Project Dissertation Report on

RECEPTIVITY OF ARTIFICIAL INTELLIGENCE AMONG CONSUMERS

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DECLARATION

I, Tushar Singh, student of MBA 2016-18, of Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42, declare that the final project report on "Receptivity of Artificial Intelligence among Consumers", submitted in partial fulfillment of Degree of Masters of Business Administration, is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This report is not being submitted to any other University for award of any other Degree, Diploma and Fellowship.

Tushar Singh

Place:

Date:

CERTIFICATE FROM THE INSTITUTE

This is to certify that the Project Report titled "Receptivity of Artificial Intelligence among Consumers", is a bona fide work carried out by Mr. Tushar Singh, of MBA 2016-18 and submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 in partial fulfillment of the requirement for the award of the Degree of Master of Business Administration.

Signature of Guide

(Dr. Vikas Gupta)

Signature of HOD

(Dr. Rajan Yadav)

Place:

Date:

ACKNOWLEDGEMENT

I am using this opportunity to express my gratitude to everyone who supported me throughout the course of this MBA project at Delhi School of Management, Delhi Technological University. One of the most important tasks in every good study is its critical evaluation and feedback which was performed by my faculty guide Dr. Vikas Gupta. I am thankful to faculty mentor as well as my colleagues for investing their precious time to discuss and criticize this study in depth and explain the meaning of different concepts and how to think when it comes to problem discussions and theoretical discussions.

My sincere thanks goes to my Institute and family, who supported and encouraged me.

Tushar Singh

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CHAPTER 1

INTRODUCTION

1.1 About Virtual Personal Assistant

Interaction with a virtual personal assistant on a smartphone or any other smart device, or interaction with a smart bot (chatbot) on a website rather than a human customer representative is reality these days. Personal assistants, which goes by multiple names viz. virtual personal assistants (VPAs), intelligent personal assistants, digital personal assistants, virtual agents, mobile assistants, or voice assistants, have become prevailing technology. Examples include Siri, Google Assistant, Bixby, etc. Indeed, a search for "personal assistants" on Google Play at the end of 2017 gave more than 100 results. Many of these VPAs can be used to perform a variety of tasks on smartphones, such as searching or finding something on the internet using voice command, finding movie timings, real time navigations, doing basic calculations and conversions, checking the mail, and engaging in a conversation with the assistant itself. Others provide a much more specific purpose, such as monitoring the fitness level, getting recipes, etc. The software and smartphone giants have been pushing their assistant in most of their products and expect it to be the major game changing technology of the future.

The term conversational interface is used to define the technology behind the interactive interface which allows conversation with the voice assistants through voice input and other modalities. To explain it even further we have displayed some examples of the interactions that can be performed with a VPA via conversational interface.

1.2 Interacting with a Conversational Interface

Fig 1.1 Google search tab as seen on most of the stock android devices

The following are few of the examples which are taken from interacting with the Google Assistant (available for Android devices). Activating Google Assistant is very easy, just

by touching on the microphone icon in the Google Search box, and also on the newer versions of Android devices (Android 4.4 onwards) by saying “OK Google” or “Hey Google”. Google provides a support page that facilitates the information required to turn on “OK Google” voice search along with multiple examples of what can be said in multiple languages. The following example displays the output from a query about the current weather in the city of Delhi.

User (spoken input): What’s the weather in Delhi?
Google Assistant (spoken output): Right now in Delhi its 37 degrees with a storm. It will be partly cloudy with a high of 38 and low of 23.

Along with the spoken response, Google also displays the recognized question visually, and the hourly weather forecast for entire day (Fig. 1.2).

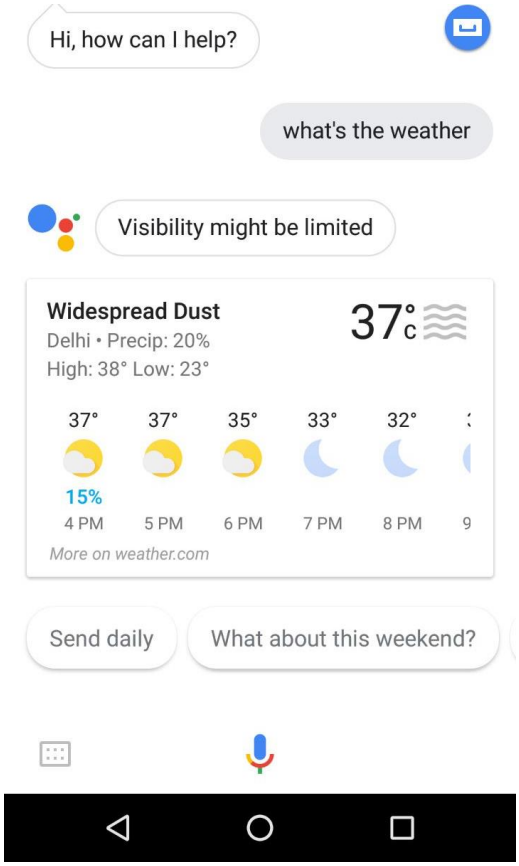

Fig. 1.2 Google assistant displaying weather information

The second example is a question related to general knowledge.

User (spoken input): When was the Taj Mahal built?

Google Assistant (spoken output): 1631.

Google Assistant response's shows the question asked, its answer, a picture displaying Taj Mahal, the year it was built in, along with the links to some add on information when scrolled down (Fig. 1.3).

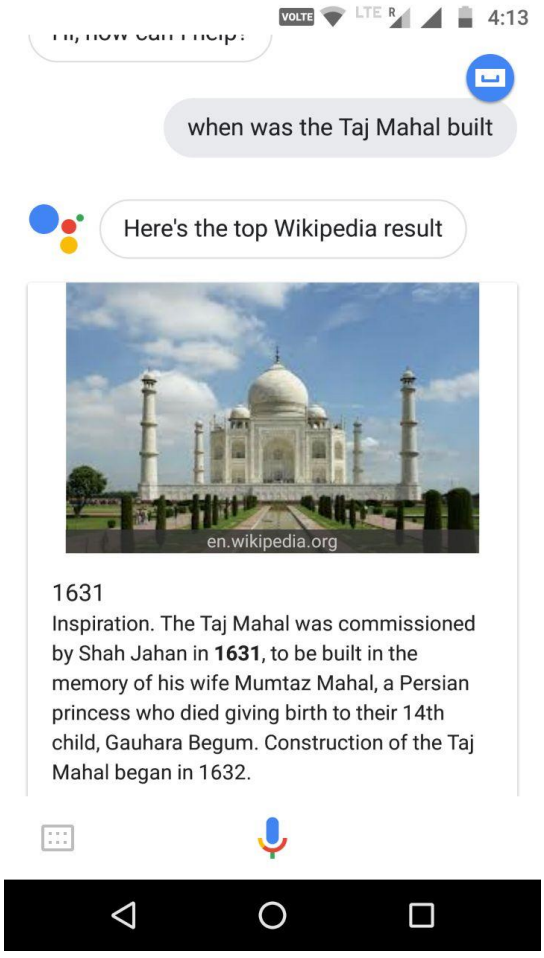

Fig. 1.3 Google Assistant displaying information regarding Taj Mahal

Our final case shows access to activities on the gadget, for this situation to set an alarm.

User (spoken input): Set an alarm for 8 am.

Google (spoken output): OK, 8 am, setting your alarm.

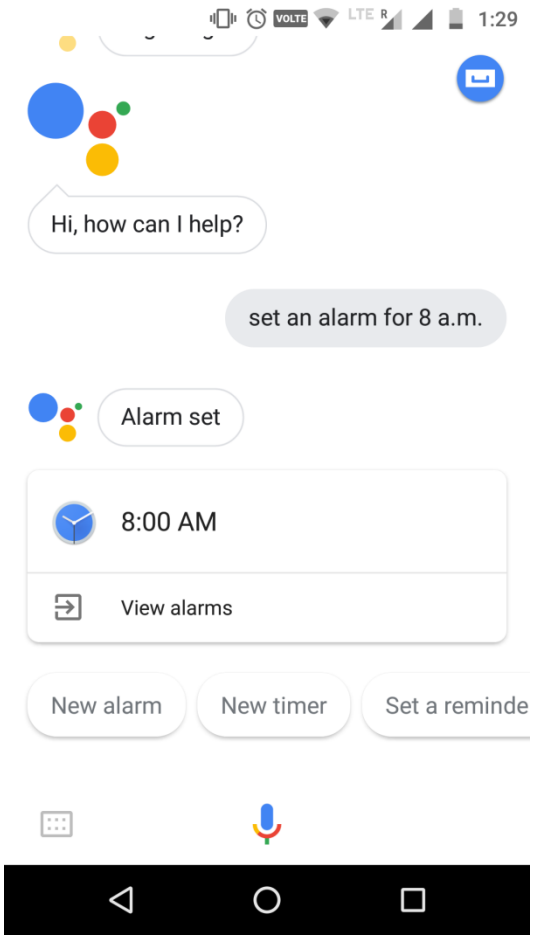

Fig. 1.4 Google Assistant setting up an alarm

Notwithstanding the talked reaction, Google Assistant likewise displays the data appeared in Fig. 1.4, which shows the perceived inquiry, and a message confirming that the alarm has been set.

An extensive variety of device activities can be done utilizing voice, for example, ringing a contact, sending a message, or launching an application. By and large, the utilization of voice orders empowers clients to complete these activities in less advances contrasted and customary information strategies.

For instance, the accompanying advances are followed to set an alarm physically on a Pixel 2:

1. Tap on the clock symbol (e.g. from the home screen).

2. Discover the symbol which represents the alarm and tap on it.

3. Touch on the time showed.

4. Set the hours and minutes as required.

5. Tap on "Done" to finish.

1.3 Explaining the Rise of the Voice Interface

Its been a dream of specialists in discourse innovation and artificial intelligence (AI) to develop a conversational interface, however as of not long ago, this dream has just been displayed in books and motion pictures of sci-fi genre, for example, iRobot, Resident Evil, and numerous others. In 1987, Apple discharged an idea video portraying a gadget called the Knowledge Navigator, a product specialist that gave administrations like those of a present-day VPA and that had propelled correspondence abilities, including great content to-discourse and impeccable discourse understanding. In 2001, Berners-Lee and partners set forward a dream for a Semantic Web in which Semantic Web specialists would perform errands, for example, checking logbooks, making arrangements, and finding areas. It was not until 2011 that apple launched Siri (it’s very own VPA), which has been referred to as the very first voice empowered assistant. Siri and comparative conversational frameworks have been made conceivable because of improvements in innovation and of expanding client acknowledgment and reception, as clarified promote in the accompanying segments.

1.4 Technological Developments

Different innovative advances have added to the current ascent of conversational interfaces.

The rise of Artificial Intelligence. Since the mid-1950s, scientists in artificial knowledge have grappled with the test of making PCs that are equipped for savvy conduct. AI has experienced cycles of elation and dismissal with some underlying victories took after by some dynamite disappointments. At first, it was trusted that astute conduct could be repeated utilizing models of emblematic thinking in light of tenets of formal rationale. This was known as the information based approach, in which the attention was on issues that are difficult for people yet simple for PCs—for instance, basic leadership and playing chess. Learning based frameworks (otherwise called master frameworks) were created in the 1980s to help with basic leadership in complex issues, for example, therapeutic finding, while IBM's chess playing PC Deep Blue vanquished a human best on the planet in 1996. In any case, it wound up obvious that different parts of insightful conduct that are simple for people yet difficult for PCs, for example, discourse acknowledgment and picture acknowledgment, couldn't be understood utilizing these emblematic methodologies however required procedures, for example, the extraction of examples from information and gaining for a fact. A few components have added to the current achievement of subsymbolic approaches: improvements in designs preparing units (GPUs) that have empowered the enormous parallel calculations required to run neural systems; the accessibility of immense measures of information that empower AI frameworks to learn and turn out to be progressively more astute; and the advancement of new calculations (known as profound realizing) that keep running on GPUs and process these huge measures of data. An indication of the guarantee of this new AI is that numerous real organizations, have enlisted the world's driving specialists in profound figuring out how to help their innovative work function in territories, for example, seek, learning, normal dialect comprehension, and individual collaborator innovation.

Advancements in technologies related to language. AI has proven to be benefitial for language technologies. Discourse acknowledgment precision has enhanced significantly since around 2012 after the reception of profound learning advances. There have likewise been significant advances in talked dialect understanding. Machine learning ways to deal with discourse administration have brought enhanced execution contrasted and conventional high quality methodologies by empowering frameworks to take in ideal exchange techniques from information. Moreover, fantastic difficulties in different territories of discourse and dialect innovation, including discourse acknowledgment, content to-discourse blend, talked exchange administration, and regular dialect learning, have advanced the investigation and assessment of various frameworks and procedures utilizing shared undertakings and information, prompting mechanical advances and more extensive collaboration inside the exploration groups.

The development of the Semantic Web. Semantic Web visualizes that the majority of the substance on the Web ought to be organized and machine-discernable, with the goal that hunt utilizing the conventional approach of catchphrases as information has been supplanted by semantic inquiry in light of the importance of the information. Semantically labeled pages increased utilizing encodings, and expansive organized learning bases have empowered web crawlers to better translate the semantics of a client's plan, to return organized responses to inquiries, and, for virtual individual aides, for example, Google Now, to help an inquiry/answer kind of communication. Cases of the more perplexing kinds of question that would now be able to be replied by the Google application are depicted here.

Device advancements. Cell phones and other astute gadgets have turned out to be more capable than the extensive PCs of just a couple of years back. Without a doubt, in one correlation, it was expressed that a single Google Nexus 5 has 2.5 times the handling energy of a 1984 supercomputer. Moreover, since cell phones approach an extensive variety of logical data, the coordination of this logical data into conversational interfaces empowers VPAs to give assistance and bolster that is pertinent and customized to the individual client.

Improved Connectivity. Higher speeds of wireless devices, the relatively universal accessibility of WiFi, all the more effective processors in cell phones, and the appearance of cloud computing imply that asset escalated activities, for example, voice recognition and net searches can be done in the cloud with the use of huge network of powerful computers.

Interest shown by large technology organizations in conversational interfaces. While already enthusiasm for conversational interfaces for VPAs was constrained to moderately little specialty organizations and to the enthusiastic newcomers in the field with a dream of developing AI, now a significant number of the biggest organizations on the planet are contending to make their own VPAs, for instance, Siris, Google Assistant, Alexa, Cortana, and Samsung's Bixby. These VPAs empower organizations to all the more precisely profile the clients of their VPAs, empowering them to advance their web based business administrations and therefore pick up an upper hand.

Despite such advancements, there is still a need for more work in this field before conversational interfaces accomplish a level of execution like that of people. For instance, in searching for a conceivable route forward, Moore (2013) proposes that it is important to go past the space of discourse innovation and draw motivation from different fields of research that educate open cooperation, for example, the neurobiology of living frameworks all in all.

1.5 User Acceptance and Adoption

Regardless of whether an item is innovatively best in class, it won't succeed unless it is acknowledged and received by clients. As of not long ago, it appeared that clients quit utilizing their VPAs after an underlying phase of experimentation. At times, they experienced issues, for example, discourse acknowledgment blunders thus returned to more acclimated and more exact methods of information. A few clients discovered diversion by saying "senseless" things to their VPA to perceive what kind of reaction they would get. Moreover, the multiplication of such a significant number of virtual individual aides makes it difficult to choose and receive one specific VPA for general utilize.

Conversational interfaces are speaking to clients who wish to draw in with Web administrations when in a hurry. Given the preparing force and speed of present day cell phones and additionally continuous Internet availability, clients never again should be situated at a work area PC to look for data or access Web administrations. Likewise, with gadgets getting to be littler to help compactness input is less demanding utilizing a conversational interface contrasted and tapping on the delicate consoles of cell phones. Regardless, a few gadgets won't have consoles yet receivers for voice input. This is probably going to be the situation as an ever increasing number of gadgets wind up connected in the Internet of Things, where a significant number of the gadgets will depend solely on voice for information and yield.

Youngsters are likewise more inclined to utilize interactive mediums such as a voice interface. In a current investigation of the utilization of voice seek, it was accounted for that young people converse with their telephones more than the normal grown-up and the greater part of adolescents in the vicinity of 13 and 18 utilize voice look daily.7 Voice seek is additionally broadly utilized as a part of China in VPAs.

CHAPTER 2

LITERATURE REVIEW

The concept of Para Social Relationship was talked about by Horton and Wohl (1956) in while analyzing the watchers at home's reactions to characters on media. When seeing a media persona through TV, individuals come to "know such a persona in to some degree a similar way they know their dear companions: through direct perception and translation of his appearance, his signals and voice, his discussion and lead in an assortment of circumstances". Horton and Wohl demanded that watchers build up a "deception of closeness" with the remote artificial character through successive review. Despite the fact that the artificial character seems just on the TV screen, the watchers may react to the character "also to how they feel, think and act, all things considered, experiences" (Klimmt, 2006). Subsequently, Para Social Relationship is additionally communicated as semi relationship (Rubin, 2000); it is one-way and less extraordinary contrasting and a real social relationship (McHugh, 1987; Rubin, 2000).

Like an up close and personal relationship, Para Social Relationship can be improved by relational fascination. Relational fascination is characterized as "a person's propensity or inclination to assess someone else or the image of the individual in a constructive (or pessimistic) way". Any individual has a tendency to discuss more with another person who is felt to be more alluring. This expanded measure of correspondence can add to a private relationship mutual feeling among them. Relational fascination comprises of three measurements: assignment fascination, social fascination, and physical fascination. Assignment fascination demonstrates the simplicity of working with something; social fascination depends on social or individual loving properties; and physical fascination is ascribed to apparent physical appearance.

The idea of Para Social Relationship has increased experimental help generally in the field of media and correspondence. Studies have demonstrated that individuals really create and keep up a personal security with TV famous people, or radio hosts. The examination space of para social relationship has now been reached out to the field of human-PC communication. As PCs, for example, robots or AI come to have human-like

interfaces, scientists have explored the presence of emotional affinity between people and those computers. para social relationship may be fitting to disclose enthusiastic closeness to such innovation. Studies have proposed that individuals may see human-like PCs as a wellspring of enthusiastic correspondence, which infers a potential brotherhood between them. Lee et al. (2006) found that individuals felt identity in and fascination in socially intelligent robots in view of their verbal and non-verbal practices. Yoo et al. (2016) demonstrated the critical impact of para social relationship on the student's mental preparing in choosing to receive robot-helped learning frameworks. Lee and Kwon (2013) announced that the customized and more human friendly UI of a smartphone have shown growth in para social relationship of users, which expanded client fulfillment with the cell phone and proceeded with utilization of the gadget.

The ability of VPAs to comprehend common human dialect is developing rapidly and winding up near that of a genuine human individual right hand. At the point when a man is all the more regularly cooperating with an VPA by talking and issuing voice orders, the connection between an VPA and its client is relied upon to be more intelligent and socially charming. The personal relationship would add to the cease less utilization of an VPA, like how individuals continue meeting with their companions in close relationship. Thusly, for those inspired by advancing VPA utilization, it is essential to comprehend the variables that influence the connection between a VPA and its client. This investigation theorizes that para social relationship with a VPA is influenced by the relational fascination of the VPA. In the proposed look into show, security/protection danger of a VPA has been consolidated, in light of its rising significance because of late hacking incidents, and it is expected to affect para social relationship with a VPA. Furthermore, we expect that Para Social Relationship with a VPA may bring about positive relationship results, particularly expanded client fulfillment and readiness to keep utilizing the VPA.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Model

This study utilizes a research model that takes account a user's level of agreement with the utility with respect functionality, complexities (security/privacy risks), and the future expectations from Virtual Personal Assistants (VPAs).

Functionality

Functionality is relevant to number and complexity of the tasks that a VPA can perform without encountering any unsatisfactory result. User's thoughts about a VPA's ability to complete the task at hand and its dependence as a work partner affect the adoption of Artificial Intelligence in day to day life. A user can order a VPA to perform various tasks such as searching for a video, setting alarms, launching an app, or playing a song. When a VPA successfully recognizes its user's spoken words and gives out the correct outcome, his/her dependence and trust on the VPA might rise. This in turn is expected to develop the user-VPA relationship even further.

Security/privacy Risk

Security risk can be defined as a "circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste, and abuse" (Balta-Ozkanetal., 2013), which also consist of the risks related to the user's privacy and its violation (Yanget, 2016). This study characterizes security/protection hazard as clients' dread of unapproved access to VPAs by others, and possibility of loss of personal information by disclosing it to VPAs. Certain VPAs still have a specialized impediment in recognizing the voices of various individuals (BongGi, 2017). This discloses the risk of a possible hijack of VPAs by an individual in order to take client data.

Future Expectations

Future expectations refer to the future possibilities, advancements of artificial intelligence and its impact on its consumers, based on its current capabilities and reception among users. In near future Artificial Intelligence used in VPAs may get smart enough to replace human assistants or any job which require human voice assistance. Jobs like customer support representative will be a direct victim to the advancement of AI. On the contrary the consumers may also feel that development in AI despite eating up old jobs will open up new jobs in this field, thus creating a rise in overall job opportunities.

3.2 Research Method

The research conducted is a descriptive research. The primary data for the descriptive research was collected through a questionnaire distributed via online survey channels. The secondary data was collected through previous researches done on similar topics.

Sampling

The study sample consisted of 97 people selected via Convenience Sampling Technique. The selected sample of people consisted of people majorly of 20-30 years of age.

Data

An online survey was conducted and validated for two weeks in April 2018, before it was used to test the research model. The participants of the online survey consisted of respondents who majorly belong to 20-30 age group. A total of 97 responses collected for analysis. The data corresponding to the detailed demographic characteristics of the respondents is presented in Table I. The number of men participating in this survey was greater than women (72.2% men, 27.8% women), and the majority of respondents (91.8%) belonged to 20-to 30 years of age. The selected gender and age characteristics of sample audience represent the high probability of them to be early adopters, as the VPA technology and its market is still at an initial stage. Early adopters usually belong to the young generation and are educated and there is a tendency in men to be more accustomed to new and upgraded technology and IT products/services.

Instrument Development

The measurement items used in this survey and analysis were selected based on prior studies done on similar topics. Together, the 26 measurement items describe three latent constructs: functionality, Complexities (security/privacy risk, reliability, emotional understanding) and future expectations. Table III presents the survey items used in this study.

Cronbach's α test was applied to test the reliability and validity of these items. It was found that the alpha's value was 0.848, which indicate that the inter-item reliability of the measurement items was adequate.

CHAPTER 4

DATA ANALYSIS AND RESULTS

4.1 Demographic Data

Characteristics	Number	Percentage
Gender		
Male	70	72.2
Female	27	27.8
Age		
Less than 20	7	7.2
20-30	89	91.8
31-45	1	1
More than 45	0	0

Table I: Demographic data of respondents

Interpretation: Majority of respondents (91.8%) belonged to 20-to 30 years of age. The selected gender and age characteristics of sample audience represent the high probability of them to be early adopters, as the VPA technology and its market is still at an initial stage. Early adopters usually belong to the young generation and are educated and there is a tendency in men to be more accustomed to new and upgraded technology and IT products/services.

4.2 Number of times the respondents interact with VPAs

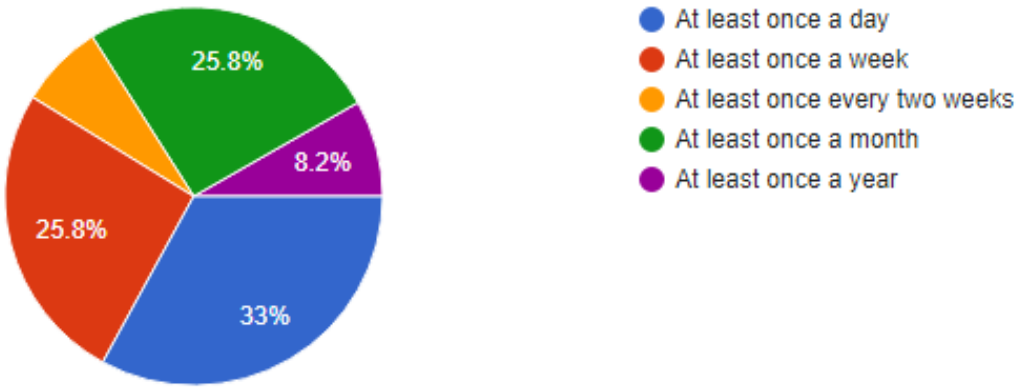

Fig 4.1 Graphical representation of number of interactions with VPA

Characteristic	Number	Percentage
Number of Interactions with VPA		
Atleast once a day	32	33
Atleast once a week	25	25.8
Atleast once every 2 weeks	7	7.2
Atleast once a month	25	25.8
Atleast once a year	8	8.2

Table II: Data representing the number of interactions done with VPA

Interpretation: More than half of the respondents (58.8%) interact with Virtual Personal Assistants atleast more than once every week.

4.3 Survey Items Used in the Study

Construct	Item No.	Measurement Item
Functionality (I often use Virtual Agent/Voice Assistant...)	F1	To look up information on the internet.
	F2	To set up alarms/reminders on my smartphone.
	F3	To make a call/send a text to a person from my contact list.
	F4	For fun and recreational purposes.
	F5	To create a shopping list/to do list.
	F6	To get personalized information based on my location.
	F7	To launch other apps on my phone.
	F8	For basic mathematical calculations and conversions.
	F9	I feel that voice assistant's responses are more human like.
	F10	I prefer using chat bots to look up information on a website.
	F11	I feel that chat bots can provide more personalized information.
Complexities	C1	I don't feel any security threat while providing my personal information to a virtual agent.
	C2	Virtual agents are not sufficiently equipped to deal with complex requests.
	C3	I feel that I am often forced to use virtual agents when I don't want to.
	C4	I get better and more personalized offer when speaking to a human.

	C5	Virtual agents can't understand my emotions
	C6	I feel that a human agent can better understand/address my particular needs.
	C7	I can ask questions on a variety of topics at once that a human is better able to keep track of.
	C8	My query is sorted quicker through a virtual agent.
	C9	Virtual agents are more reliable than human agents.
	C10	I'm afraid of artificial intelligence (i.e. security breach, loss of information etc.)
Future Expectations (I feel that Virtual Agents...)	FE1	Will replace human customer representatives in coming future.
	FE2	Will get better in understanding human behavior/emotions in coming future.
	FE3	Will bring more job opportunities.
	FE4	Will control most of the human controlled operations.
	FE5	Will predict human responses more accurately.

Table III: List of Survey Items used in the Study

4.3.1 Functionality

F1. Level of agreement for using VPA to look up information on the internet

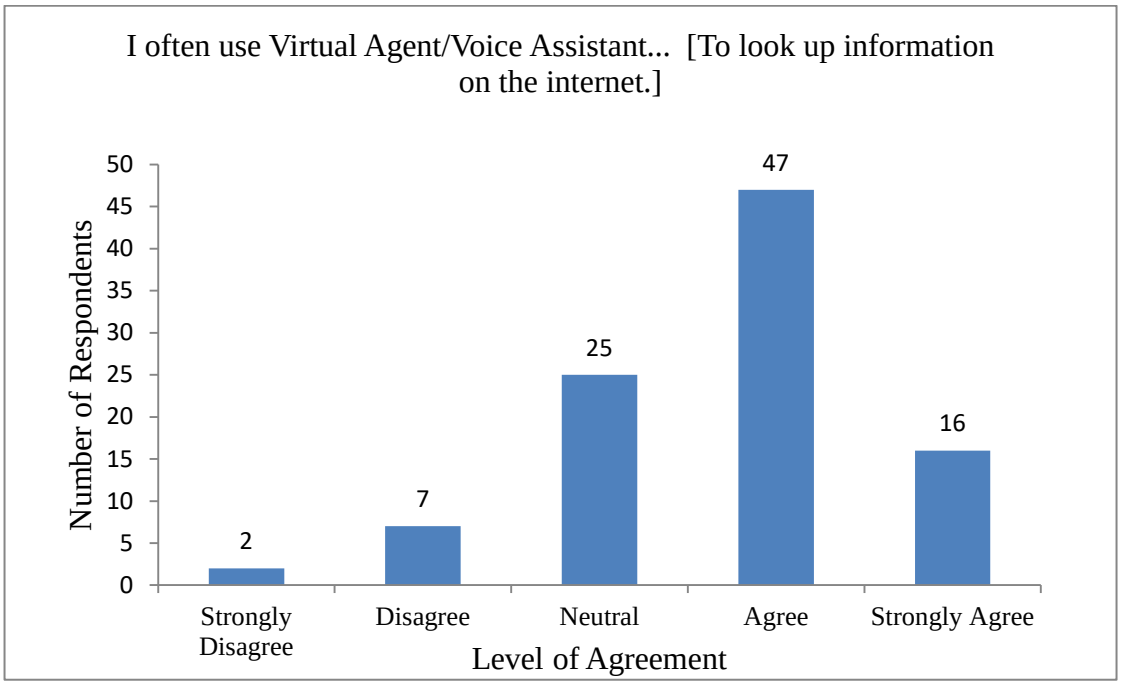

Fig 4.3

F2. Level of agreement for using VPA to set up alarms/reminders

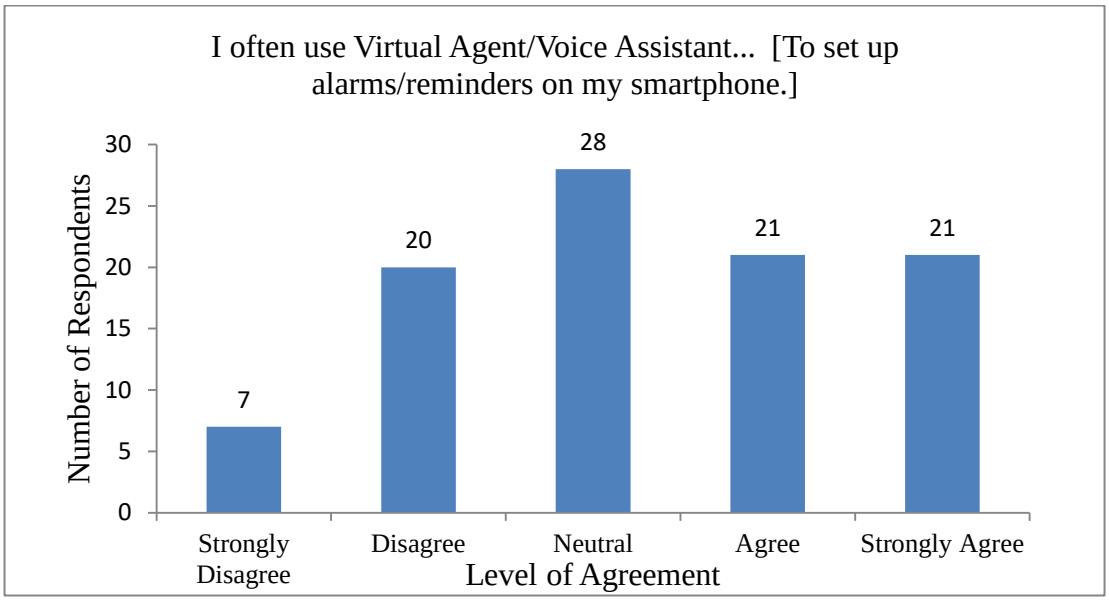

Fig 4.4

F3. Level of agreement for using VPA to make a call/send a text

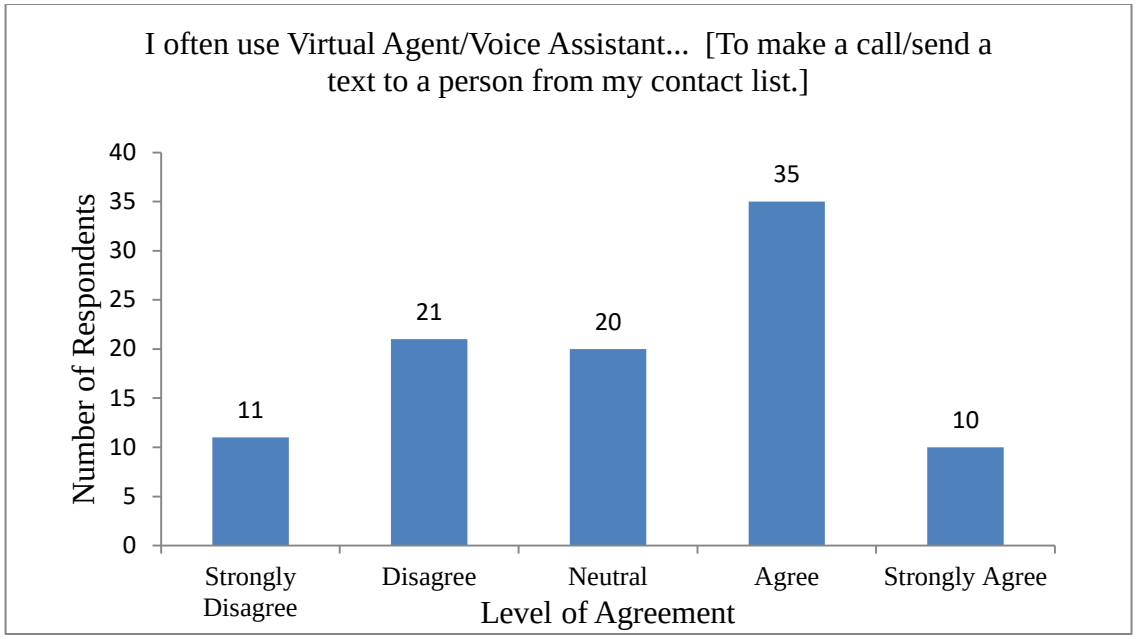

Fig. 4.5

F4. Level of agreement for using VPA for fun and recreational purposes

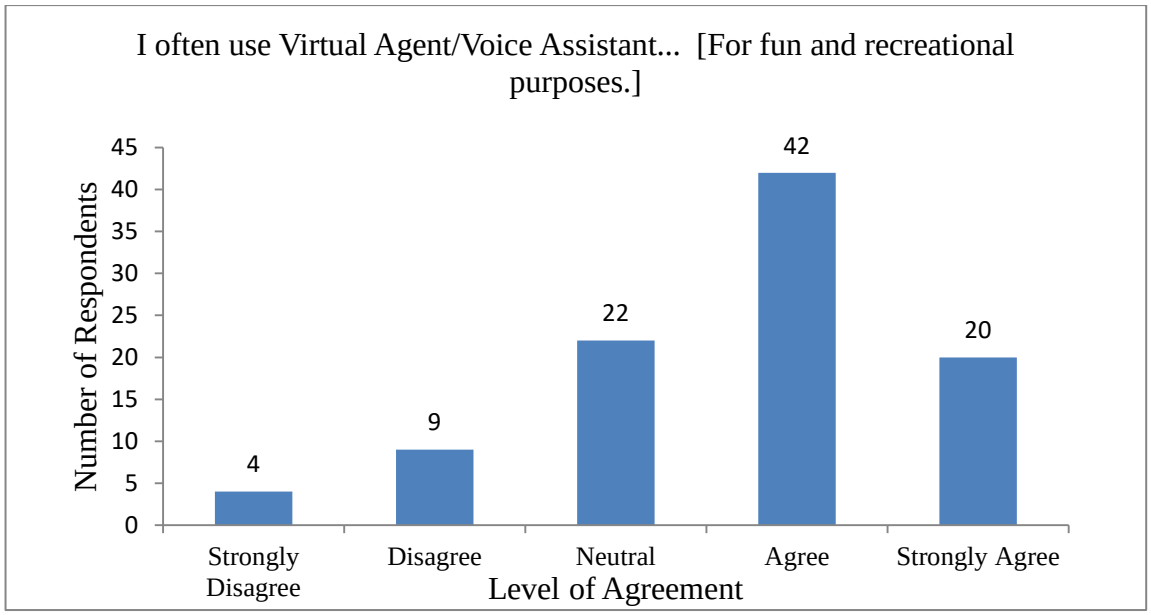

Fig. 4.6

F5. Level of agreement for using VPA to create a shopping/to do list

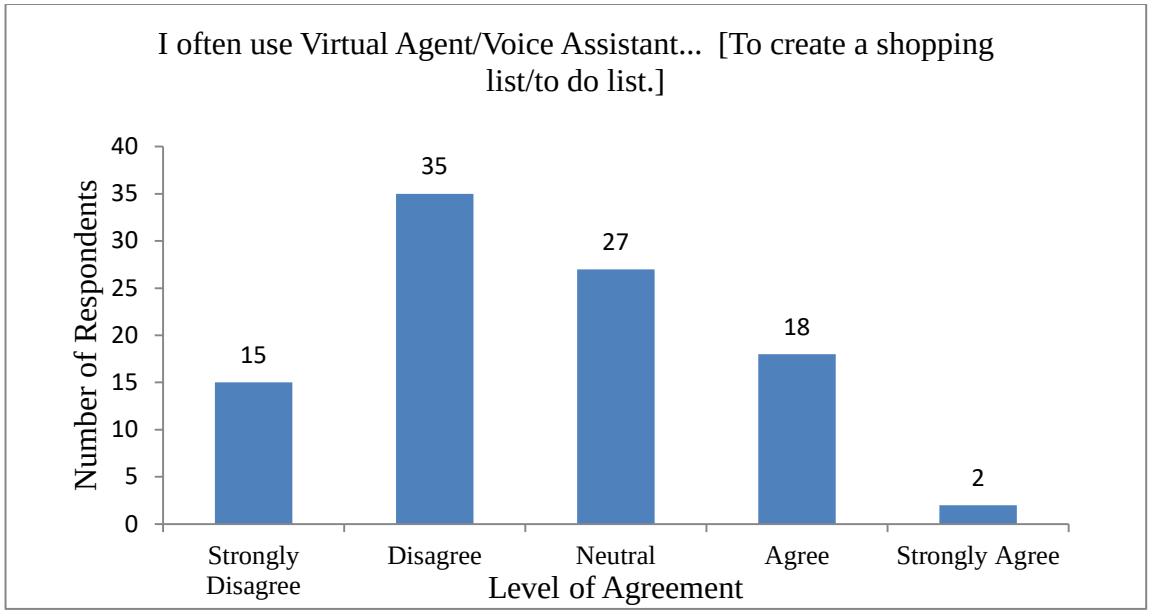

Fig. 4.7

F6. Level of agreement for using VPA to get personalized information based on location

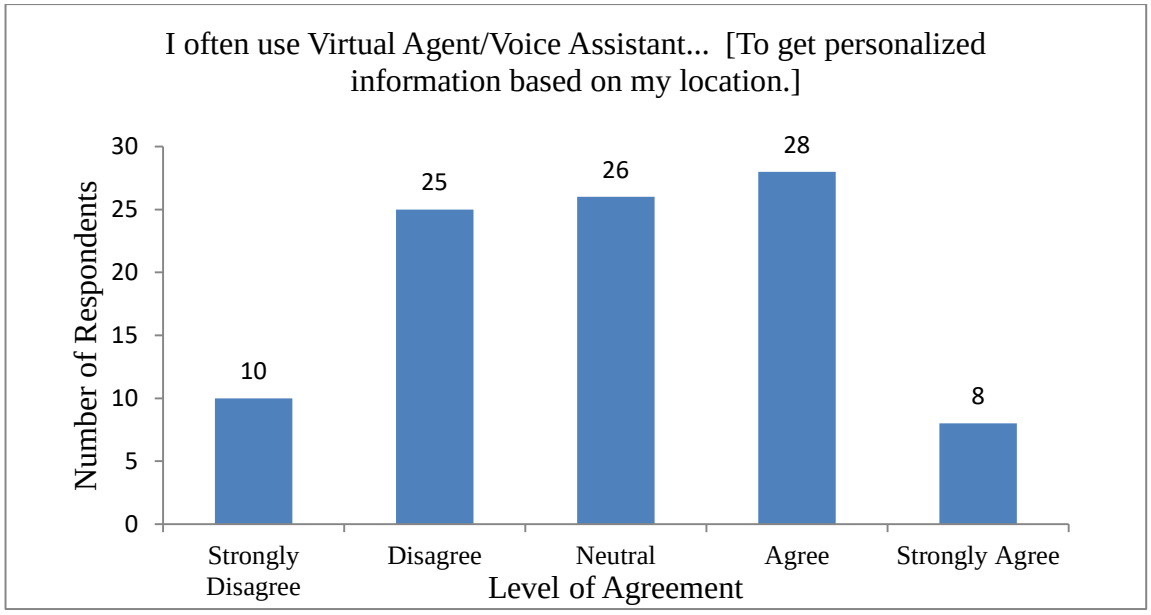

Fig. 4.8

F7. Level of agreement for using VPA to launch other apps

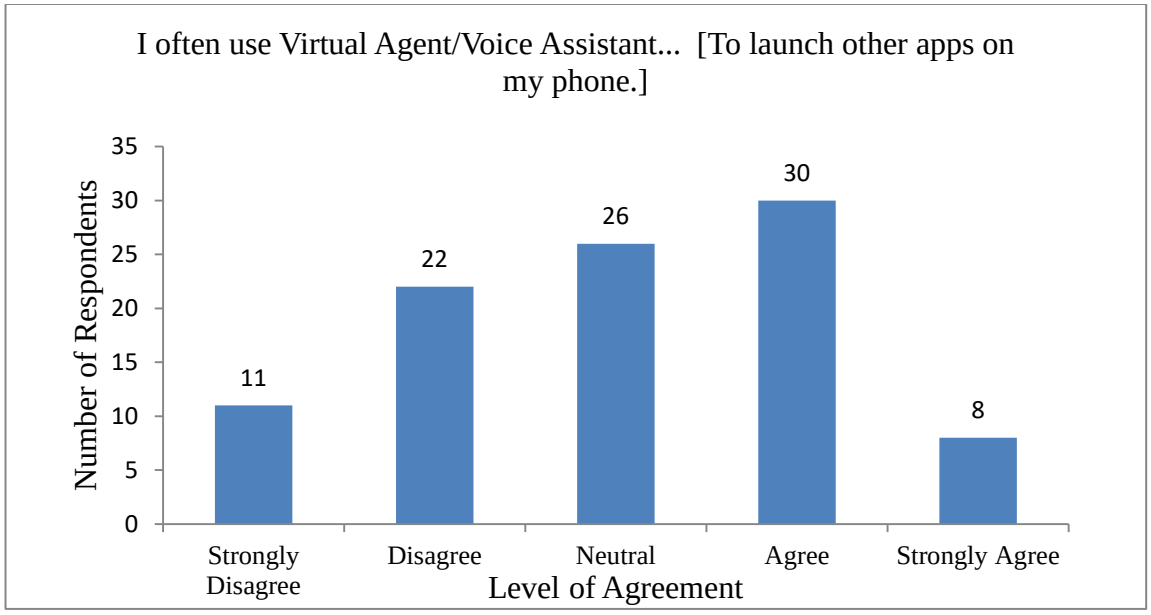

Fig. 4.9

F8. Level of agreement for using VPA for basic calculations/conversions

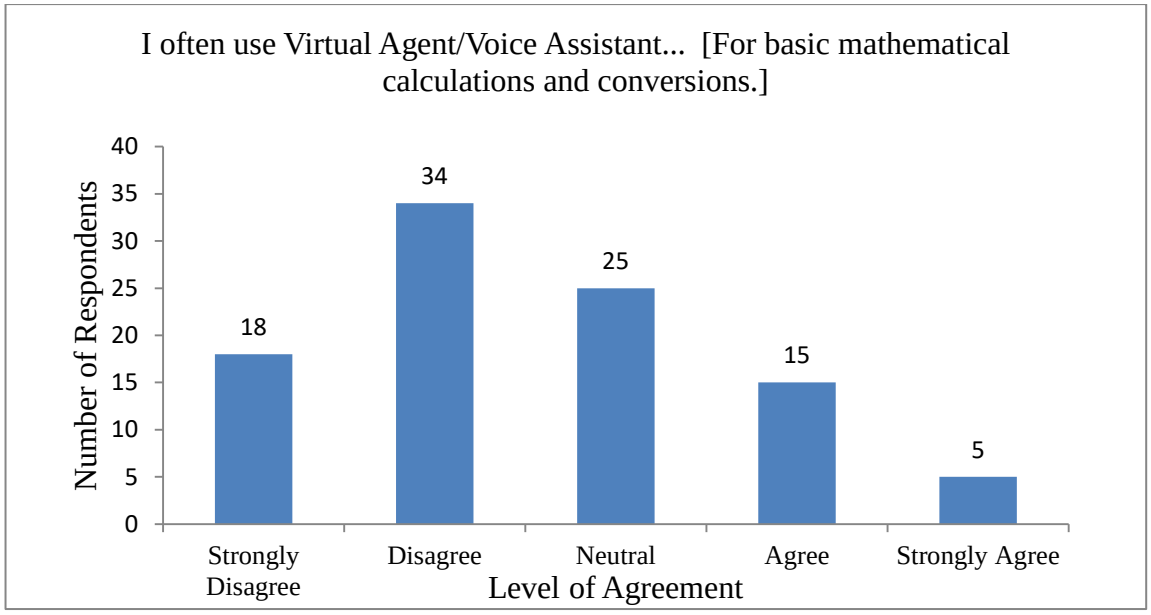

Fig. 4.10

F9. Level of agreement for a VPA's responses being human like

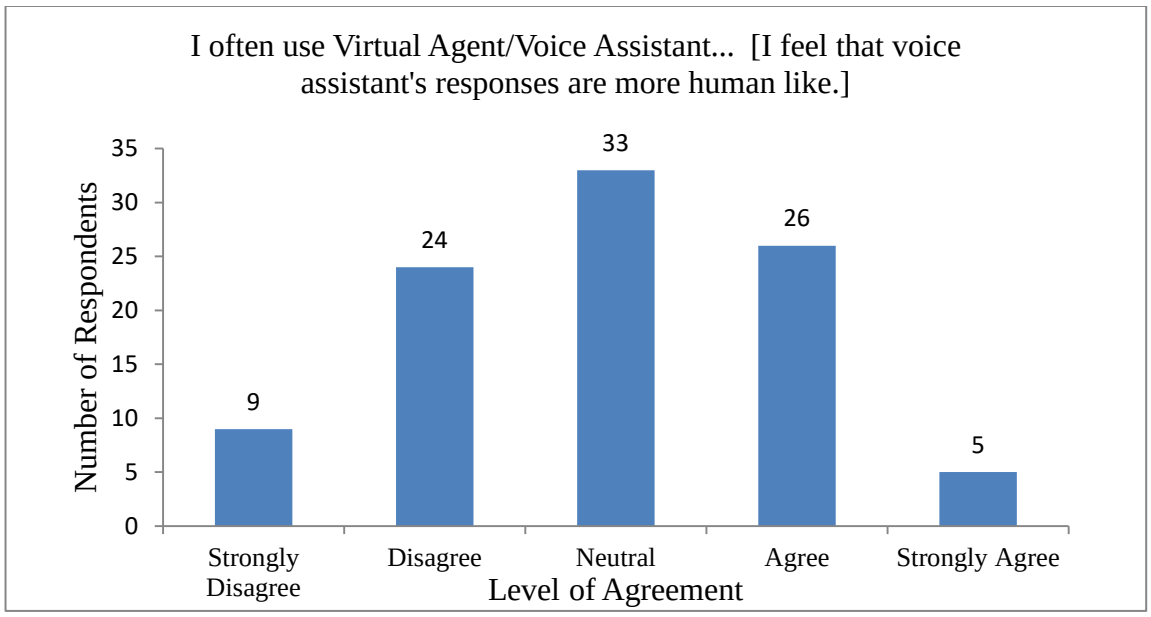

Fig. 4.11

F10. Level of agreement for using chat bots to look up information on a website

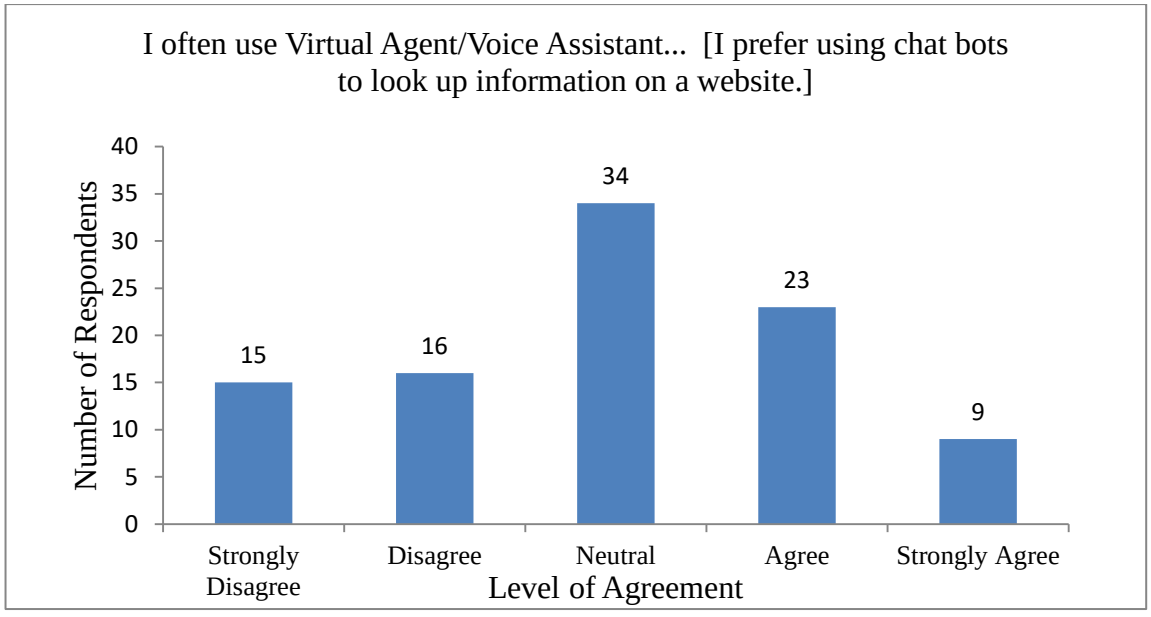

Fig. 4.12

F11. Level of agreement for chat bots providing personalized information

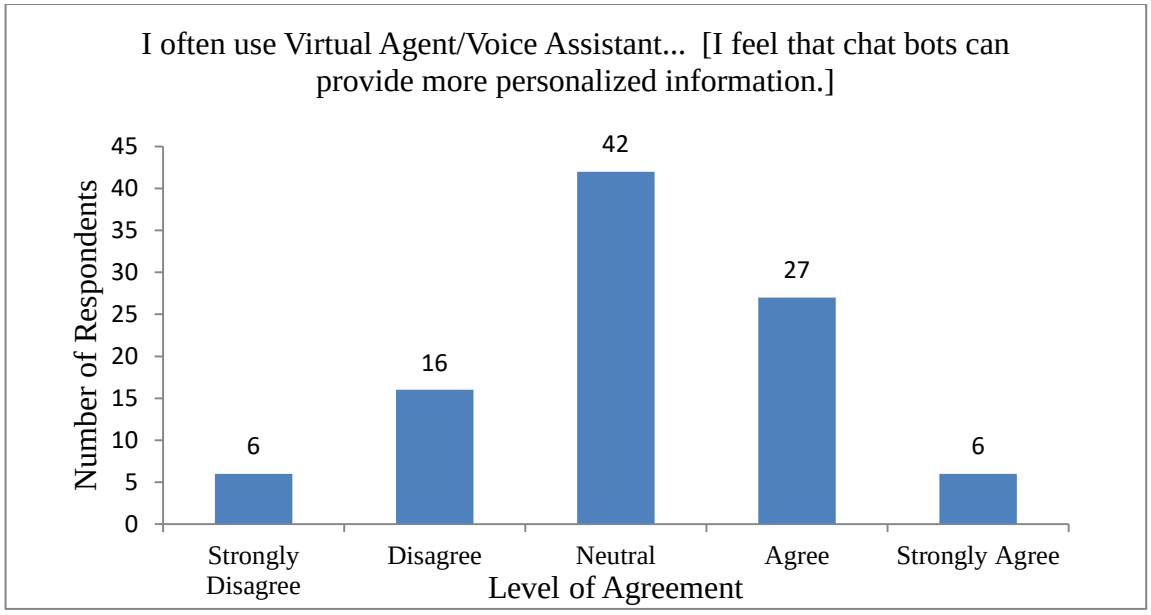

Fig. 4.13

Interpretation: Majority of respondents agree to use VPA for fun and recreational purposes, looking up information on the internet, setting up alarms/reminders and to make a call/send a text to a person from their contact list. It is mainly because of the convenience provided by VPA. The number of steps to execute any of the above mentioned actions without using a voice command is way more in number. A fair amount of people use AI to get personalized information with respect to their location. Creating a shopping list and basic mathematical calculations were the least used feature of the VPA.

4.3.2 Complexities

C1. Level of agreement for not feeling any security threats in providing personal information to virtual agent

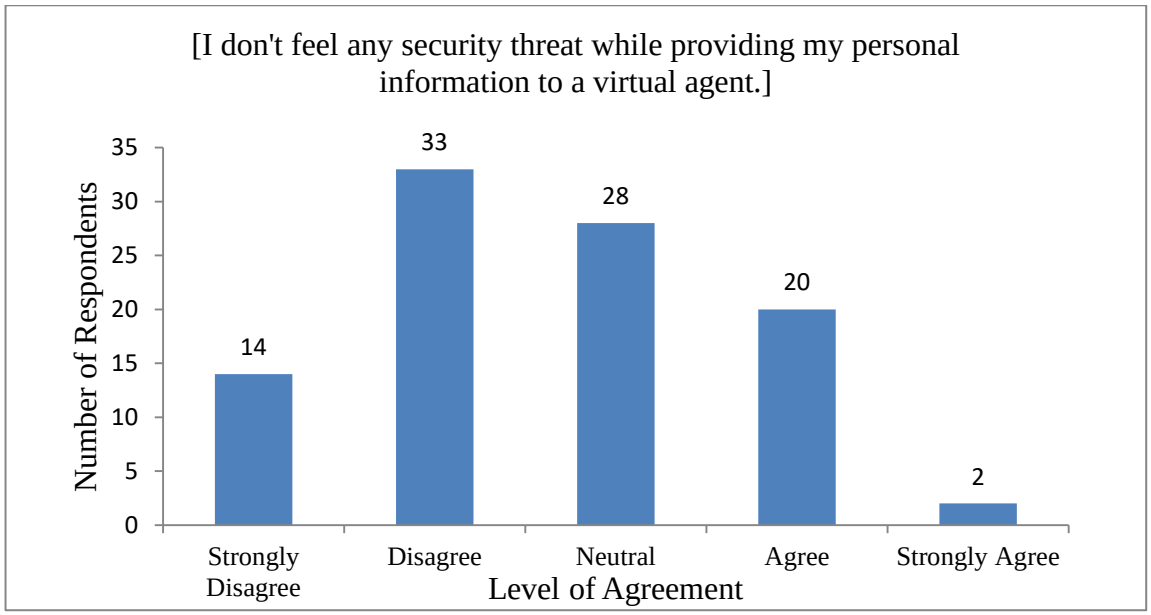

Fig. 4.14

C2. Level of agreement for virtual agents not being sufficiently equipped to deal with complex requests

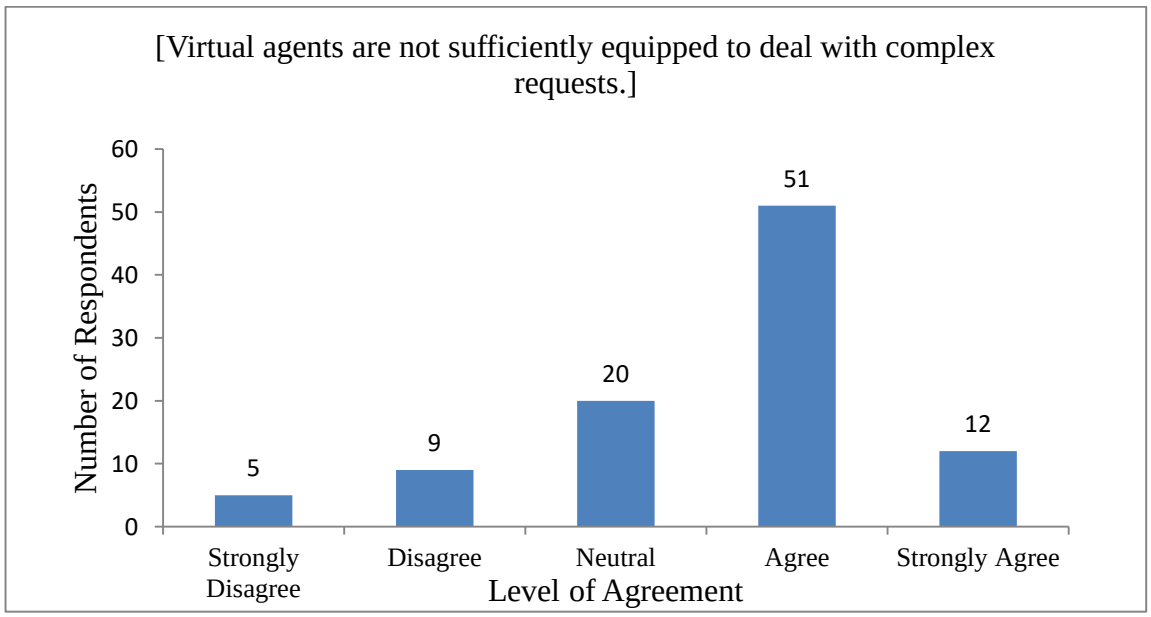

Fig. 4.15

C3. Level of agreement for feeling forced to use virtual agents

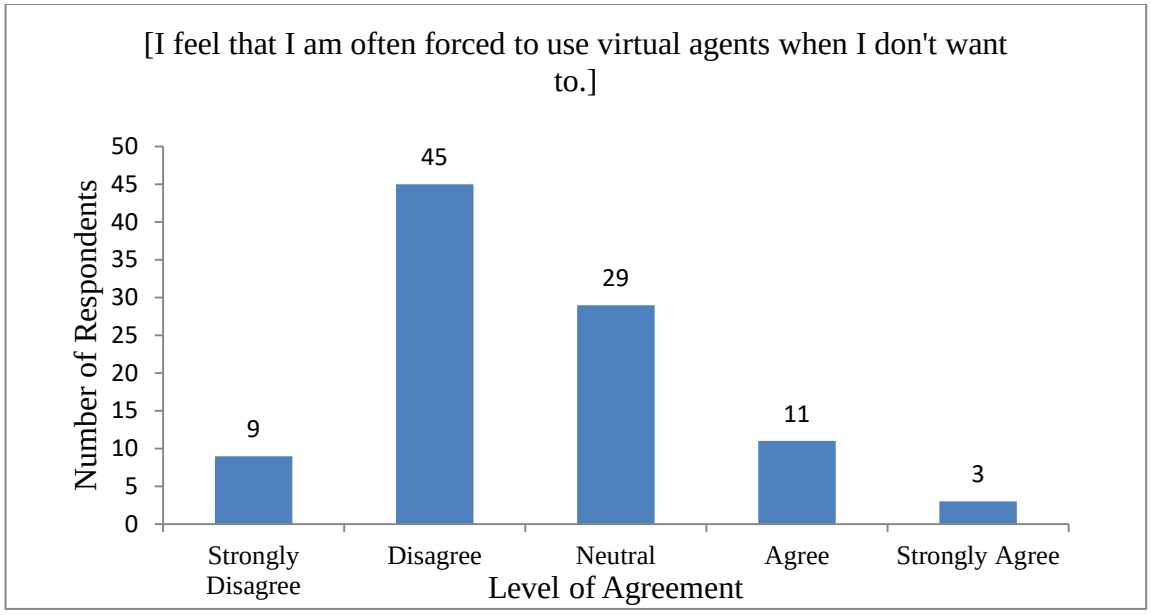

Fig. 4.16

C4. Level of agreement for getting more personalized offers when speaking with a human

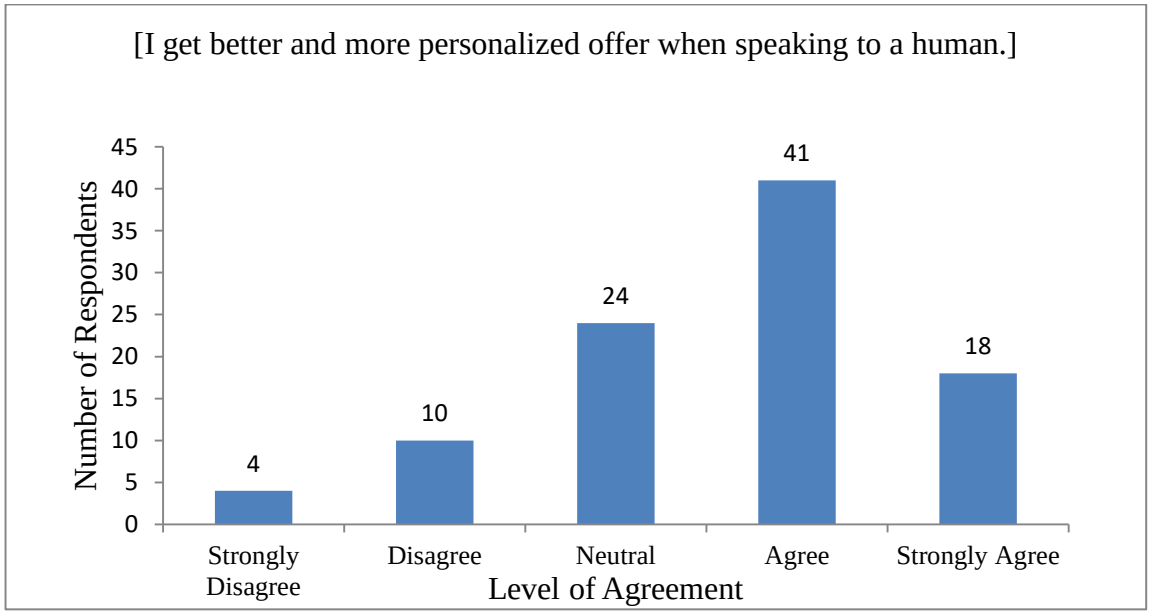

Fig. 4.17

C5. Level of agreement for virtual agents being unable to understand the emotions

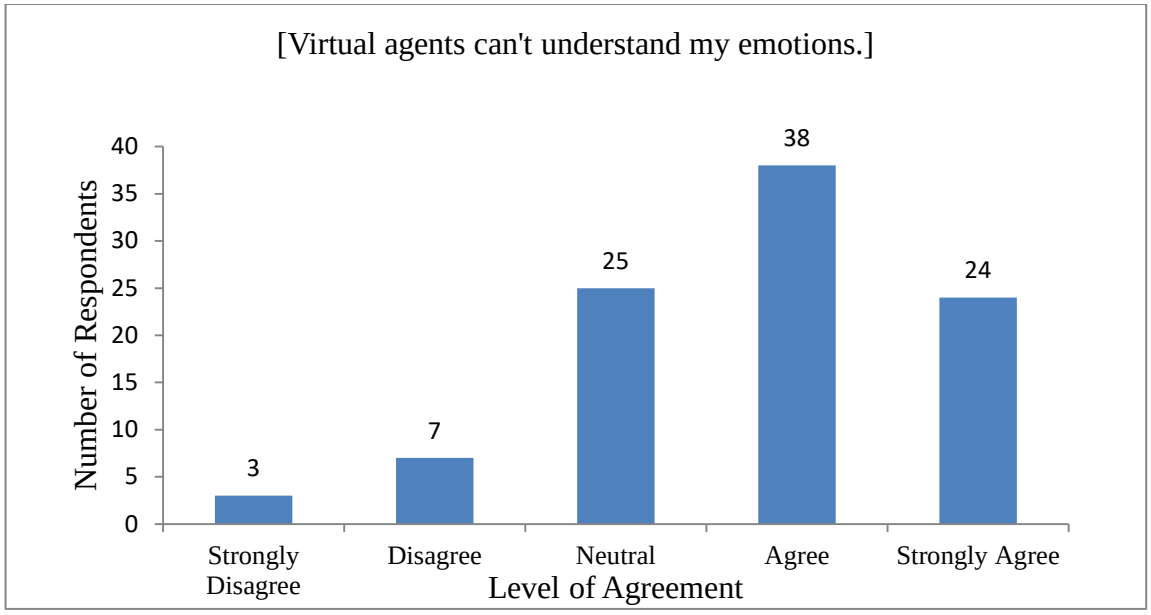

Fig. 4.19

C6. Level of agreement for human agents being more capable to understand/address one's particular needs

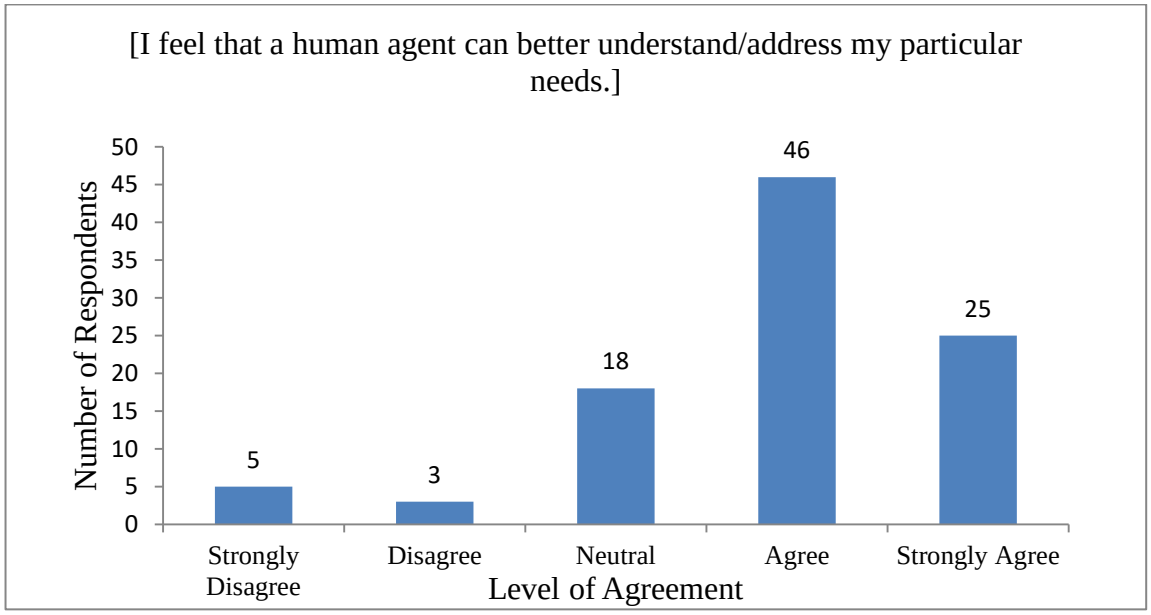

Fig. 4.20

C7. Level of agreement for being able to ask a variety of questions at once that a human is better able to keep track of

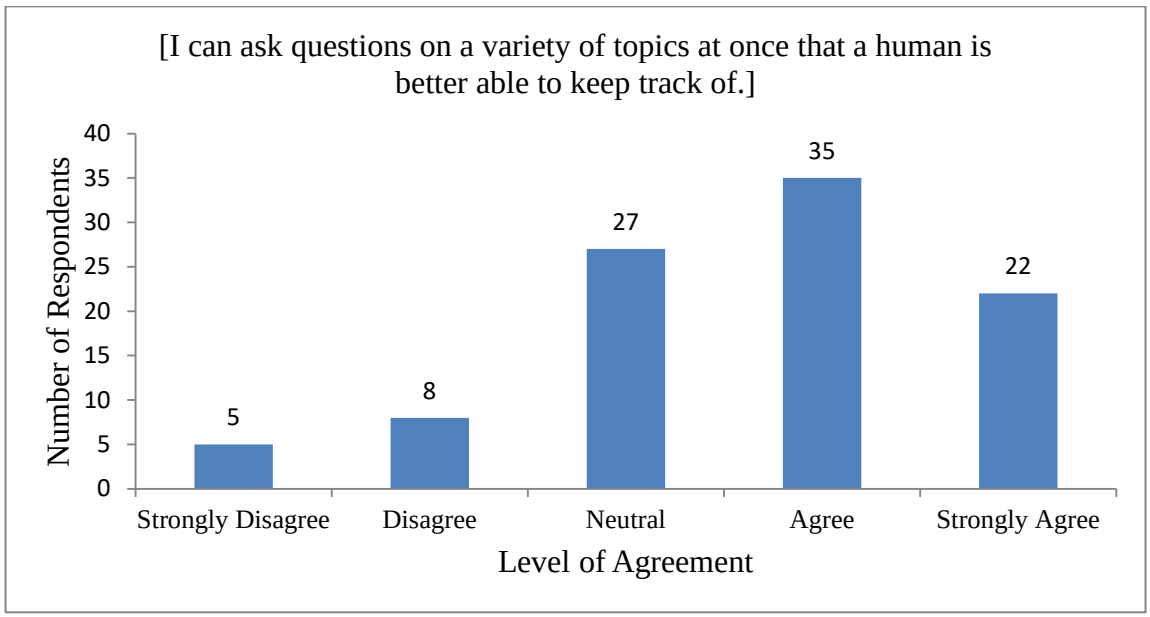

Fig. 4.21

C8. Level of agreement for virtual agent being able to sort a query quicker

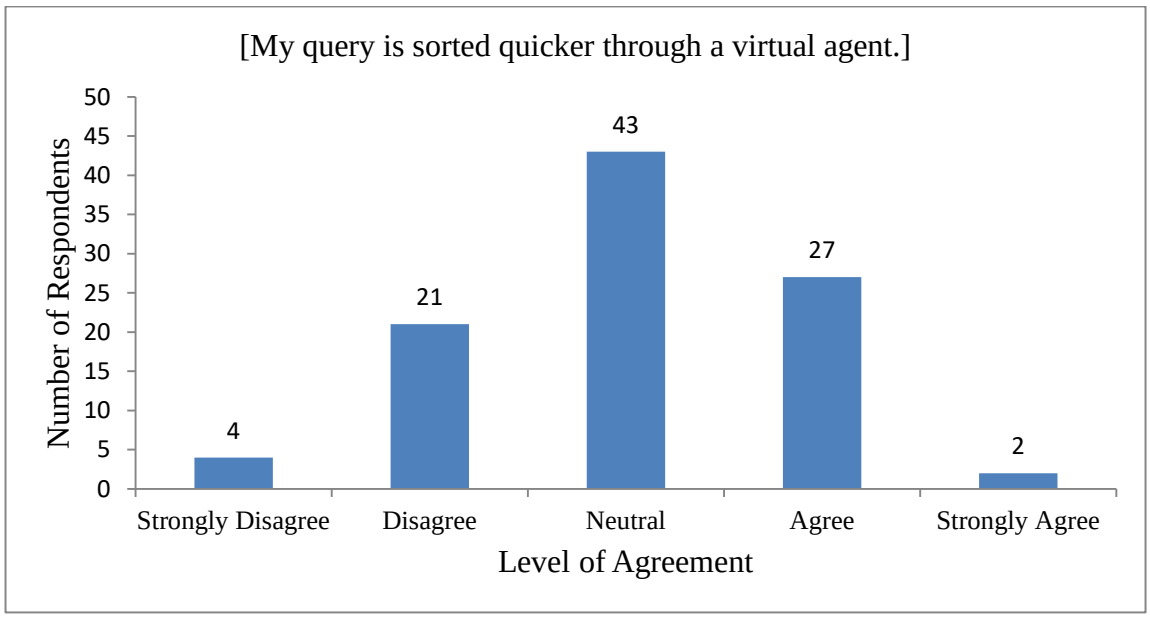

Fig. 4.22

C9. Level of agreement for virtual agents being more reliable than human agents

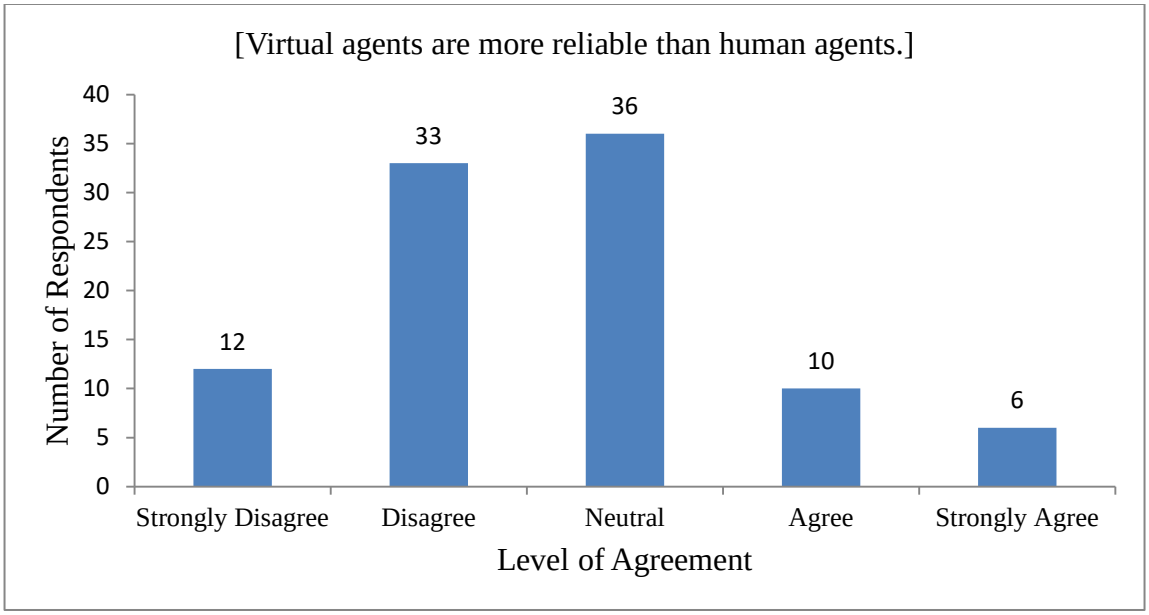

Fig. 4.23

C10. Level of agreement for being afraid of artificial intelligence

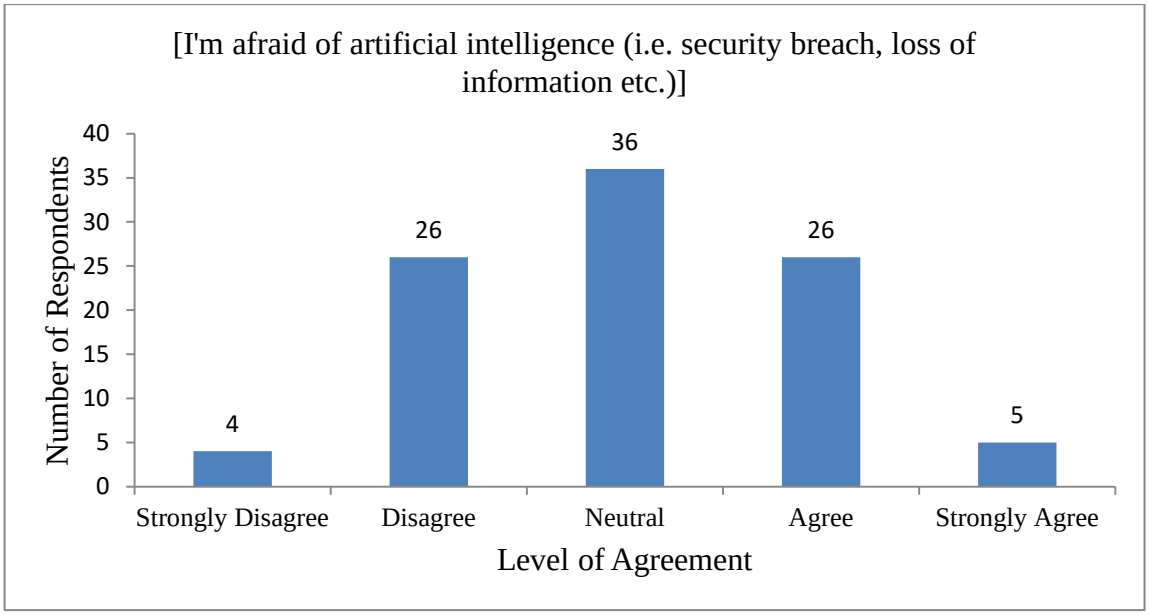

Fig. 4.24

Interpretation: Majority of the respondents find a human better equipped to handle their questions as they believe that the AI is not very reliable and their questions could get very complex for an AI to understand and give out a fitting response. Most of them don't also feel safe while providing personal information to a virtual agent.

4.3.3 Future Expectations

FE1. Level of agreement for virtual agents replacing human customer representatives in future

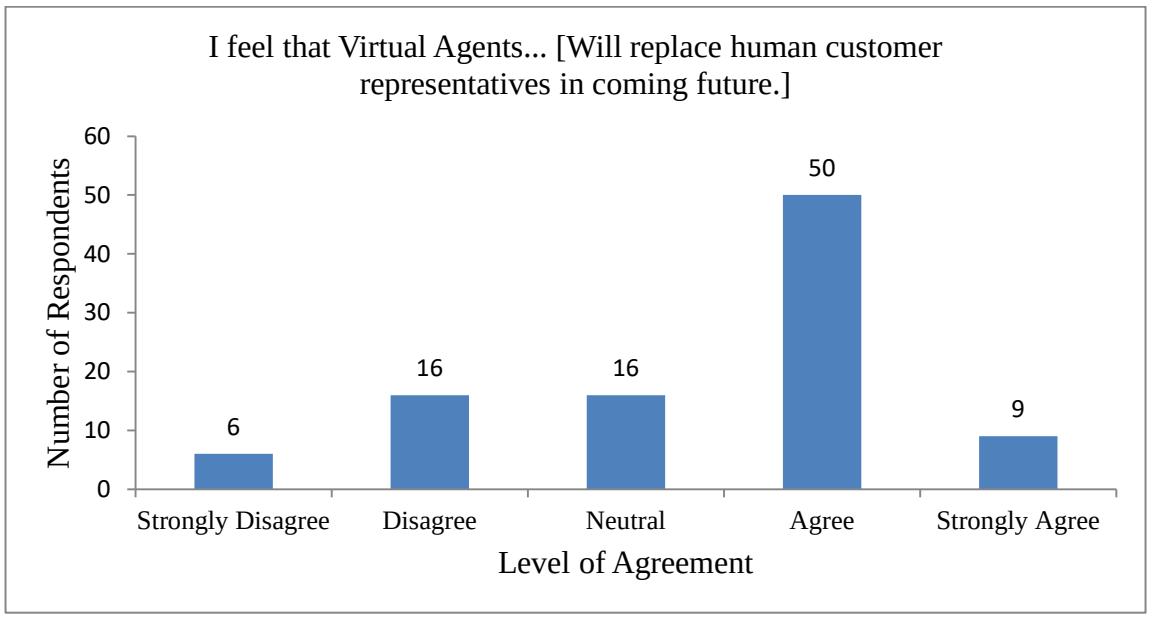

Fig. 4.25

FE2. Level of agreement for virtual agents getting better in understanding human behavior/emotions in coming future

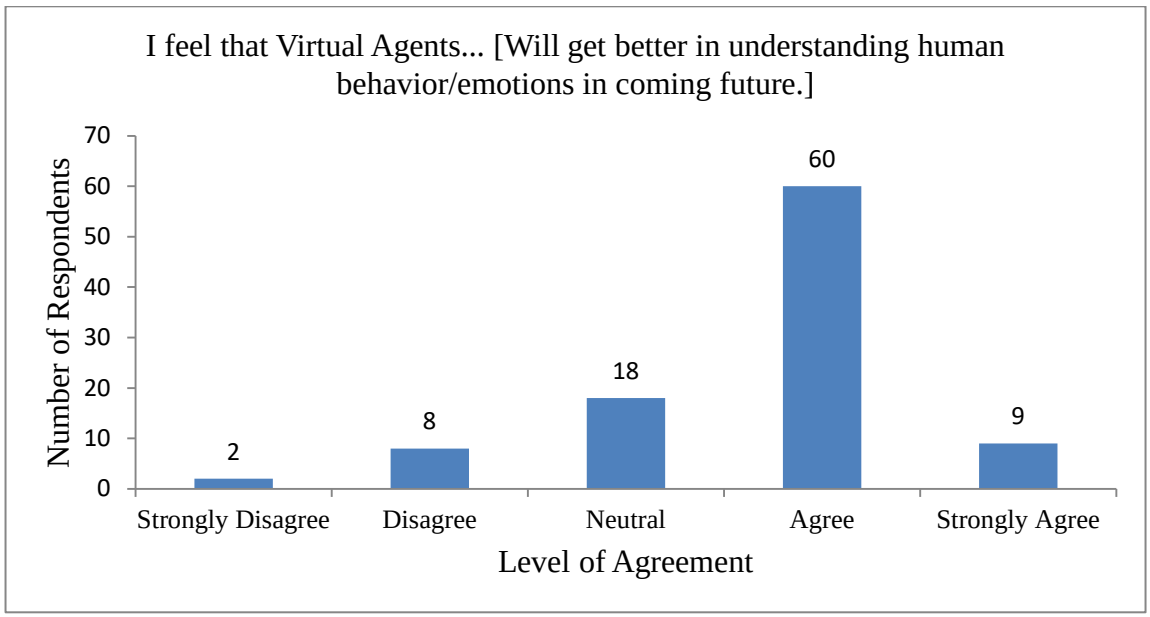

Fig. 4.26

FE3. Level of agreement for virtual agents generating more job opportunities

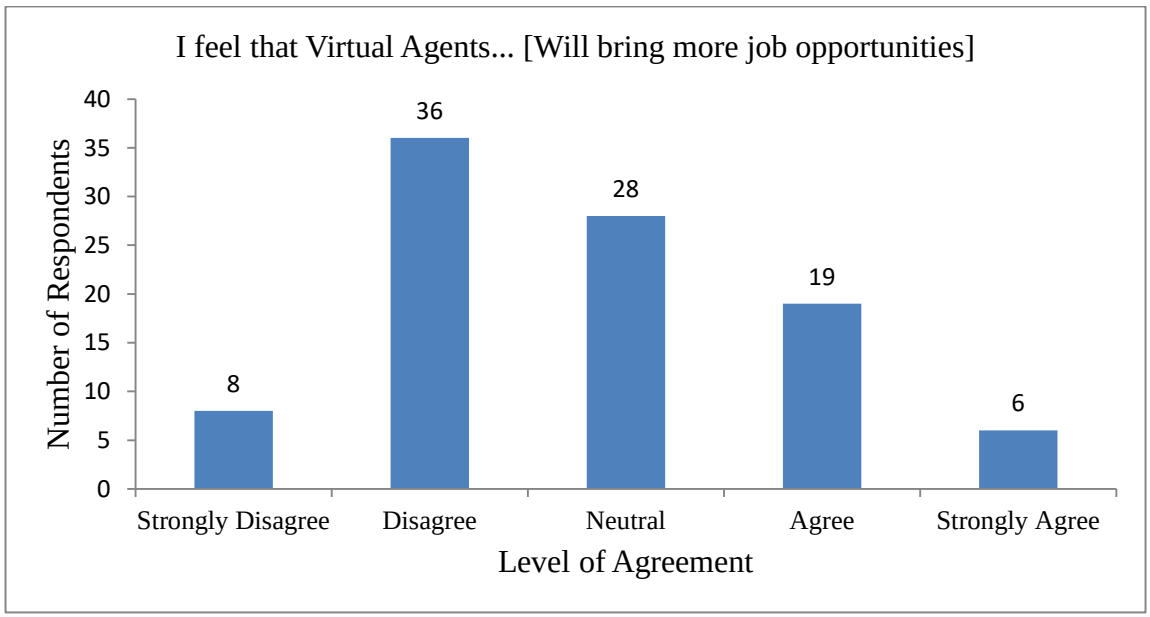

Fig. 4.27

FE4. Level of agreement for virtual agents controlling most of the human controlled operations in future

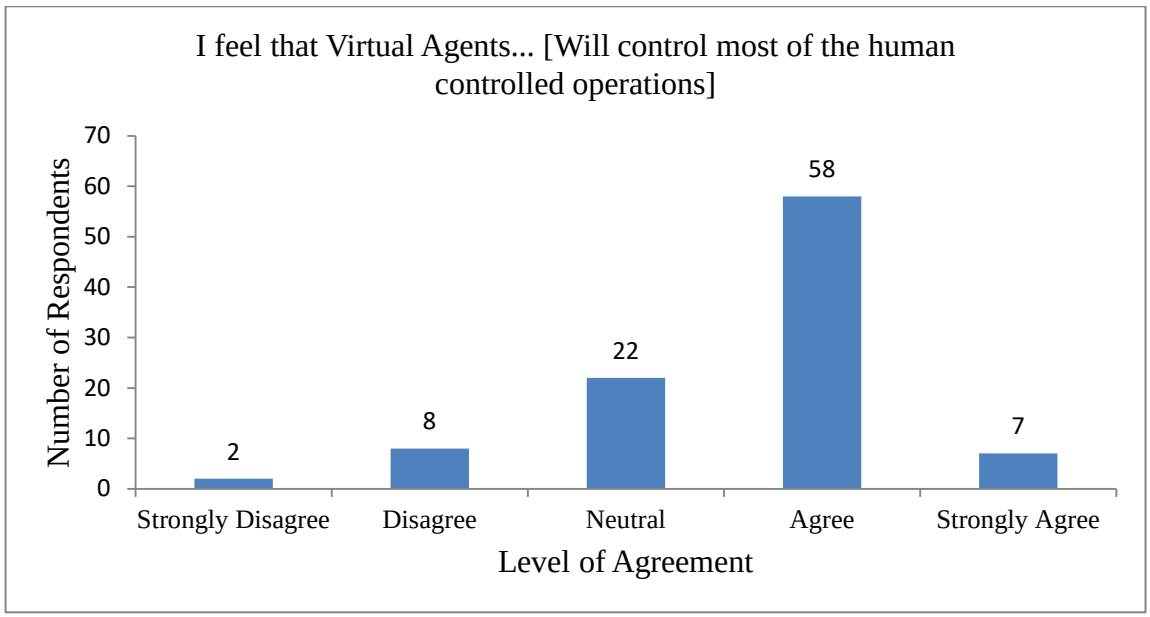

Fig. 4.28

FE5. Level of agreement for virtual agents being able to make more accurate predictions of human responses in future

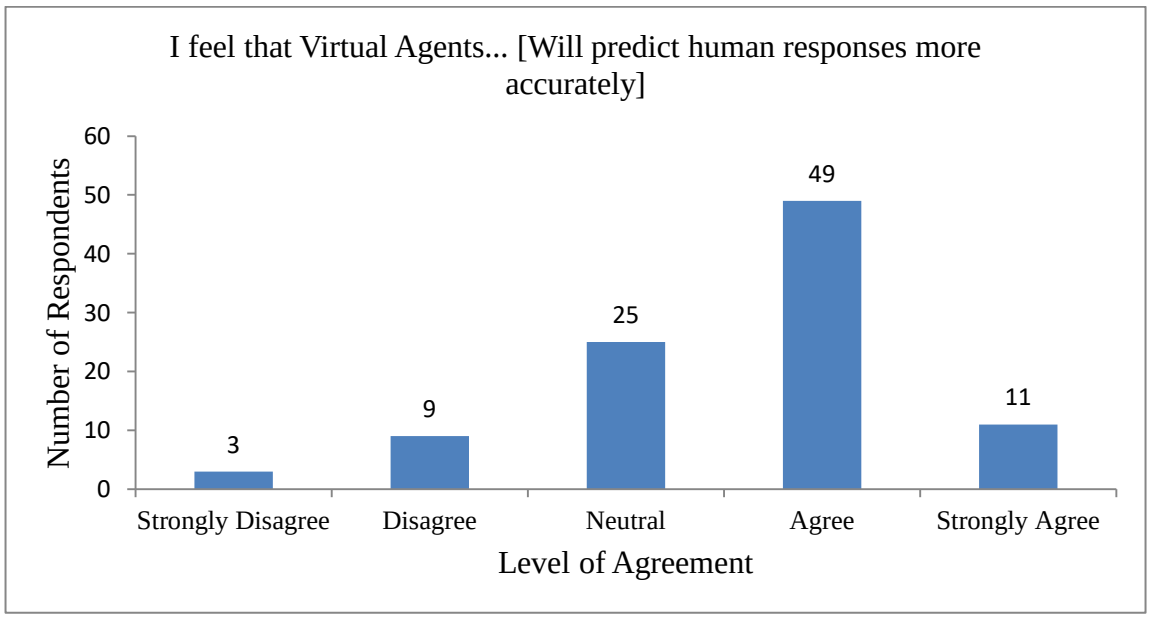

Fig. 4.29

Interpretation: Even though most respondents don't feel safe while providing personal information to AI they do believe that AI is the future and it will replace most of the human controlled operations in future. They also don't see AI creating many job opportunities in future.

4.4 Quantification of Data

For the quantification of data, the variables of likert scale were assigned with numeric values with the lowest (Strongly Disagree) being 1 and the highest (Strongly Agree) being 5. So the values assigned to all the variables would be as follow:

Strongly Disagree = 1

Disagree = 2

Neutral = 3

Agree = 4

Strongly Agree = 5

The mean numeric value for each response was calculated with respect to each measuring item on the questionnaire. The result is presented in the below tables:

Functionality:

I often use Virtual Agent/Voice Assistant...

Measurement Item	**Mean Value**
To look up information on the internet.	3.70
To set up alarms/reminders on my smartphone.	3.29
To make a call/send a text to a person from my contact list.	3.12
For fun and recreational purposes.	3.67
To create a shopping list/to do list.	2.55
To get personalized information based on my location.	2.98
To launch other apps on my phone.	3.02

For basic mathematical calculations and conversions.	2.53
I feel that voice assistant's responses are more human like.	2.93
I prefer using chat bots to look up information on a website.	2.94
I feel that chat bots can provide more personalized information.	3.11

Table IV

Complexities:

Measurement Item	**Mean Value**
I don't feel any security threat while providing my personal information to a virtual agent.	2.61
Virtual agents are not sufficiently equipped to deal with complex requests.	3.57
I feel that I am often forced to use virtual agents when I don't want to.	2.52
I get better and more personalized offer when speaking to a human.	3.60
Virtual agents can't understand my emotions	3.75
I feel that a human agent can better understand/address my particular needs.	3.85
I can ask questions on a variety of topics at once that a human is better able to keep track of.	3.62
My query is sorted quicker through a virtual agent.	3.02
Virtual agents are more reliable than human agents.	2.63
I'm afraid of artificial intelligence (i.e. security breach, loss of information etc.)	3.02

Table V

Future Expectations:

I feel that Virtual Agents...

Measurement Item	Mean Value
Will replace human customer representatives in coming future.	3.41
Will get better in understanding human behavior/emotions in coming future.	3.68
Will bring more job opportunities.	2.78
Will control most of the human controlled operations.	3.61
Will predict human responses more accurately.	3.57

Table VI

CHAPTER 5

CONCLUSION

After a thorough analysis of the responses obtained from the online survey the following deductions were made:

- The most used functions of a Virtual Personal Assistant were found to be
    - Looking up information on the internet
    - Setting up alarms and reminders
    - Making a call/sending a text to a person from the contact list
    - Fun and recreational purposes
    - Getting personalized information based on the location of user
    - Launching other apps on phone
- The least used functions of a Virtual Personal Assistant were found to be
    - Creating a shopping list/to do list
    - Making basic mathematical calculations and conversions
- Even though people seemed to use most of the functions offered by a virtual personal assistant, there were still some concerns and issues which a user face while using the artificial intelligence technology. Those issues are:
    - Majority of the users feel a security threat while providing any kind of personal information to a virtual agent running on AI technology.
    - A major chunk of the sample population felt that the AI in its current state is not sufficiently equipped with handling complex requests.
    - Majority of people believed that a human agent can better understand their particular needs and hence can give a better and more personalized offer,
    - Most of the respondents felt that the virtual agents is not equipped to understand their emotions
    - Most of the respondents felt that a human agent is more reliable in general when compared to a virtual agent.

- Even though majority of the respondents felt that AI in its current state is not as efficient as a human agent, but when asked about future expectations and possibilities of AI, they responded very positively.
    - Majority of the respondents felt that the AI technology will improve at understanding human emotions and predicting human responses with time.
    - Most of the respondents believe that virtual agents will replace human customer representatives in near future and will also control most of the human controlled operations.
- The respondents also showed concerns over jobs created by Artificial Intelligence technology. They feared that AI will replace most of the human controlled operations while generating a comparatively less number of job opportunities.

CHAPTER 6

REFERENCES

- Sangyeal Han, Heetae Yang. "Understanding adoption of intelligent personal assistants", Industrial Management & Data Systems, 2018
- Louie, W.-Y.G., Mccoll, D. and Nejat, G. (2014), “Acceptance and attitudes toward a human-like socially assistive robot by older adults”, Assistive Technology, Vol. 26 No. 3, pp. 140-150.
- Nanda, P., Bos, J., Kramer, K.-L., Hay, C. and Ignacz, J. (2008), “Effect of smartphone aesthetic design on users’ emotional reaction: an empirical study”, The TQM Journal, Vol. 20 No. 4, pp. 348-355.
- Rubin, R.B. and Mchugh, M.P. (1987), “Development of parasocial interaction relationships”, Journal of Broadcasting & Electronic Media, Vol. 31, pp. 279-292.
- Stork D (ed) (1998) HAL’s legacy: 2001’s computer as dream and reality. MIT press, Cambridge Trappl R (ed) (2013) Your virtual butler: the making of. Springer, Berlin.
- Springer International Publishing Switzerland 2016 M. McTear et al., The Conversational Interface

CHAPTER 7

APPENDIX

7.1 Questionnaire

Section A

1. Name

…….....

2. Gender

Mark only one oval.

Male ◯

Female ◯

3. Age

Mark only one oval.

Less than 20 ◯

20-30 ◯

31-45 ◯

More than 45 ◯

4. How often would you say you engage with virtual agents (voice assistants/chat bots)?

Mark only one oval.

At least once a day ◯

At least once a week ◯

At least once every two weeks ◯

At least once a month ◯

At least once a year ◯

Section B

5. Here are a number of statements related to the functionality of virtual agents. Depending upon your level of agreement mark your entries in front of each statement. I often use Virtual Agent/Voice Assistant...

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
To look up information on the internet.	⬭	⬭	⬭	⬭	⬭
To set up alarms/reminders on my smartphone.	⬭	⬭	⬭	⬭	⬭
To make a call/send a text to a person from my contact list.	⬭	⬭	⬭	⬭	⬭
For fun and recreational purposes.	⬭	⬭	⬭	⬭	⬭
To create a shopping list/to do list.	⬭	⬭	⬭	⬭	⬭
To get personalized information based on my location.	⬭	⬭	⬭	⬭	⬭
To launch other apps on my phone.	⬭	⬭	⬭	⬭	⬭
For basic mathematical calculations and conversions.	⬭	⬭	⬭	⬭	⬭

I feel that voice assistant's responses are more human like.					
I prefer using chat bots to look up information on a website.					
I feel that chat bots can provide more personalized information.					

6. Here are a number of statements related to the complexities of virtual agents. Depending upon your level of agreement mark your entries in front of each statement.

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I don't feel any security threat while providing my personal information to a virtual agent.					
Virtual agents are not sufficiently equipped to deal with complex requests.					
I feel that I am often forced to use virtual agents when I don't want to.					
I get better and more personalized offer when speaking to a human.					

Virtual agents can't understand my emotions	⬭	⬭	⬭	⬭	⬭
I feel that a human agent can better understand/address my particular needs.	⬭	⬭	⬭	⬭	⬭
I can ask questions on a variety of topics at once that a human is better able to keep track of.	⬭	⬭	⬭	⬭	⬭
My query is sorted quicker through a virtual agent.	⬭	⬭	⬭	⬭	⬭
Virtual agents are more reliable than human agents.	⬭	⬭	⬭	⬭	⬭
I'm afraid of artificial intelligence (i.e. security breach, loss of information etc.)	⬭	⬭	⬭	⬭	⬭

7. Here are a number of statements related to the future possibilities of virtual agents. Depending upon your level of agreement mark your entries in front of each statement. I feel that Virtual Agents...

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Will replace human customer representatives in coming future.	⬭	⬭	⬭	⬭	⬭
Will get better in understanding human behavior/emotions in coming future.	⬭	⬭	⬭	⬭	⬭
Will bring more job oppurtunities	⬭	⬭	⬭	⬭	⬭
Will control most of the human controlled operations	⬭	⬭	⬭	⬭	⬭
Will predict human responses more accurately	⬭	⬭	⬭	⬭	⬭