CORTANA-INTELLIGENT PERSONAL DIGITAL ASSISTANT: A REVIEW

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Abstract——The most important means of communication is language and the primary medium being the speech. The interaction among humans and computer that is their communication is called human computer interface(HCI).The design of speech recognition system require careful attentions to the challenges or issue such as various types of speech classes, speech representation, feature extraction techniques, database and performance evaluation, adaptability, vocal strain, out of vocabulary words, Accent and dialect. This paper gives an overview of technological perspective and appreciation of the fundamental progress of CORTANA which is voice controlled assistant for Microsoft windows .This paper gives an overview of merits and demerits of CORTANA and how it is trying to catch up with other available technologies.

*Keywords—*HCI, speech classes, speech representation, feature extraction techniques.

I. INTRODUCTION

Microsoft released Cortana, the voice-activated digital assistant built into windows 10 and windows phones, for all Android phone users in a public beta on April 2 , 2014. Named after Cortana which is a synthetic intelligence character in video game franchise of Microsoft's Halo. Its development started in 2009withZigSerafin as general manager. Cortana is designed to help get things done. It is helpful in getting weather forecasts, setting up reminders, telling jokes, sending emails, finding files, searching the internet and so what not. It has eight languages tailored for 13 countries. It helps usremember things we have said we might would do in our emails, without even having to ask her [1].

II. TECHNOLOGY USED

Cortana uses a Microsoft translator back-end in order to perform this magical feat [2]. Microsoft translator speech API (Application Program Interface) is a cloud-based automatic translation service [3]. Microsoft translators main and important mission is to break the language barrier by providing translation [2]. It uses Bing as web search engine which has been developed using ASP.NET. It was Tellme Networks, bought by Microsoft in 2007, from where natural processing capabilities of Cortana are derived & are coupled with a sematic search database called Satori [1]. It's ultimate motiveis to get more meaning of data and integrate rational concepts with more powerful abstraction conceptsthat we

know from the field of artificial intelligence. The aim is to provide high level modeling primitives as integral part of a data model in order to facilitate the representation of real world situations.

III. WORKING OF CORTANA

Fig 1Working of Cortana

The speech recognition involves following five steps [4,5]:

1)Signal processing:

It is the technology present in all stages of sound processing, from the conversion from analog to digital[6], to the application of filters or the gain control [5]. Regarding Cortana it enables extracting the information within signals to translate it recognizable words.

2) Speech recognition:

This is the most important part of this process, here the actual recognition is done. The feature vectors sequence is then decoded into a sequence of words. This is done by using algorithms such as Dynamic Time Warping.Dynamic Time Warping is the algorithm that measures similarity between two temporal sequences which may vary in speed

during time series analysis [4,5], in Cortana. It is used to cope with different speaking speeds. The program includes big dictionary of popular words that exist in language. Each feature vector is matched against the sound.

3) Semantic interpretation:

Here it checks if the language allows a particular syllable to appear after another. After that there will be grammer check. It tries to find out whether or not the combination of words make any sense [5,6]. It uses "command mode'' semantic property to decide how to respond to the user.

4)Dialogue management:

The errors encountered are tried to be corrected. Then the meaning of the combined words is extracted and the required task is performed. It is a framework that provides authentication in Cortana skills [7] . The output of the dialogue management is a list of instructions to other parts of the dialogue system, usually in a semantic interpretation. This semantic interpretation is usually converted to human language by the natural language generation component [5,6]

5) Response generation:

After the task is performed, the response or the result of that task is generated. The response is either in the form of a speech or text. What words to use so as to maximize the user understanding, are decided here. If the response is to be given in the form of speech then text to speech conversion process is used [5,8]. In many cases Cortana's voice is not digitized at all. It is really Taylor's Voice or whoever else owns Cortana's voice in a given country. In case,there islittle no time for an answer to be recorded Microsoft can have her own response be readout by Cortana using her digitally-generated voice font, based on the actor's or actress's real voice [1].

IV.FEATURES OF CORTANA

1) Cortana's Notebook.

Like a new friend, Cortana will slowly learn your preferences and habits based on the stuff you tell her, but if there are important things you think she should know right away, you can add them to her notebook. You can include info such as your favorite sports team [9].

2) Reminders:

It includes Cortana's important features, that is the ability to set reminders, that too are time based, people based & event location based. It is one of the most powerful features of Cortana [9].

3) Improved Search:

The Internet may be a sea of knowledge, but that isn't the only resource available to Cortana. She can also search the contents of your computer or your One Drive storage to find what you're looking for [9].

4)Compose an Email:

You have to remember to set up your email accounts first, but after that you can say a name from your address book, narrate your email and send it off without ever touching your keyboard [9].

5)Multi-Device Syncing:

If you create a reminder on your laptop, still you are able to receive the notification on your tablet, smartphone by this feature of Cortana [9].

V.COMPARISON WITH OTHER TECHNOLOGY:

- Since the launch of iOS 5 in 2011,Siri has been an integral part of OS. Since the support more third-party integration with MacOS, Siri has greatly extended itself from the basics such as weather and messaging. Itintegrate with third-party apps and can also understand follow-up queries. That is a huge change in the strategy for Apple, since Apple typically maintains a firmhold on which third-party companies get access to its native functions. Among all digital voice assistants, Siri is probably the most familiar one [9].
- Google Assistant has incorporated it's functions from the older Google Now, has been phased out now which is totally different from Cortana and Siri. It hasgot less personality, but more functionality. Although it is an integral part of Android, Google Assistant also exists in an iOS app, and can be accessed through the any browser as required. If you want to know directions to any restaurant or want to know about weather condition's for next week, you can ask Google Assistant like Cortana and Siri. If we let it, Google's software will help in utilizing our search history and customize its responses based on what it knows about our queries [9].
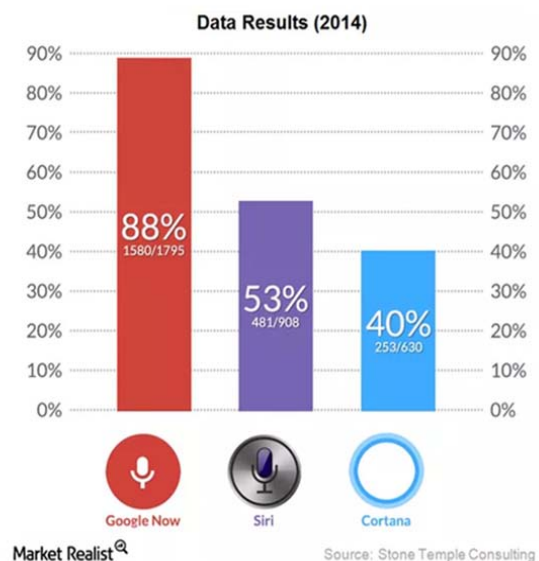

Fig 2 Data results chart

V. CONCLUSION

Currently Cortana is the name for a an ultimately different and new path of handling Windows Phone, and in no time maybe Windows too Everyday Cortana becomes more useful by learning more about us day by day. By paying attention to what you like and how you do things, it certainly provides us with an experience where a person's individuality is celebrated and not ignored. Since we can decide what Cortana knows about us , so we're in control of what information we share. The first attempt from Microsoft to expand its Cortana assistant away from computers and phones and into a more useful home setting isHarman Kardon's invoke speaker.

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VII. REFERENCES

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