Artificial Intelligence in Voice Assistant

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ABSTRACT: With the ever-increasing popularity of Voice Assistant surrounding is revolutionising day by day. Voice assistants are software agents which recognize human speech and respond using synthesized voices. Some of the popular voice assistants like Alexa, Siri, Google Nest, Cortana are used in form of dedicated home speakers or inbuild in smartphones. User can control various electronic devices present in home (viz. speaker, reading emails, updating calendar events). In extension to these tasks, voice assistants have other features, often called "skills," which expand their abilities by interfacing with other programs via voice command. Where voice assistants have exciting and useful features, they also have several problems i.e. security. Anyone with access to a voice-activated device can ask any questions related to account details and services related to the device which can be vulnerable to the user. This paper highlight on the role of artificial intelligence in voice assistant technology and its application in daily life.

KEYWORDS: Voice assistant, Artificial Intelligence, Reliability, Accessibility, Technology Adoption**.**

I. INTRODUCTION

Artificial Intelligence (AI) is one of the famous and broad branch of Computer Science in today's life. Artificial Intelligence are some of the smart machines which are able perform various human simulation activities by means of algorithm that test the data provided. The human is familiar with functions of machines based on AI technology due to which their tasks gets easily executed. Voice assistants are one of the best examples of AI smart machines which interact with users using voice. The most used of AI in Voice Assistants will provide an enhanced user experience, generates new leads. User can do daily task such as telling time, whether report, traffic in area, paying bills, Checking Emails, Paying bills, To-do list and so on. User can wake up device by just saying it's wake up word eg. For Amazon's Alexa the wake,

up word is "Hey Alexa". A light on the device signals that it is ready to accept commands from user.

The technologies that powers Voice assistants require plenty amount of data, which feeds artificial Intelligence platforms, including machine learning, natural language processing and speech recognition platforms. As end user interact with voice assistant, the AI program uses redefined algorithms to learn data from data inputs and becoming better and better after certain time with user interaction. According to

Statista, there are total 4.2 Billion user worldwide which user digital voice assistant out of which Amazon had sold 4.1 Million Echo devices in year 2018 itself. There is great impact of Voice assistant in mainly Older Adult and children. According to research 26% of children uses voice assistant to do their studies or daily tasks. Voice assistants improve day by day with user experience. An AI in voice assistant update itself with human behaviour.

II. OBJECTIVES

1. To understand the reliability of voice assistant
2. To understand the problems rendered using voice assistant.

Following hypothesis is proposed to attain the above objectives using survey analysis: -

H1: Individual consuming voice assistant experience good reliability and accessibility.

III. RELATED WORK

In [1], M.B. Hoy purposed that voice assistant's accuracy, complexity and software growing drastically in past few years. In [2], McLean et al. authors use Amazon's Alexa device as an example for unique variables of artificial intelligence that powered voice assistant to recognize more intelligence of assistant. In [3], Nasirian et al. authors purposed that interaction quality is, most important factor which build trust between user and virtual assistant. Also, author describe about how technology adoption increasing

day by day. In [4], M. Ahmadian et al. authors stated that voice assistants have interface that relies on voice commands supported by AI, ML and natural language processing techniques to have verbal interaction with end users for performing a variety of tasks. In [5], O'Brien et al. authors proposed that instead of typing or surfing on computer or smartphone they can directly ask voice assistant for their daily casual needs. In [6], Lei et al. authors identify several security vulnerabilities by considering Alexa as a case study. In [7], Alepis et al. authors discussed about attacks on voice assistant using malicious apps to expose user's personal information like location, visited web pages. In [8], Q. Yan et al. authors explained about new attack named as "SurfingAttack", in which multi round interaction between attacker and voice-controlled device over long distance, without need to be line of sight. This is done by using inaudible ultrasonic guided waves. In [9], L. Burbach et al. authors stated that many users worried about their privacy and what happened to the data that recorded by voice assistant. By analysis found that, privacy is more important than price of voice assistant. In [10], FilipoSharevskiet al. authors proposed that Malexa is twin of Alexa which says new briefing. But Malexa convert these briefing intentionally to introduce misperception about the reported events. In [11], Y.Chang et al. purposed that lack of an authentication mechanism gives attackers a chance to take advantages of voice assistant's control and obtain personal information from linked services.

IV. APPLICATION OF VOICE ASSISTANT

Using AI in voice assistant improves overall user experience.
A. User can do day to day life simple tasks like remembering to-do list, set remainders, play, pause any song, traffic updates, weather updates, quizzes and all other stuffs using AI enabled voice assistant.
B. Using voice assistant in smartphones enhanced user experience like hands-free calling, send messages without typing it, access to some settings, etc.
C. Voice assistants also helps to control home devices such as smart lights, smart plugs, fans, etc using home automation system.
D. AI in voice assistant play important role for elderly people as their activities are limited due to changes in their memory, memory and vision, but many tasks can be accomplished by using voice technology, such as ordering groceries or foods, placing telephone calls,

controlling smart home devices like door lock, lights, etc.
E. For children voice assistants is best as it reduces screen time, conversational AI provides information without actually staring at screen. Kids do tasks such as quizzes, storytelling, math problems, etc using voice assistant.
F. E-commerce like Amazon already allows user to buy any online stuffs, track their order status using their assistant 'Amazon Alexa'.

V. METHODOLOGY

An online survey was held using Google Form. The link of the form was circulated in social media platform. The questionnaires in the form were designed to test the proposed hypothesis which verified certain parameters.

A. PARTICIPANTS

To test the proposed hypothesis, this study used two conditions i.e. Reliability and Accessibility. A total 45 participants data was collected from different states of India. Among the 45 participants 73.3% were male and remaining 26.7% were female.

B. MEASURES

Gender	Reliability	Accessibility	Total
Male	11	22	33
Female	5	7	12
Total	16	29	45

Observed Value
There exists a simple formula to calculate the expected for any value in the above table.
Formula:
Expected Value= (row total) * (column total) / (grand total)

Gender	Reliability	Accessibility	Total
Male	11.73333333	21.26666667	33
Female	4.2666667	7.73333333	12
Total	16	29	45

Expected Value
The formula for Chi-Square is

$$X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$ Where, O_i = Observed Value, E_i = Expected Value

VI. EXPERIMENT

The test scores of independent samples were calculated at the significance level 95% using Chi-Square Test. By using the Chi- Square test calculate chi value i.e. X^2. The participants presented multiple questions to test the parameter in the test (e.g. Did you think voice assistant machines are cost effective? How reliable voice assistant are?) so, the calculated chi value is 0.11153 and tabulated chi-square value is 3.84 at significance level 95 percentage with the degree of freedom 1.
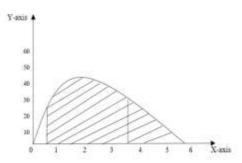

FIG.1 STATISTICS OF CHI-SQUARE TEST

VII. RESULT

The test scores of independent samples calculated using Chi-Square test using survey analysis resulted that the participants get better reliability and accessibility using voice assistant. Voice assistants are easily accessible, it helps mainly for differently abled people in their daily life chores. Voice assistant are reliable because the product is consistent and it satisfies users queries in short span of time. Hence, "H1" is accepted.

VIII. LIMITATIONS AND FUTURE SCOPE

In this study, we handle sample of male and female with less age group. In this research we only discussed about voice assistant's uses, reliability and accessibility. Most of the voice assistant users have concern about trust and their privacy like credit card details, bank information. In future research for this type of confidential work, needs multi-step authentication like biometric login while payment gateways.

IX. CONCLUSION

Accuracy and reliability of voice assistant is increasing exponentially from past few years. Since voice assistant are getting smarter by gaining support from third party applications, they adopt user behaviour and expectations to enhanced user experience. Security and privacy are still major issue while using voice assistant. They need to be improved before voice assistant used any data which is confidential.

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