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DIGITAL VOICE ASSISTANT FOR VISUALLY IMPAIRED USERS

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Abstract:

Now a days many people suffer from vision impairment. They frequently require assistance with daily activities. Braille was once used by blind people to read, but it is gradually becoming obsolete. In today's technological era, blind readers can read electronic documents using screen reading software. However, due to the high cost of that software, not all blind readers can buy it. That is where the voice assistant started in which text or commands from users are accepted and tasks are completed using this method. This paper provides information on some digital voice assistants like Google Assistant, Alexa, and Siri etc. This an innovative system for visually impaired users and act as a voice assistant for them the system is used to help the visually impaired to have access to the most important features of the phone enhancing the quality of the system making use of different layouts and using speech to text.

Keywords: *Voice technology, Voice assistant, Virtual Assistant, Assistive Technology, Digital Voice Assistant.*

Introduction:

A voice assistant is a digital assistant that listens to particular voice commands and returns relevant information or performs specified action as desired by the user, using speech recognition, language processing algorithms and voice synthesis. Voice assistants can deliver relevant information based on particular instructions, also referred into as intentions voiced by the user by listening for certain keywords and filtering out the ambient noise. While voice assistants can be totally software-based and integrated into most devices, others like the Amazon Alexa are developed exclusively for single device applications.

Voice Assistant uses artificial intelligence and voice recognition to provide users with accurate and fast information. There are many use cases for using a voice assistant in today's 21st-century world. For example, when your hands are busy and you cannot use a touch screen or keyboard, or when you are busy at work and need to change your music, you could just tell a voice assistant, "Please play my happy music."

It also helps automate search, discovery, and online order operations by supporting specialized tasks such as

booking a flight or finding the cheapest book online from various e-commerce sites and then providing an interface to book an order.

Definition of Voice Assistant/ Virtual Assistant:

"A virtual assistant is an application program that can understand natural human language, speak natural language and complete electronic tasks for the end user" (TechTarget-2022)

Objective of the Study:

- To know about the basic concept of Voice assistant.
- To make an overview of different digital voice assistants available for PWD users.

Literature Review:

Barata, M., Salman, A. G., Faahakhododo, I., & Kanigoro, B. (2018) has discussed about the development of an Android-based intelligent software application for visually challenged or blind people so that blind students can access library resources using an Android device. The researchers concluded that while trying to use applications for blind and visually impaired users, all applications received a good response. Hoy, M. B. (2018) has studied voice assistants are software agents who can interpret human speech. Apple's Siri, Amazon; s Alexa, Microsoft's Cortana, and Google Assistant are the most popular voice assistants. It includes smartphones or home speakers. Library users can ask questions to their voice assistant. Voice can help control your home automation devices and media playback, as well as manage your basic tasks like e-mail, to-do lists, and calendars with your verbal commands. This article also discusses some of the privacy and security issues involved in Voice Assistant and some potential future uses for this device. Librarians will need to become familiar with their work and consider it as a means of distributing library services and materials like the use of voice assistants grows exponentially. Tulshan, A. S., & Dhage, S. N.(2018) have studied about voice assistant like Siri, Google Assistant, Cortana, Alexa. Voice Assistant have attracted the world in many ways, like smartphones, laptops, computers. Virtual assistants have not yet solved the problem of voice recognition and human interaction. To solve such problems, the researchers surveyed 100 users. After that, the researchers realized that if we could solve the problems of these 100 users, the use of this voice assistant would increase in the future. Kumar, N., Prathinan, K., Suresh, G., & Prema, P. (2020) in their work entitled "Smart Voice Assistant for Library System." The library has an important place in the lives of students and research students. Currently, the library system is available in all colleges and universities. It is considered very difficult for students to find a book in such a library. So some students get bored of finding books. In this article, the researcher has done a detailed study on how to find books in the library through voice recognition. This makes it easier to find books. With the help of voice recognition, even students who do not know the system can easily find books in the library. The voice recognition system reduces the time it takes to find books in a library and makes the library more accessible to readers.

Alboaneen, D., Alsaffar, D., Alqahtani, A., Alamri, L., Alfahhad, A., Alqahtani, B. & Almohammedsaleh, F. (2021) The purpose of this article is to develop a Smart Information desk system through Smart Mirror. It is a mirror, which

has more capacity to display answers for academic inquiry. Voice recognition features were also used to answer questions asked in the audio to serve other users with disabilities. This system displays general information such as date, time, and weather. This system was implemented on Raspberry Pi 4 Model B. It was connected to a two-way mirror and an infrared (IR) touch frame. Patil, M. A. A., Gavali, R. A., & Shetty, S. S. (2021) discusses the development of an intelligent software assistant based on Python for the blind and visually impaired as well as everyone else. This Voice Assistant application is designed to help blind and visually impaired students access Android devices. So that students can use these library resources on their Android devices. Both voice-to-text and text-to-speech methods are used for the accessibility of this application. When the researcher tested this application from some blind and visually impaired students, they got satisfactory answers regarding the use of the Voice Assistant application. Finding the library resources in the library in which such Voice Assistant application is installed will be very convenient for the blind and visually impaired as well as other general students. Finally, the researcher believes that in today's world of Artificial Intelligence, the technology to understand human natural language is in the machine. This is the Voice Assistant Device, which can be integrated with more and more intelligent systems. Bajpai, M. K., & Sharda, P. (2022) This paper focuses on speech recognition technology for OPAC service using Voice Search, Web-OPAC, Mobile Technology, OK Google, Hey Alexa. The method in this paper includes a Literature review. The researchers have attempted to concentrate on how the voice technology is working with the looking. A definite review of the related literature writing was made how speech technology can be consolidated in the OPAC to assist the pursuers with retrieving the ideal data all the more proficiently and actually from the library.Eventually, researchers realized that if voice search technology or speech was used in identity-based technologies like 'OK Google' and 'Hey Alexa' in web-OPAC, it would be a challenge and useful to students and the smartphone savvy generation. Gaikwad, S., Purandare, S., Balaji, S., & Ramteke, K. (2022): has focuses on library management using voice assistants like Google Assistant from Google, Siri from Apple, and Alexa from Amazon, which is an intelligent personal assistant. Also discusses recent advancements in voice recognition technology. It provides an overview of the various types of voice assistants as well as functions that voice assistants may perform a collection of 17 criteria for voice-based devices is described in this research. The researcher has studied in detail how intelligent personal assistant is capable of everything from app opening to alarm setting as well as taking notes.

Kinds of Voice Assistant Devices:

1. Amazon Alexa:

Alexa is a device. Alexa is an artificial intelligence service, Alexa is a device launched by Amazon company in 6 November 2014. Alexa is called a digital assistant device. It is a device that we can ask any kind of question while operating. For example, when you search for information on the Google search engine, you see it on a computer screen. But if you ask Alexa for information, you will get it in the form of a voice. After turning on this device you can ask him any question in your voice. E.g. What time is it today

So the answer to that question can come from Alexa in the voice of a female. We can also use Alexa device through mobile. In today's 21st century, many homes have some appliances that can be connected to devices that do automatic work. Can access them remotely. E.g. AC, music, smart TV appliances. Alexa device is connected to the Internet. And since it is connected to the Internet, its connection is with the server. All the information on the Internet is with the server. So Alexa can answer your every question.

The features are as follows:

- It can respond to voice commands,
- Play music,
- Create to-do lists,
- Set alarms,
- Stream podcasts,
- Play audiobooks,
- Provide weather, traffic, sports,
- Other real-time information, like news.

Alexa can also manage a number of different of smart devices by acting as a home automation system.

2. Google Assistant:

Google Assistant is a digital assistant software application. It is developed by Google. Google Voice Assistant is based on Artificial Intelligence. It is released in 18 May 2016.Users interact with Voice Assistants mainly through natural voice, though keyboard input is also supported. The Google Voice Assistant can answer questions, set events and alarms, change hardware settings on the user's device, display information from the user's Google account, play games, and do other things. Through the device's camera, the Google Assistant will be able to recognize objects, gather visual data, and support sending money and making purchases.

Features:

- Third-party device makers can add their own "Actions on Google" commands to their products.
- Interactions via text and a variety of languages
- Users can specify the device's accurate geographic location to improve location-specific queries.

3. Siri:

Siri is today's most popular voice assistant. Siri, which was created in 2010 by SRI Inc and purchased by Apple in 2011, had also quickly become an integral part of the Apple ecosystem, bringing all Apple devices and applications together to be used in tandem. Siri is very easy to use. While using an iPhone or iPad or some other Apple device, using Siri can make things faster and more convenient. Siri can make inferences using natural language understanding. Siri is available on all Apple devices. That means Siri is available on the iPhone, iPad, and iPod touch, as well as the Apple Watch, Apple TV, and Mac. Siri can do a lot of things, like how much space is available on the computer or finding files on a Mac.

Features:

- Teach Siri how to pronounce names.
- Share on Twitter/Facebook.
- Look for recent tweets.
- Identify and purchase songs...
- The weather...
- The best films...

4. Cortana:

Cortana is a virtual assistant. It is developed by Microsoft. It is released in April 2014. Cortana uses the bing search engine it is used for to perform tasks like setting reminders and answering questions of the user. The Cortana voice assistant can manage calendar and keep schedule up to date, set reminders, events and alarms, it can find facts, definitions, and information

also, it can create and manage lists. Cortana is available in many language like English, French, German, Italian, Spanish, Chinese, Portuguese language.

5. Bixby:

Bixby is a one more virtual assistant which is developed by Samsung Electronics On March 20, 2018, It is available in Samsung device. Samsung announced Bixby a voice digital assistant also it is Samsung intelligence assistant which is first introduced on Galaxy S8 and S8+. Users can interact with Bixby using voice, text and taps. It is integrated in Samsung phone. Bixby can perform many of the tasks that we do on our phone.

6. Faebook M:

The Facebook M digital assistant is developed by Facebook. It is slowly step by step implemented in Facebook Messenger. Now a days this voice assistants is available only for few users, but after few days it will be available to the rest of the Facebook users. So Facebook M users can used for plan holidays, to search restaurants, do book tickets and also buy online material in very convenient manner.

7. Braina:

Braina is a virtual digital assistant, which is developed by Brainasoft. This virtual assistant is used in Windows PC operating systems. This assistant assists users in completing tasks using voice commands. It is primarily concerned with voice recognition and employs a natural language interface. It is a single-window environment that allows you to control your computer and perform a variety of tasks using voice commands. It is possible to take voice recognition (speech to text).

8. Teneo:

This digital assistant is developed by Artificial Solutions; and helps businesses to create natural language applications which can be used to provide their customers with added personalization and enhanced customer service.

9. Hound:

Hound is a very intelligent and helpful digital assistant which provides fast and detailed search results of weather, sending text messages, making a call, finding a suitable hotel for you, navigating help, checking the stock market, etc. It can also be used to play music and play various interactive games.

Conclusion:

These applications can meet the needs of visually impaired users because it includes a speech-to-text and text-to-speech features. They are the background applications, which will continue to run while the device is turned on. These applications includes features that the blind user can use with ease and comfort. In this paper we discussed about few such digital voice assistants devices best suited, supported and helpful to visually impaired users and they are Alexa, Google assistant, Siri, Cortana and Bixby etc. These applications will run on Android operating system.

As per the available review of literature and our knowledge regarding the use, amongst the all Google voice assistant is the best voice assistant. Because from the operating system to the language and testing to the company, Google Assistant is perfect in all sense. Initially Google Assistant was available on a few devices, but is now available on more than 1 billion devices with customized applications. The Google Assistant is easy to use and provides quick and accurate user responses. Hum to Search is the most popular feature of Google Assistant, where users can identify songs by whistling or singing. Google assistant is also better

towards directing of peculiar information. Apart from the above, finding address and navigation are the core skill of this assistant.

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