DAWN OF VIRTUAL ASSISTANTS

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INTRODUCTION:

it's progressive intelligence, not autonomous intelligence- Marcus Ash

We wake up to the technology of Artificial Intelligence, Machine learning and Voice recognition. Yes. we are in the era of Virtual Assistants like Cortana, Alexa and Siri in all hemispheres of life. According to Gartner:

- By 2018, digital business will require 50 percent less business process workers and 500 percent more key digital business jobs, compared with traditional models.
- By 2018, the total cost of ownership for business operations will be reduced by 30 percent through smart machines and industrialized services.
- By 2017, U.S. customers' mobile engagement behavior will drive mobile commerce revenue in the U.S. to 50 percent of U.S. digital commerce revenue.
- By 2020, developed world life expectancy will increase by 0.5 years due to widespread adoption of wireless health monitoring technology.
- The goal of this project would be to explore the advent of Virtual assistants as technology in the Software Industry, understand, implement and compare how Cortana, Alexa & Siri have made our lives easy. As an extension of this we would want to understand the extent of personal data impeachment the technology has made, on pretext of Artificial intelligence.

METHODS AND TOOLS:

Tools to develop voice assistants are various programming languages and multiple platforms to host the executing code. In the stack of languages to program these productive assistants, to develop the Class Trivia application we used Node.js for coding the server side virtual logic which responds to each request if they are proper.

A request is sent to http server which parses the request, processes it and sends back the response. Class Trivia, an Alexa skill, had two aspects namely Skill interface and Skill Service. The basic model of Alexa skill is just like a http request response model. Skill interface consists of 3 parts namely Utterances, Slot types and Intent Schemas. Utterances parses the spoken utterances and defines what function is to be performed upon what utterances. Slot Types help you determine custom slot types for variables which are used for program execution Lastly, Intent Schemas are used to call the intent which are functions residing in the Skill service.

After the Intent Schemas call the functions from Skill Service which resides in HTTP server or AWS Lamda function, would reply to the intents on basis of the function called.

This response in JSON format is sent back to Alexa device and then the JSON is parsed in form of speech and spoken out.

Above mentioned technique is one out of multiple methods for developing voice assistants.

COMPARISON

PRO

Employee's Assistant: Employees who use company phone, can utilize the Virtual Assistants as their private assistants. They can make use of the technology to help keep a track of their schedules. A VA can remind the employees about the appointments, meetings, tasks to be completed and so on.

App Developers: To increase the usability and efficiency of the app. The developers of the Apps can now configure the Virtual Assistants into the Application making the app more convenient. In the previous year, Amazon introduced "Alexa" enabling the developers to create voice commands. Similarly, Windows OS now supports "Cortana" to do search and various other functionality.

Virtual Assistants on Websites: There are now a day's lot of service oriented websites which offer Online help 24X7. This is done by an artificial human-like characterization using Virtual Assistant. It not only tries to answer the questions put forth by the user but also tries to have a conversion making it interactive.

CONS

Privacy Breach: All the commands, text or speech, given to the assistants are stored on the respective clouds. They can be accessed by the companies to gain the user data or preferences and use it for Data monetization. If hacked, it can be used by the third party for their own benefits.

Clarity of Voice: The Virtual Assistants require a quiet place to work efficiently. It cannot be used in a noisy environment as that will create ambiguity in voice recognition.

Language Barrier: There are some Virtual assistants which are still not developed for all the languages. They only support English language. This creates a limitation for the other users.

ADVANTAGES/DISADVANTAGES

What is the basis we want to compare these virtual assistants on?

* How easy it is to perform an action? Ex: no. of steps used to carry out a task
* How personalized/ relevant are results? Ex: Do the assistants know our background and can understand our activities?
* How secure is the platform and reliability?

Alexa	**Siri**	**Cortana**	**Google Assistant**
ADVANTAGE			
Lots of supporting devices.	More secure platform	Can install on any platform: windows and android.	It is compatible on ios, and chrome
Range of appliances where Alexa can act are more	More compatible in Apple eco-system	Built exclusively for android and windows thus making it more platform oriented yet catering to audiences.	It is more secure as it is integrated with google environment.
Ex: Home control	Robust, more of Learning	Personalized and robust	Portable across platforms and more easily accessible
DISADVANTAGE			
Requires more training	Runs on limited platform	Delayed technical advancement	Not a client application

More no of steps for execution	Restrictive	Vulnerable and requires more security.	Makes it vulnerable and susceptible to

EXAMPLES/HANDS ON EXPERIENCE:

Before we begin to have our hands on these virtual assistants, we analyzed the following:

What are the most activities we perform on repeat?

- Basic tasks (Call a person, message them, send an email, read the message, open an application, take a photo)
- Planning (scheduling events on calendar, reminders, paying bills, book a cab etc.)
- Social activities (weather, news, Facebook, snapchat)
- Entertainment (Play music, video etc.)

	Alexa	**Siri**	**Cortona**	**Google Assistant**
Basic tasks:	Couldn't recognize, the commands! Repetition	Most efficient. precisely what's expected	Does mostly Web-search	Decent behavior
Planning:	Mostly efficient. Asks for details	Most efficient. Keeps track of personalized detail	Asks for more input	Follows certain classic commands
Social:	Equally efficient	Equally efficient	Equally efficient	Equally efficient
Entertainment:	Most efficient	Most Efficient	Asks follow-up Questions	Requires more training.

POSSIBLE FUTURE ENHANCEMENTS

Most of the world is already surprised by how fast and prevalent Voice Assistant systems have become. For example, Echo Dot was the No.1 selling item on the Thanksgiving Day, Black Friday, and Cyber Monday at Amazon.com. The companies are continuously improving their respective assistants by adding new features and capabilities to them. These improvements might look minor, which consist of minimal UI changes and better voice recognition, but eventually they will grow as years pass by and technology advances.
Artificially Intelligent assistants are going from meek home assistant to all-surround presence. They are modified to be built into every gadget we own. Not only fridges, cars, smartwatches, but also robots.
The amazon's Echo, which is the hardware which connects with Alexa, the software. The company is planning to take Alexa on various other platforms and devices. Amazon is making advanced AI models and planning to incorporate Alexa in to third party applications by making it available to the developers. The different aspects Amazon is currently working on to improve are

- Amazon Recognition, which is the image analysis technique that can identify various attributes of an image.
- Amazon Polly, a service that takes text input and returns an MP3 audio file which contains the speech.
- Amazon Lex, is a new technology for natural language processing and automatic speech recognition.

Similarly, Microsoft is working for Cortana to proliferate, from the Windows tablets and computers out to devices like the Harman Kardon home speaker, or to next-gen cars by collaborating with companies like Nissan.

"The last 60 years of computing, humans were adapting to the computer. The next 60 years the computer will adapt to us. It will be our voices that will lead the way; it will be a revolution." **-Brian Roemmele**

When we look ten-twelve years into the future, when the AI becomes capable enough to improve itself by reprogramming, we can imagine lot of surprising and impressive achievements. Just like the way humans learn through experience, machines could potentially write their own code as output to acquire new features and capabilities, without the developer intervention and then probably half the communications with the machines would be voice based.

CONCLUSION

Competition:

- Clearly Alexa is hitting all the spheres of AI Applications.
- More scope of improvement and advancement.

As of this year, 42% US smartphone owners surveyed, said they had used their phone's virtual assistant over past three months. As this being said, Gartner research director Annette Zimmerman said that AI, Machine Learning, and VA together will be major strategic battleground going forward. Because of this quote, many apps will become sub servants of Virtual assistant in the foreseeable future.

References:

http://www.businessinsider.com/microsoft-cortana-vs-amazon-echo-2017-1

https://www.onmsft.com/news/cortana-how-intelligent-too-intelligent

https://acceptingpayments.quora.com/BOOM-Echo-Dot-is-the-best-selling-at-Amazon-on-Thanksgiving-and-Black-Friday%E2%80%94Amazon

https://aws.amazon.com/blogs/aws/polly-text-to-speech-in-47-voices-and-24-languages/

https://aws.amazon.com/blogs/aws/amazon-lex-build-conversational-voice-text-interfaces/

https://aws.amazon.com/blogs/aws/amazon-rekognition-image-detection-and-recognition-powered-by-deep-learning/

http://fortune.com/2016/12/21/virtual-assistant-usage-gartner/