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Study of Voice Controlled Personal Assistants

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ABSTRACT

Artificial Intelligence's purpose is to create human interaction with computers and other electronic devices much easier and practical, and also to form a technology that helps computers and machines to function in an intelligent manner. Nowadays, Virtual assistants are trained to adapt human speech and reciprocate via produced voices. People can ask them queries, information or control office or home appliances as well as devices. It's also useful for multimedia playback, and managing other vital errands like sending emails, creating to-do lists, and even managing calendars with commands that are voiced. Many companies like Amazon, Apple, Google, Microsoft are utilizing dialogue systems technology to train various varieties of virtual personal assistants. As of recent years, the talents and usage of virtual assistants are known and are escalating swiftly, with new products getting launched within the market frequently it has created a robust weight on both email and voice user interfaces.

Keywords - Virtual Personal Assistant, Artificial Intelligence, Voice Recognition, Internet of things.

I. INTRODUCTION

In this era of the Information Age, The digitalization of the world has made sure that humans do not need to be dependent on anyone else for help, they could depend on a far more efficient and reliable system which can take care of their everyday tasks. The computers, mobiles, laptops, etc., have become a part of us and they make our daily life better and easy, It could carry out almost all of the simplest tasks like Arithmetic Calculations to Complex tasks such as writing programs to reduce tedious work that would take endless hours of time.

A computer system that is able to have a conversation with humans using a voice is known as Dialogue system or Conversational system. It is used to help users accomplish their tasks more effectively via voice commands or communication. These dialogue systems are widely used in various devices such as smart-phones, Computers, smart TVs, Autonomous cars. Also, these dialogue systems can sustain a wide range of applications in education, healthcare ,business initiatives and entertainment, etc. These devices are known by numerous names such as, personal voice assistants, virtual personal assistants or voice assistants

II. MATERIALS AND METHODS

A. Virtual Assitants with IOT

The accuracy of ML algorithms, voluminous training data,[13] have improved over the years and also the

introduction of the elements to add personalized touch of humanity to the voice recognition softwares. The AI-powered virtual assistants like- Siri, Cortana, Amazon Alexa, and Google Assistant are now capable of handling speech at a 100% precision rate. It suggests that The Internet of Things has a phenomenal relationship with virtual digital assistants.. The Internet of Things is the linking of physical objects that contain embedded technology to communicate and sense or interact internally or the external environment.

The IoT Applications links every single thing from humans to processes to various objects. The IoT automates tasks without man-made interference. In simpler words it means it monitors objects remotely using Natural Language Processing (NLP) via VAs. For Example, In the smart phone or speakers like Alexa or Google Assistant they help in the management of these smart devices.[12] The touch-screen interface has made life easier, particularly for seniors. With visual impairment or reduced mobility in pictures it's a bit easier, yet screen readers, which have formed an area for the easily accessible interface, they still suffer with some issues.[12] The voice-responsive virtual interface that is Voice controlled personal assistants are a great addition to many such communities.

Fig.1 A Virtual Assistant with IOT [1]

B. Setting up a Custom Skill for any Laboratory Instrument Interaction (Amazon)

The demanding computing service like Amazon Lambda, Amazon Web Services are usually operated to host a routine skill which will interact with the laboratory system shadows and will react to the received speech commands. Once the skill is available, Amazon customers can see it in the Alexa App and choose to enable and use it.[2] Using this option on an Alexa-compatible device allows the following operations to be carried out:

1. The user's command that is known as speech is sent to the Alexa service which exists in cloud.[3]
2. Alexa identifies the request received, denotes the OneshotTideIntent intent for the "Tide Pooler" skill.[3]
3. It then assembles this data into a request which depends upon various cases and situations. Here in this example its specifically an IntentRequest. Alexa sends this IntentRequest to whichever service defined for the Tide Pooler skill. The request includes the value "Pune" under "City".[3]
4. This Tide Pooler service receives the data in form of a request and does the required deed. [3]
5. Tide Pooler provides the Alexa service with systematic reply in form of a text that later she conveys to the user using her voice.[3]

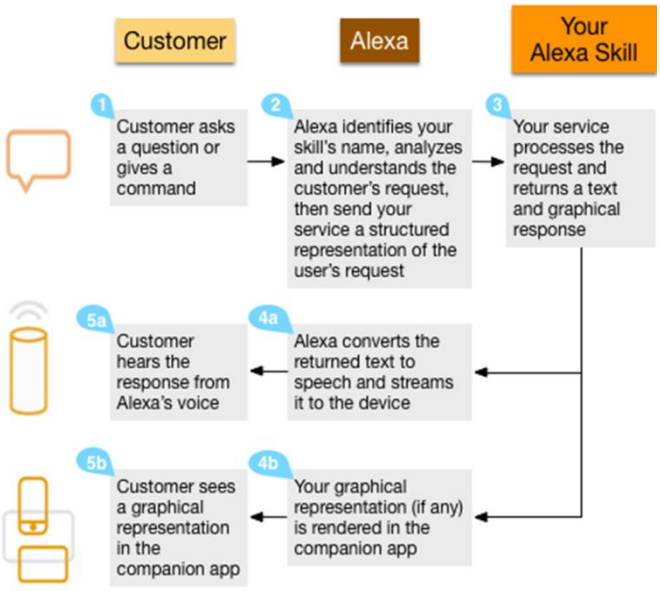

Fig.2 Alexa Custom Skills [2]

C. Creation of a Voice Interaction Interface

The Alexa Skills Kit most commonly known as ASK is a software development framework. ASK permits you to create content, called skills who act as apps for Alexa. Due to its interactive voice feature, Alexa offers its users a hands-free means of communicating with the help of skills. Users can use their voices to accomplish their daily responsibilities like checking the news, match scores, listening to music, or playing games.[7] Users can also use their voice to control devices that are connected to the cloud[[7]

For instance, users can have Alexa turn on the lights or change the temperature of the electronic heater or air conditioning.[7] Skills are compatable on almost every Alexa-enabled device, such as Amazon Echo, etc, or any other Alexa-enabled devices built by other manufacturers. In addition to vocal interaction, skills may include corresponding visuals and tactical interactions as well.[7]

Fig.3 Alexa skills kit [3]

III. INTELLIGENT PERSONAL ASSISTANTS

There are four smart personal assistants Google Assistant, Amazon's Alexa, Apple's Siri, and Microsoft's Cortana that have been established to assist people in managing time vows and accomplishing tasks. [8]

A. Google Assistant

Google Assistant is Apple's version of Siri or Amazon's Alexa or Microsoft's Cortana. It was launched in 2016 & has made excellent progress so far making it the most dynamic and advanced virtual assistant out there. Google's Assistant is not only available with Google's hardware but it's also made available for various devices like wireless headphones, Smart Fridges, Smart Cars & Smart Speakers.

Earlier Google Assistant was an extension of Google Now but now, Google has completely killed Google Now. Google Assistant responds to both text-based & voice-based conversations. After invoking Google Assistant with commands like - "Hey Google" or "Ok Google", it can help you with voice searching & voice commands, letting you complete any number of tasks. Once you've started talking to Google Assistant, it will keep on listening for your commands without needing to be invoked again with wake words like "OK Google". It can also recognize your voice and differentiate it from other's voices by keeping voice profiles

Here are some things Google Assistant can help you with :-

1. If you've lost your way and can't find your way back to home , Google Assistant can help you. Just say something like - "Get me Home" and it will guide you through the best route with the help of Google Maps.
2. You can listen to the latest news headlines instead of reading them on your own by asking Google Assistant. Just say - "Play the News".
3. You can queue up your favorite TV Shows or Movies on Netflix by asking Google - "Play Friends on Netflix". For this to work, You'll need to have Netflix app installed in your phone
4. You can also use Google Assistant to check for appointments or read out your Emails by saying - "Read out my Mails" or "Check for today's Appointments".

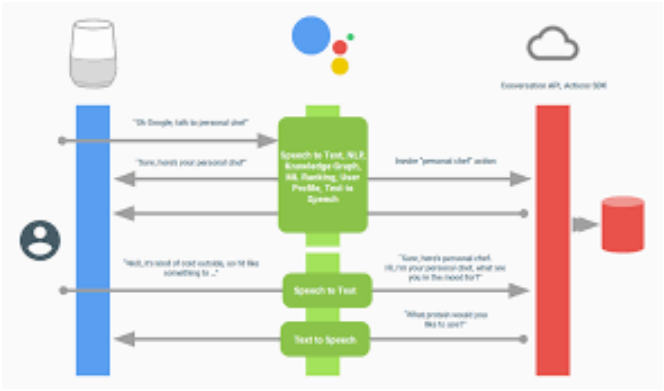

Fig.4 Google Assistant Action SDK Workflow [4]

B. Cortana

Technically speaking, Cortana wasn't supposed to exist for another 500 years, But on April 2, 2014 Microsoft launched it on Windows 10 (pre-2004 update). With Google Home and Apple Siri in competition, Microsoft decided to take a different approach with its exclusive take based on an Artificially intelligent character from a video game series named Halo.

Fig.5 Cortana [5]

Cortana is a personal digital assistant that helps you with your daily tasks like searching for information on the web, giving heads-up of upcoming events, setting reminders, managing meetings, recognizing natural voice without the requirement for keyboard input and giving smart answers by using Bing search engine. Cortana is able to do this by continuously learning your habits & interests. Apart from that she has a good sense of humor and she's smart & witty while closely resembling a human assistant. This is the story of Cortana & how she came into existence.

In order to invoke Cortana, users simply need to say "Hey, Cortana!" and make a command or request, like "set a reminder for 4.15 PM" or "read my email from Alan" or "search for the best voice assistant". While speaking to a PC, Cortana's window will automatically be pulled up.

C. Siri

Just like Google Assistant, Siri is a personal voice assistant which was specifically made for Apple users. Siri is available on all of the Apple devices like - iPhone, iPod Touch, iPad, Apple Watch, Home Pod and Mac. What makes Siri stand out from other voice assistants is that Siri offers a seamless way of interacting with the user. You can ask her questions, You can tell her to set reminders, find or do things you need and she'll do all of the things you've asked her for on your behalf and hands-free just like a human assistant would. Siri has access to all the built-in apps like mail, contacts, maps, safari , etc. and she'll call upon those apps for you whenever it is required.

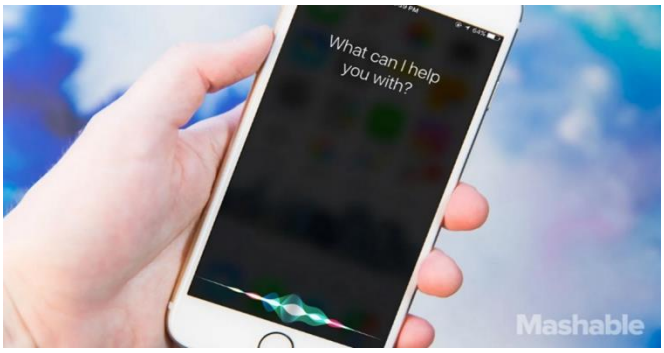

Fig.6 Siri [6]

You can invoke Siri by saying "Hey Siri" to the apple device you're using. You can invoke her using buttons too, you just need to hold down the Home button for 2-3 seconds to launch Siri on your iPhone. Siri is pretty clever, fast and at times really funny too. She can do a lot. She can help you when you're out and about, with sports and entertainment information, getting organized, phone class and messages, giving you tips about certain things,

answering your questions, giving you directions, setting an alarm, flip a coin, finding a book by a specific author. She will also tell you when a good restaurant is nearby exponents.

IV.CONCLUSION

In today's digital world where user experience and performance of the system play the most important roles, One thing is for sure that Personal Voice Assistant technology is here to stay for a long time. Just a simple thought of talking to a device and getting some tasks done is an appealing innovation in itself. The usage of Artificial Intelligence in user's day-to-day lives is directing the shift towards voice based applications. Unlike Alexa, Siri and Google Assistant which are software based systems, There're many Hardware Based Systems out there known as Smart Speakers. These devices use the Voice Recognition technology and they respond to similar commands or wake words such as , "Hey Google!" , "Hey Alexa!". This technology is growing exponentially and some experts even predict that this voice technology will be integrated with almost every application out there in the near future.

We can predict, this is only the beginning of Voice technology as we will definitely be seeing major advancement in the field of Artificial Intelligence in the upcoming years and there will be major changes with the user interface as well. With this ever-evolving technology of Artificial Intelligence, Companies need to start honing these skills and learn how to use Voice technology to have better interaction with their customers.

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