to your system as it directly does not interact with servers.

2. PROPOSED WORK PLAN

2.1 Literature Review

[1] In today's world, they are training machines to think like humans and complete tasks on their own, and the things which humans can do are being replaced by machines. Based on this situation, the idea of a voice assistant that could perform many tasks based on the human voice was born. Custom commands that the user gives to the virtual assistant can filter the commands and send relevant information. [2] In 2019 Ravivanshi Kumar Sangpal et al. gave out the model, called JARVIS, which aims to combine artificial intelligence with the Google platform and use markup language to convert text into speech. He describes the survival and reuse of this model, and finally describes its future scope. [3] In 2020 Ankit Pandey created a smart voice assistant that can take notes, exchange emails, and organize meetings on your calendar. This voice assistant was designed so that customers can work on the device using voice commands and collect the necessary information for user. [4] In 2020 Rahul Kumar designed an energy-saving smart home assistant which work with voice commands. In today's world, digital services are widely used in many areas such as home usage, used in electronic devices, used for public works, and most importantly, these services can also help individuals with visual problems. This is done using a hardware device called a Raspberry Pi, which is a small computer that has 40 input and output pins and uses a variety of connectors and outputs that plug into the monitor. Thanks to

this user, can get the necessary information through the sounds. [5] In 2020 Deepika Sherawat used desktop voiceover. This digital assistant has commands such as Spotify, Chrome, music player, notepad, and some other commands that enable the user to open multiple applications through voice commands. [6] In 2022 N Vignesh presented a comparative study of voice chatbots. In his study there was a comparison between virtual assistants and chatbots. Many problems occur because the chatbots do not support more than one language. In the process, they have an ontology using mapping technology connected to RDBMS. The purpose of using RDBMS is to store data repeatedly. [7] In 2020 Ankit Pandey, Vaibhav Vashist, Prateek Tiwari, Sunil said their Virtual assistant was able to send emails, update to-do lists, and start working on the website. In their article they described the connection of the microphone importance in the entire Virtual assistant. Future plans of virtual assistant are to connect to the cloud so more users can easily use the cloud to bring their ideas to life. Personal voice assistants are becoming a major influencer in the digital world. The number of smart speakers in the United States increased by 78% to 118.5 million units. [8] Independence in terms of expertise is an important part of the Virtual assistant ability to understand user needs and work in the user's best interests on a daily basis.

2.2 General Architecture/Flow Chart/DFD:

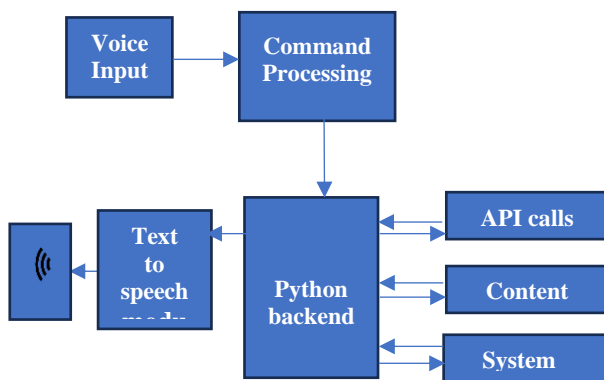


Fig.1 Flowchart

User Interaction: User interacts with the voice-controlled assistant by speaking commands. The assistant captures the user's voice input using the take Command function.

Command Processing: The script processes the user's command and determines the action to be taken based on the command.

Module Execution: The assistant executes specific modules for tasks such as searching Wikipedia, opening applications, playing music, setting reminders, etc. **External Services:** The script interacts with external services and APIs, such as Wikipedia, IMDb, Wolfram Alpha, and OpenWeatherMap. **Feedback to User:** The voice assistant can provide text-to-speech feedback to the user. **Continuous Listening:** The script runs in an infinite loop, continuously listening for user commands until the user says "exit".

3. RESULTS

3.1 Greeting Function

As they activate the virtual assistant it greets the user as per the time i.e. morning ,evening or night, after wishing the user the assistant starts listening and recognizing the user commands while translating speech to text.

```
import pyttsx3 ...

Good Morning!
I am SAHASA Sir. Please tell me how may I help you
Listening...
Recognizing...

Say that again please...
Listening...
Recognizing...
```

Fig.2 Greeting the User on Activation

3.2 Opening any Website Function

This Personal voice assistant can open any websites. The user can open any website just by saying the website's name. As soon as the assistant listen the user's command it open the required website and present it on the user's screen.



Fig.3 Opening Website

3.3 Searching on the Web Function

This Personal voice assistant can be used to search on the web. As soon as the assistant listen the user's command it starts searching on the web and present it to the user.

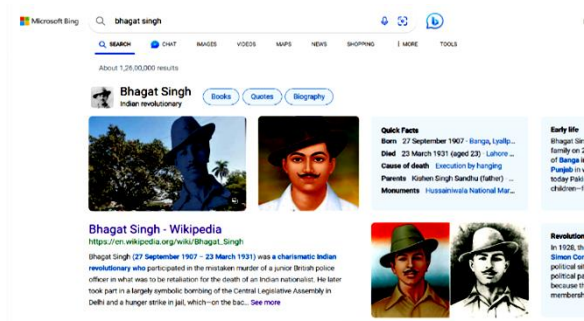


Fig.4 Bing Search

3.4 Movie Searching Function

To activate Movie searching Function the user need to speak 'Movie' followed by the 'Movie Name'. Then the Voice Assistant will show the related movie details as shown in the below figure.

```
Listening...
Recognizing...
User said: movie
```

```
Spider-Man
Spider-Man: Across the Spider-Verse will release in 2023 has an IMDB rating of 8.7. The plot summary of the movie is Miles Morales returns for the next chapter of the Oscar-winning Spider-Verse saga, an epic adventure that will transport Brooklyn's full-time, friendly neighborhood Spider-Man across the Multiverse to join forces with Gwen Stacy and a new team of Spider-People to face off with a villain more powerful than anything they have ever encountered.
Listening...
Recognizing...
```

Fig.5 Movie Search

3.5 Opening and Closing Apps Function

Personal Voice Assistant can open any application present in the system just by speaking the command 'open' followed by 'application name' to be opened and the apps opened can also be closed by speaking the command 'close' followed by 'application name' to be closed.

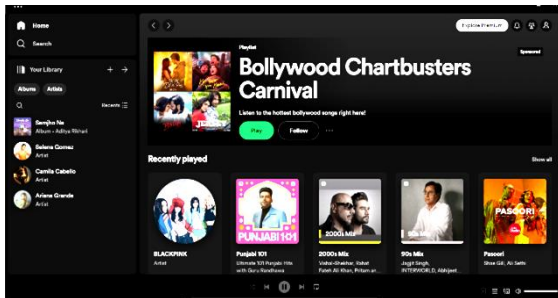


Fig.6 Opening and Closing Apps

3.6 Reading and Writing Notes Function

Another Function of this Voice Assistant is it can automate Notes. The user can read and write a note document by just giving suitable voice commands.

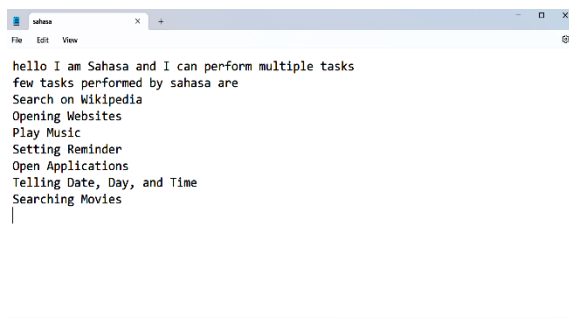


Fig.7 Reading and Writing on Notes

3.7 Playing Music Function

This Personal Voice Assistant can play music whenever the user wants. The user needs to speak command 'Play Music' to start playing music. If no music files are found in the system the voice assistant can also use YouTube to play music for user.



Fig.8 Playing Music

3.8 Any City Weather Report Function

Personal Voice Assistant can also give the weather conditions of any location throughout the world by using open weather map services. The user just have to provide the City Name and the assistant will give the report of the city.

```
Listening...
Recognizing...
User said: weather report
```

```
City name :
Listening...
Recognizing...
User said: Dehradun
```

```
Temperature (in Kelvin): 285.35
Atmospheric pressure (in hPa): 1018
Humidity (in percentage): 39
Description: overcast clouds
```

Fig.9 Weather Report

4. CONCLUSION

Functionality: The script serves as a voice-controlled assistant with various functionalities such as searching Wikipedia, opening applications, playing music, setting reminders, retrieving weather information, and interacting with external services like IMDb and News API.

Modularity: The code is modular, with separate functions for specific tasks, enhancing code readability and maintainability.

External Service Integration: Integration with external services and APIs, such as IMDb and News API, enhances the assistant's capabilities by providing real-time data.

User Interaction: User interaction is facilitated through voice commands, and the assistant responds with text-to-speech feedback.

Continuous Listening: The script runs in an infinite loop, continuously listening for user commands until the user chooses to exit.

Improve user experience: The voice control assistant provides a hands-free, interactive user experience, allowing users to perform a variety of tasks using voice commands.

Versatility: The integration with external services expands the assistant's versatility, allowing users to access information from multiple sources.

Usability Across Domains: The modularity of the code makes it adaptable for use in various domains, from entertainment (playing music, jokes) to productivity (setting reminders, opening applications).

Potential for Further Development: The existing script can serve as a foundation for further development and customization. Additional modules, services, or improvements can be incorporated based on specific user requirements.

Room for Refinement: While the script covers a wide range of functionalities, there is room for refinement and optimization in terms of error handling, user feedback, and additional features.

User Engagement: The continuous listening loop allows for extended user engagement, enabling users to interact with the assistant for multiple tasks without restarting the script.

5. FUTURE DIRECTIONS

Natural Language Processing (NLP) Advancements: Explore and develop more advanced NLP algorithms to enhance the understanding of context, emotions, and user intent. Investigate techniques for more seamless multilingual and cross-cultural interactions.

Emotion Recognition and Response: Research methods for voice assistants to recognize and respond to user emotions, providing a more empathetic and personalized experience.

Conversational AI and Context Awareness: Focus on improving conversational AI to allow voice assistants to better understand and maintain context over more extended dialogues.

Integration with Augmented Reality (AR) and Virtual Reality (VR): Explore how voice assistants can integrate with AR and VR technologies to provide immersive and hands-free experiences.

Enhanced Security and Privacy Measures: Investigate robust security measures to ensure the protection of user data and privacy in voice interactions.

Healthcare Applications: Explore voice assistants' role in healthcare, including remote patient monitoring, medication reminders, and providing health-related information.

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