APPLICATIONS OF ARTIFICIAL INTELLIGENCE AND THE MILLENNIAL EXPECTATIONS AND OUTLOOK TOWARDS ARTIFICIAL INTELLIGENCE

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ABSTRACT

Artificial Intelligence (AI) is a domain which focuses on creation of intelligent machines that will process the work superfast like machines by will, react and understand as humans. It is a flourishing technology with applications in every industry with a growth rate of 45% CAGR within a period of 2018-2022. This study is conducted to understand the applications of AI in different industries like automotive, health care, insurance, education, manufacturing and retail and to explore and understand the millennial current outlook towards AI and their future expectations from this technology in various areas of life and business. Extensive literature review was done to know about the current applications of AI in various industries and Qualitative Analysis method was adopted by conducting in-depth interviews of millennial to capture the outlook and future expectations of AI technology. Data was analyzed using DICTION software for interpreting attrition pattern. Content analysis was done using vocabularies to obtain a statistical index of qualitative data. These statistical indices were used for further analysis. Findings suggested that all believe that AI will be the disrupting technology of the near future and they are keen and looking forward for it in all domains of life. The study unearths the latent need of product/service and applications customers are expecting and provide insights to business to develop potential product with regards to AI.

Keywords: Artificial Intelligence, Millennial Expectations, Potential Product, AI Applications, AI Perceptions, AI Industry Applications.

INTRODUCTION

Artificial intelligence (AI) is a domain which focuses on creation of intelligent machines that work and reacts like humans. The objective of AI is to manage complex difficulties in the same way how a human being will tackle using logic and reasoning. AI is a technology that allows machines to act with higher level of intelligence and imitate the capabilities of sense, comprehend and act as an individual. Natural language processing and inference engines assist AI systems to analyse and understand the data that is collected. AI is believed to transform the way we live and work in day to day life. It can be used in carrying out repetitive tasks, customizing services based on the preference of the users. AI also helps in minimizing human error while executing tasks and also assists in faster decision making using cognitive technologies. AI is being used in various industries such as health and medicine, automotive, insurance, entertainment. AI will be used to enhance the customer experience to the end customers. Report by Business wire 2018 stated that the world enterprise AI applications market will show a whooping growth of 45% CAGR during the period between 2018 to 2022. A report by Accenture research 2016 has predicted that in the 12 developed economies AI will cascade the economic growth rate to almost double by the year 2035 and it will totally transform the way we live and the way we work.

The nature of work content will see a radical change as our interaction with machines will become a way of our life.

People will be able to make use of their time more efficiently and labor productivity will go up by almost 40% as AI will take over the routine and mundane repetitive and labour-intensive task, this will boost the business and its processes can become full proof with reduction is defects and deviations. In June 2018, NITI Aayog drafted a national strategy and roadmap to develop AI in India so that country can grow economically stronger and contributing in developing all the sectors to a greater extent. NITI Aayog has identified ways through which AI can serve the country's needs. First, AI will help in economic growth of the country by overcoming the physical limitations of capital and labor. Second, implementation of AI in social sector will help to improve the quality of life of ordinary citizens. Third, India can act as garage to develop new AI technologies. An article published in economic times in October 2018 said that Start-ups based on AI received maximum funding and currently there are about 400 start ups working on AI and machine learning (Inurture blog, 2018). AI has the potential to add US $957 billion or 15% of India's gross value in 2035 (Accenture Report, 2017). AI can boost profitability and growth and transform the business of big companies and sectors. The manufacturing sector could see a jump in the profit of 39% due to implementation of AI. Accenture report shows that the eco system of AI depends on 5 pillars - universities, large companies, start-ups, policy makers and multi-stakeholder partnerships.

History of AI-During the Second World War, Alan Turing worked on Enigma code which was used by German forces to send messages securely which was an application of AI and machine learning. Alan Turing and his team created Bombe machine that was used to decipher Enigma messages. These Enigma and Bombe machines laid foundation stone development of AI and machine learning. Realizing its potential, research centres were set up across USA to explore the potential of AI. The growth of AI was hindered during 1970s because lack of support from government, this time duration was called AI winters. Researchers faced an acute shortage of funding for AI research during this phase from mid-1970s to mid-1990s. In the mid-1990s many American and Japanese companies and government became interested in developing AI and starting funding in this technology. Amazon, Google, IBM started leveraging this technology for their commercial advantage. After AI winters, AI saw a rapid growth because of its various applications and advent of computers.

LITERATURE REVIEW

AI is one of the disrupting technologies of our era. AI along with machine learning can build technologies and systems which have the ability to think on their own and improve their performance by learning from the data available over time. AI has applications in almost all the industries like automotive, financial services, health care, defence, entertainment etc. AI systems in health care have the potential to detect the causes of the disease and assist in diagnosis of diseases, in the automotive field it has the capability of developing a driverless car and tackle more complex problems. In this current research, extensive analysis of the applications of AI has been done in industries like automotive, financial services, health care.

As per the survey done by PwC in India, 71% of the respondents believe that AI will help in solving complex problems and make their life more, 67% of the respondents believe that they would prefer AI assistance over humans as office assistants, 43% of the respondents believe that government will apply AI to improve health, education and other sectors. One of the major concerns of AI is about data privacy. 93% of the respondents expressed that they have concerns regarding data privacy. 61% of the respondents use digital assistants like Siri, Google Now, etc. Hence there is huge opportunity for improvement in these technologies using AI. 49% of the respondents are ready to pay extra for AI technologies or smarter higher touch customer service. By this we can infer that people are ready to accept AI technologies and there is huge potential for growth. (PwC report, 2018).

The Finance Ministry of India mandated NITI Aayog to create and start a national program on AI in order to leverage the benefits of this technology. NITI Aayog championed a threefold approach by commissioning an exploratory proof-of-concept AI projects in numerous industries, conscripting a national plan for establishing a spirited AI environment in India and teaming-up with several specialists and stakeholders of different industries. NITI Aayog in its report recommends and emphasizes on five important sectors in order to answer the social needs using the AI technology. The five sectors chosen are:

Healthcare, Agriculture, Education, Infrastructure and Smart-Cities, Transportation and Smart-Mobility

All the developed and developing countries are realizing the importance of the application of AI and all the types of industries and what a world of opportunities and ease of business it holds. For instance, China and UK have predicted that 26% and 10% of their GDP will be from AI related technologies (NITI Aayog report, 2018). Different countries like France, Japan, and USA are drafting and implementing AI applications and policies in their eco system. EY and NASCCOM conducted a study on the new jobs of the future which revealed that by 2022 almost 46% of the entire workforce will be engaged in completely different kind of job-content and will drastically acquire or will be trained in altogether different skillsets and compared to what they are doing today in Figure 1. (NITI Aayog report, 2018).

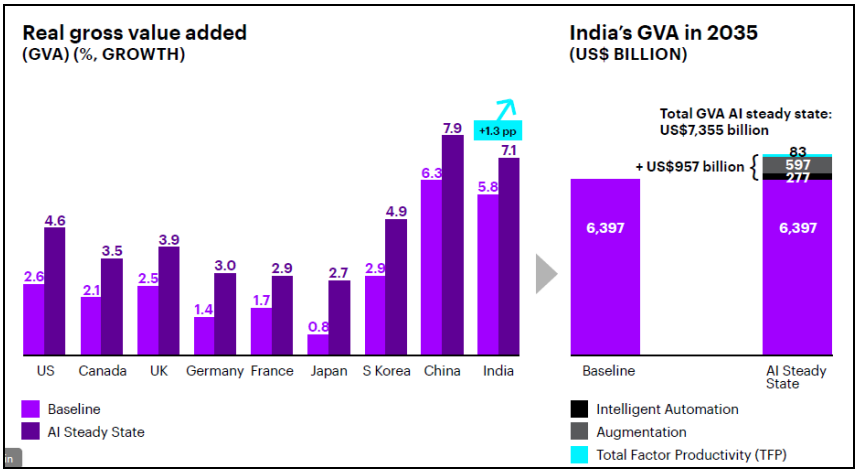

Figure 1
INDIAN ECONOMY

Accenture predicted that AI will boost India's annual growth rate by 1.3 percentage points by 2035. AI has the potential of adding 1 trillion US $ to the Indian economy by 2035.

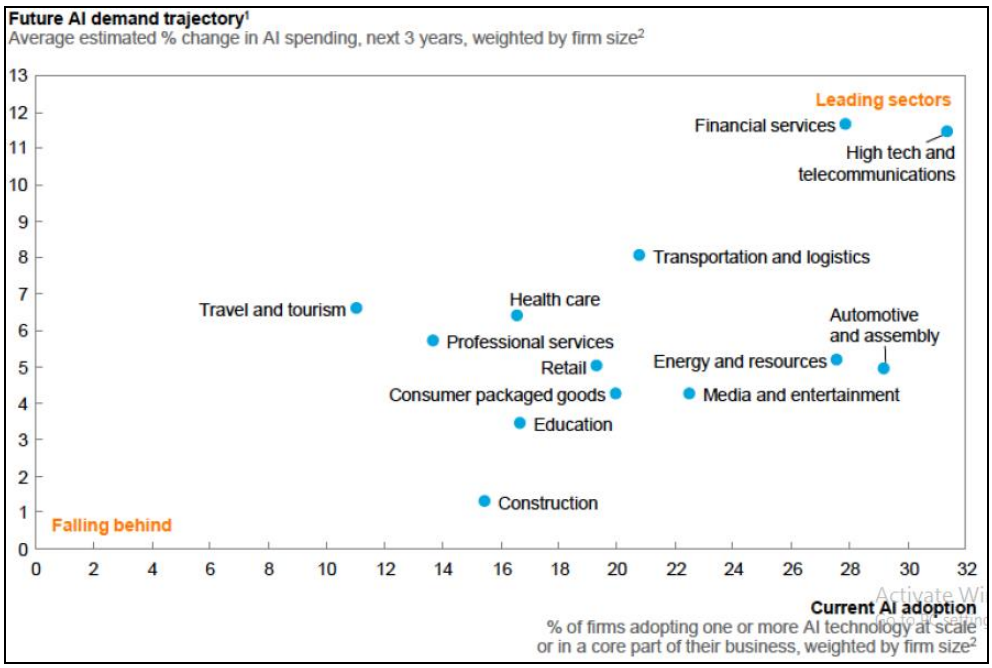

Figure 2
AI TECHNOLOGY

As per the McKinsey report, industries which are leading in the AI acceptance currently also plan to invest in AI technology, thus further strengthening the disparity of AI adoption across the various sectors.

The above Figure 2 sectors like financial services, automotive, telecommunications are the sectors which are the leading in AI adoption as well as their spending in these sectors is increasing.

Abdulhafis Abdulazeez Osuwa et al. proposed application of artificial intelligence in Internet of Things (IoT). With the increase in the digitalization in the past 10 years, loads of data is being collected everywhere and especially through IoT the data collected is enormous. In order to solve this problem, Artificial intelligence (AI) is being used. AI is one of the best solutions to data mining, manage and control of congestion in the network. Applications like fuzzy logic and neural networks will be implemented in conjunction to the IoT network to address the issue data. (Abdulhafis Abdulazeez Osuwa et al, 2017).

Industry Wise Applications of AI

Automotive

Artificial intelligence has been increasingly adopted by the automotive industry. Automotive industry is one of the major industries experimenting with AI and trying to develop systems which will replicate the humans and perform better than them. Currently the vehicles that incorporate applications of AI systems are automotive, semi-automotive and autonomous. In the vehicles that are autonomous, AI collects all the information and processes and chooses an exact action, whereas the semi-automotive and automotive vehicles use advanced tools like cameras, radars, ultrasound and LIDAR to gather all the information and understand the environment around them. All the repository of collected information which is Bigdata is analyzed by AI techniques like deep learning, machine learning, and natural language processing. Artificial Intelligence has provided applications like speech recognition for advanced communication with the drivers and passengers, directs the vehicle to the refueling station or the recharge station when the vehicle fuel tank goes below the specified level, analyses and selects

the route to reach the destination based on the traffic conditions and trying to follow the shortest path.

Tractica forecasts that revenue from automotive AI software, hardware, and services will increase from USD 2.0 billion in 2018 to USD 26.5 billion by 2025, representing a compound annual growth rate (CAGR) of 46.9%. The Automobile companies like Volkswagen Group are focusing acutely and investing heavily in digital transformation and building their competence in the AI domain. The emphasis is to use this technology in the field of autonomous and driver-less car. Volkswagen in not only determined in the product area but also want to exploit this technology in their production processes to create a competitive advantage and improve their productivity. They also have plans to build an eco-system with AI applications to smoothen and speed up their corporate processes to make the entire organization up breast with the technological advantages and make the most of these technology applications. (Pivotal sources, New Delhi, 2016).

Artificial Intelligence (AI) is also staged to become the disruptive technology in automotive, particularly in the context of Highly Automated Driving (HAD), according to Vision Systems Intelligence (VSI). AI has proven its usefulness in many use cases from object detection and classification, to path planning, to predictive control. AI can even support the full driving process (end-to-end) where the computer gets trained by mapping sensor observations directly against known output (control). (Davidson, Tony, Automotive Industries, 2016).

Health Care

In order to increase the efficiency of decision making in the field of health care, application of AI has become a necessity. As per a report published by Allied Market Research, titled, Artificial Intelligence in Medicine Market by Product Type, Technology, and Application: Global Opportunity Analysis and Industry Forecast, 2017-2023," predicts a growth of 49.6 % CAGR from 2018 to 2025 and in the value of this market was 719 million dollars in 2017 and will reach 18,119 million in 2025 with this growth rate.(PR Newswire; New York, 2018) China and India and many such developing countries will have numerous opportunities in this sector.
AI technology replaces the human intervention and can perform task with more precision and with increased processing power. These characteristics of AI will help improve the efficiency of drug discovery and management of clinical trials. The growth in AI will be boosted also due to the lack of skilled healthcare professionals, as the countries can take their healthcare sector to a different level altogether by adoption and implementation of AI.

Iman Azarkhish et al have proposed a system with Artificial neural network (ANN) and adaptive neuro-fuzzy inference system (ANFIS) using AI is used to provide an accurate test for predicting serum iron levels with high accuracy and acceptable precision. (Iman Azarkhish et al, 2012) Qidwai et al. have proposed a new strategy to be of use to neurologists, neurosurgeons, and orthopedic surgeons, aiming to predict the recovery and health status of a patient after surgery of the spinal column, based on the analysis of preoperative data by the Standard Fuzzy Inference System. The results suggested a high precision rate of predictions (of about 88%) in the population of 501 patients. (Qidwai U et al. 2010). Korhonen et al., using the data mining technique, have established that dentists more successfully detect caries in their new patients, compared to their old patients. The study was done using an AI system with the data obtained at general physical examinations. (Korhonen M et al. 2009)

Ankur Mahajan et al. have proposed an automated clinic based on artificial intelligence. The proposed system involves measurement of five prominent physiological parameters of a person who enters a doctor’s clinic. The physiological parameters are height, weight, body temperature, blood pressure and heart rate. Doctors will be able to get these physiological parameters on their PC or mobile with a tag for each patient. This system reduces the burden of

the doctor as well as the receptionist. Sensors would be placed in the hospital where the sensors would measure these physiological parameters and send the data to the doctor and the database of each patient would be maintained. (Ankur Mahajan et al, 2016)

Yang Liu et al. (2018) have studied how artificial intelligence can be implemented to assist doctors and help them in the disease diagnosis and surgery which will help in the development of precision medicine. The research proposes on developing surgical navigation system based on artificial intelligence and augmented reality. The proposed surgical navigation system will help doctors to perform the operation and achieve the goal of the minimally invasive surgery. (Yang Liu et al, 2018).

Insurance

As per the Accenture's Technology Vision for Insurance 2017 report, Insurance executives believe that artificial intelligence (AI) will significantly transform their industry in the next three years, with insurers investing in AI to empower agents, brokers and employees to enhance the customer experience with automated personalized services, faster claims handling and individual risk-based underwriting processes. (Accenture report, 2017).

Future Generali India Life Insurance have implemented Robotic Enabled Virtual Assistant (REVA) chatbot and is looking at Artificial Intelligence (AI) and NLP (Natural Language Processing) to cater to consumers' increasing demands on real time basis. Private sector banks, too, are using innovative technology for improving workforce productivity. While Indian Overseas Bank (IOB) recently launched an IoT device to solve customer grievances at the branch, State Bank of India (SBI) and Bank of Baroda (BoB) have started deploying AI in a big way to improve efficiency and reduce operational costs and enhance customer experience. Aviva Life Insurance has launched a chatbot named Alisha, the chatbot is powered by IBM Watson's Conversation application programming interface. (Hindu Business Line report, 2018).

Report by Juniper research states that chatbots could save banks up to $11 billion annually by 2023. Wells Fargo has launched AI powered virtual banking assistant or chatbot, on the Facebook Messenger platform.

Retail

Retail sector is one of the early adopters of AI. There are several applications which have enhanced the user experience by providing personalized recommendations and suggestions, image based and preference based browning, products customer demand forecasting, improving inventory management, customer fulfillment and delivery management, customer assurance and complaint handling.

Manufacturing

Manufacturing industry has been benefited the most from the AI applications. Ares in which it can be applied are engineering related research and development, demand forecasting which will result in improved supply chain management, cost reduction and efficiency improvement in production processes, predictive failures and maintenance requirement which will result in optimum asset utilization, vision system with machine learning algorithms to identify deviations and outliers in product features, and in-factory warehouse and logistics process monitoring.

Rob Dolci has suggested an application of artificial intelligence in the farming and food processing industry. The study is on the practical case of malthouse which involves careful modelling of CO2, Temperature, Humidity and PH which vary in three steps of the malting process. This is enabled by an artificial intelligence system to prescribe different setting and schedules. The outcome of this system is malt with higher content of starch and proteins, which in turn means higher alcohol in the downstream process. Another application suggested by Rob

Dolci in this industry is cultivation of Medical Marijuana where similarly but in a more complex fashion (138 variables). This is supported by artificial intelligence which assists in many settings and schedules. (Rob Dolci, 2017).

Education

Abundant ideas and applications are possible in the Education industry. Customized AI applications can be designed to enhance and improve the students learning experience. Most of the administrative task can be automated and expedited with AI applications. Student evaluation and areas of concern can be identified on frequent intervals which will help to identify and address the areas of student redressal and problems without losing time, which will help the teachers and mentors to reduce dropouts and ensure effective learning. Vocational training and special support tutorials of students with learning disability can also be easily and effectively implemented with AI applications.

Hang Zhao et al. have proposed an application of artificial intelligence in the field of medical education. They have analyzed how artificial intelligence can be used to modify the traditional medical education. AI will be used to support personalized learning to students at different levels and provide support and help to students and their faculties. AI can be used to design courses for faculties and also helps them in monitoring student performance and alert their faculties so that they can alter the teaching methodology to the students. It can help them in giving personalized focus to students. With the help of AI, students can learn anytime and anywhere and few of the classroom coaching can be substituted with this technology. (Hang Zhao et al, 2018).

Objective of the Research

The objective of the study is to study the current applications and understand the millennial expectations from AI and their outlook towards AI. After understanding the expectations and the gaps in the current applications, further part would be to identify the requirements of developing potential products as per theoretical framework of product levels in Figure 3.

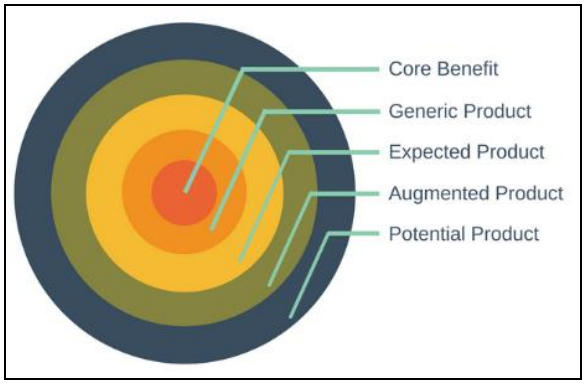

Figure 3
THEORETICAL FRAMEWORK

In this current research we will be using the framework of five product levels in order to recommend what kind of product customers are expecting and what are the features to be used in developing a potential product. The expectations of the customers of each product level are as follows:

a. Core Benefit
- Implementation of AI should make work and life simple and easy for the customers.
- AI should give basic technological advantage to the product.

b. Basic Product

- The devices which the customers are using should have an AI feature installed in it. Example: Mobile
- Apps with AI technology should address the needs and problems faced by the customers. Example: Siri, Google assistant, Google Lens

c. Expected Product

- The products instilled with AI should be affordable.
- The products should be reliable.
- The products should be user friendly and easy to use.

d. Augmented Product

- The product with AI should be accessible anytime.
- The product should be easily deployable and available to the masses.
- AI should be implemented in all the sectors to ease human work.

e. Potential Product

- AI implemented product should have stringent security to protect data.
- The product should understand the gestures command by the users and respond accordingly.
- The product should have more modes of interaction.
- The product should be self-sustaining and take its own decision.
- The AI embedded products should be scalable and adaptable to new upcoming technologies.
- It should be failure proof.

The above recommendations will help in developing the right product to the users as per their expectations and will ultimately help in satisfying the needs of the customers.

RESEARCH METHODOLOGY

This is an exploratory study. Applications of AI in industries like health care and medicine, automotive, insurance, real estate, defense has been studied and reported. Analyzing this literature review shows that there is immense opportunity for the growth of AI as it is a booming technology with a growth rate of 45% CAGR within a period of 2018-2022 according to Business Wire report.

In depth customer interviews were conducted with open ended questionnaire to understand the customer expectations and opinions. The respondents' expectations of the potential services and products that are possible and what they expect in the future from this technology in various industries like health care, medicine, entertainment, education, and defense was collected.

The target audience was the millennial between the age group of 18 to 30 years of age. Sample size was not predefined and interviews of many respondents were conducted until saturation of new information was reached. Data was analyzed using qualitative research methodology specifically text analysis using DICTION software for interpreting attrition pattern. Content analysis relies on using vocabularies to obtain a statistical index of qualitative data. These statistical indices were used for further analysis.

Qualitative analysis-In order to understand the insights of the millennial, in depth interviews were conducted and questions based on 5 themes were asked. The 5 themes are as follows.

1. Awareness of AI
2. Marketing information of AI
3. AI devices
4. Expectations of AI
5. Applications of AI in different industries.

Sample size was not predefined, and interviews of many respondents were conducted until saturation of new information was reached, with this approach in-total 25 interviews were conducted and their responses were recorded. Every interview lasted for almost 15 to 20 minutes. After collecting the responses qualitative analysis was performed using DICTION software. This analysis helped to prepare the road map of AI, based on the customer expectations. DICTION is a computer-aided text analysis program for determining the tone of a

verbal message. DICTION searches a passage for five general features as well as thirty-five sub-features; the five features are Activity, Optimism, Certainty, Realism and Commonality.

Matrices for Analysis by Diction (As Mentioned In The Diction Software)

Activity: Activity is a variable emphasizing on language featuring movement, change and implementation of ideas and avoidance of inertia. The score of activity is calculated based on the score of each sub variables. The score of activity is calculated using the formula below:
Activity = [Aggression + Accomplishment + Communication + Motion] - [Cognitive Terms + Passivity + Embellishment]
Optimism: Optimism is a variable emphasizing on the language endorsing some person, group, concept or event or highlighting their positive entailments. The score of optimism is calculated based on the score of each sub variables. The score of optimism is calculated using the formula below:
Optimism = [Praise + Satisfaction + Inspiration] - [Blame + Hardship + Denial]

Certainty: Certainty is a variable emphasizing on the language indicating resoluteness, inflexibility, and completeness and a tendency to speak ex cathedra. The score of certainty is calculated based on the score of each sub variables. The score of certainty is calculated using the formula below:
Certainty = [Tenacity + Leveling + Collectives + Insistence.] - [Numerical Terms + Ambivalence + Self Reference + Variety]
Realism: Realism is a variable emphasizing on the language describing tangible, immediate, recognizable matters that affect people's everyday lives. The score of realism is calculated based on the score of each sub variables. The score of realism is calculated using the formula below:
Realism = [Familiarity + Spatial Awareness + Temporal Awareness + Present Concern + Human Interest + Concreteness] - [Past Concern + Complexity]
Commonality: Commonality is a variable emphasizing on the language highlighting the agreed - upon values of a group and rejecting idiosyncratic modes of engagement. The score of commonalities is calculated based on the score of each sub variables. The score of commonality is calculated using the formula below:
Commonality = [Centrality + Cooperation + Rapport] - [Diversity + Exclusion + Liberation]

Conclusions- Results, Contribution and Future Scope of Research

The analysis of the respondents provided cues to understanding the latent needs of the consumers and the actual expectations from the AI technology. An understanding of these expectations will help the business/marketers to develop products and applications of AI. This will help in addressing the latent requirements of the consumers in Table 1.

Theme: Awareness
Questions based on this theme were:
Are you aware of technologies like AI, IOT and Machine Learning?
Have you come across applications of AI in your day to day life?
If yes, can you recollect what the applications of AI are?
What was the communication medium through which AI was applied?
Can you recollect the company name/manufacturer of the product which used AI?

Table1
OUTPUT OF THE DICTION SOFTWARE

Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	56.71	46.74	55.48	*
Optimism	46.25	46.37	52.25	*
Certainty	49.49	46.90	51.96	

Realism	33.47	46.10	52.62	*
Commonality	50.4	46.86	52.28	

Scores for the theme Awareness of AI.

The score indicate that Activity, Optimism and Realism are out of range. High score of Activity implies high values of accomplishment and communication. Low score of Optimism implies that low values in satisfaction and praise, the consumers are not completely satisfied with the AI applications. Low score of Realism implies low scores of familiarity, spatial awareness and human interest. The consumers are still not familiar with the present applications of AI and the current applications have not yet generated desired interest in all the consumers. The other variables are within the range.

The in-depth interview revealed that most of the consumers are using applications of AI unknowingly. Consumers use Siri, Google assistant in their mobile devices but they are unaware that it is an application of AI. Another application of AI called chatbots is used by many consumers, but consumers are not familiar that this is also an application of AI. Consumers are not comfortable with the natural language processing (NLP) of the applications. The slang or accent they speak is not easily identified by the applications hence they are not completely satisfied with AI in Table 2.

Theme: Marketing information
Questions based on this theme were:
Do you come across any marketing activities regarding AI?
Can you recollect any advertisement which emphasis on AI?
Did you come across any advertisement about AI in social media channels?
If yes, then which platform did you come across?
Can you recollect any advertisement in TV or print media about AI?

Table 2
Output of the Diction Software

Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	48.91	46.74	55.48	
Optimism	27.41	46.37	52.25	*
Certainty	48.2	46.9	51.96	
Realism	37.98	46.1	52.62	*
Commonality	50.38	46.86	52.28	

Scores for the theme Marketing Information of AI.

The scores of Optimism and Realism are out of range. Low score of Optimism implies low values of satisfaction and inspiration. The consumers have not frequently come across the marketing activities of AI and they are not inspired by the applications. Low score of Realism suggests low values of spatial awareness and familiarity. The consumers are not aware about the marketing activities done by the companies on various platforms. The other variables are well within the normal range.

In-depth interviews revealed that most of the consumers faced difficulty in brand or message recall of any marketing or advertisements done by the companies. Out of the consumers who could recall, Social media was the platform where consumers have seen any advertisements of AI. Very few consumers could recall any advertisement seen in print media. The interviews also revealed that many consumers watch advertisements of mobile gadgets and devices like Alexa, but they are not familiar that those devices are built on the technology of AI in Table 3.

Theme: AI Devices
Questions based on this theme are:

Can you name some devices which use AI, IOT technology?
Have you used any devices or services which use AI technology?
Have you purchased any devices which use AI technology?
Do the devices serve your purpose or satisfy your needs?
On a scale of 5, can you rate the satisfaction level of using the devices?

Table 3
OUTPUT OF THE DICTION SOFTWARE

Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	59.08	46.74	55.48	*
Optimism	31.13	46.37	52.25	*
Certainty	43.79	46.9	51.96	*
Realism	36.57	46.1	52.62	*
Commonality	49.87	46.86	52.28	

Scores for the theme AI Devices of AI.

Scores of Activity, Optimism, Certainty and Realism are out of range. High score of Activity implies that consumers are high on accomplishment and communication. The consumers want AI to help in their task completion and want AI to have multiple modes of interaction like read, speak and listen. Low score of Optimism implies low value in praise, satisfaction. This shows that currently consumers are not satisfied with the current applications of AI. Low score of Certainty implies that low score of Tenacity and assurance. The consumers feel that they are not confident while using AI applications and don't feel sense of completeness and assurance.

Low score of Realism implies low values of familiarity, awareness and human interest. This shows that consumers have low awareness and low familiarity of AI devices. The other variable commonality is well within the normal range.

In-depth interviews revealed that consumers are happy that AI devices are assisting in their task completion and easing their life, but many consumers complained that they find difficulty interacting with the device. Their language and slang are not easily identified by the applications; hence this is making the consumers less satisfied. Another concern consumer revealed is because of the data hacks taking place consumers are not confident and feeling assured with sharing data with the applications. Findings of the in-depth interview were validated through analysis using the DICTION software in Table 4.

Theme: Expectations
Questions based on this theme are:
Any expectations of AI or the devices that use AI?
Any shortcomings or concerns in the current applications of AI?
Do you feel AI, IOT will be disrupting technologies in the future and change the course of life?
Do you expect AI technology be implemented everywhere in all the activities to ease your life?

Table 4
OUTPUT OF THE DICTION SOFTWARE

Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	48.08	46.74	55.48	
Optimism	54.47	46.37	52.25	*
Certainty	48.03	46.9	51.96	
Realism	39.85	46.1	52.62	*
Commonality	51.13	46.86	52.28	

Scores for the theme Expectations of AI.

Scores of optimism and realism are out of range whereas the other variables activity, certainty and commonality are well within the range. High score of optimism suggests that consumers need praise, satisfaction and wants to be inspired when they buy applications of AI. The applications of AI developed should meet their needs and they need complete satisfaction. Low score of realism suggests that familiarity, temporal awareness, present concern is low among the consumers. Presently, consumers have less awareness about applications of AI which is leading to low score of Realism. The other three variables are within the normal range.

All the respondents revealed that AI will be the disrupting technology in the coming years. Hence, they have lot of expectations from this technology. Consumers feel that the current applications of AI have a gap in delivering their value and they are not satisfied. For instance, Siri does not recognize the language correctly of all the consumers. The consumers have expectations like AI should be easy to use, understand the sentiments and mood of the people, should have stringent security features to avoid data hacks and it should be more interactive in Table 5.

Theme: Industry wise applications
Specific industry wise responses were collected regarding the current applications and expectations of AI with respect to a particular industry. The industry selected for our analysis are Automobile, Insurance, Health care and Defense or military applications.
Questions based on this theme are:
Can you recollect any current application of AI in this industry and any expectations from AI?
Automobile:

Table 5
OUTPUT OF THE DICTION SOFTWARE

Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	48.25	46.74	55.48	
Optimism	53.93	46.37	52.25	*
Certainty	50.53	46.9	51.96	
Realism	46.08	46.1	52.62	*
Commonality	51.83	46.86	52.28	

Scores for the Automobile industry.

Scores of Optimism and Realism are out of range for this particular industry. High score of Optimism reveals high value of satisfaction. Low score of Realism reveals low value of spatial awareness and familiarity, the consumers are not totally aware of all the applications of the AI in automobile industry. The other variables are well within the range.

The respondents during the in-depth interviews revealed that consumers are satisfied with applications of AI such as navigation assistance in automobiles, parking assistance in the automobiles. The consumers are aware of only few applications of AI like these, they are not aware of other applications. Most of the consumers were not aware of driverless cars which are important application of AI in automobile, on further probing the consumers it revealed that consumers are aware of electric cars like Tesla but they are not aware of applications of AI in automobiles in Table 6.

Insurance

Table 6 OUTPUT OF THE DICTION SOFTWARE				
Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	15.55	46.74	55.48	*
Optimism	36.8	46.37	52.25	*
Certainty	44.64	46.9	51.96	*
Realism	28.48	46.1	52.62	*
Commonality	49.17	46.86	52.28	

Scores for the Insurance industry.

Scores of Activity, Optimism, Certainty and Realism are out of range. Low score of Activity implies low values of accomplishment and communication. The consumers feel that the applications of AI in insurance are not accomplishing their tasks and mode of communication of AI in this industry is not convenient for the consumers. Low score of Optimism implies low values of satisfaction and praise. The consumers are not satisfied with the current applications of AI in this industry. Low scores of certainties imply low values of tenacity and leveling, the consumers are not confident and they don't have assurance on the current applications of AI in insurance industry. Low score of Realism implies low values in familiarity and awareness. The consumers are not totally aware and familiar about all the applications of AI in insurance industry.

The respondents of the in-depth interview revealed that consumers are not comfortable using AI in the field of insurance and banking services. Since this field involves monetary things, the consumers are not confident in using the applications of AI. They are reluctant to share their personal information with the chatbots during the processing of claims or any other tasks. Few of the consumers who have used chatbots for this task revealed that chatbots did not help in solving their query and ultimately they had to approach the company professionals to get their query solved. Hence this revealed low levels of satisfaction and does not help in task completion in Table 7.

Health Care

Table 7 OUTPUT OF THE DICTION SOFTWARE				
Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	40.44	46.74	55.48	*
Optimism	42.4	46.37	52.25	*
Certainty	45.13	46.9	51.96	*
Realism	34.79	46.1	52.62	*
Commonality	50.71	46.86	52.28	

Scores for the Health Care industry.

Scores of Activity, Optimism, Certainty and Realism are out of range. Low score of Activity implies low values of accomplishment and communication. The consumers feel that the applications of AI in Health care are not meeting their needs and mode of communication of AI in this industry is not convenient for the consumers. Low score of Optimism implies low values of satisfaction and praise. The consumers are not satisfied with the current applications of AI in this industry. Low scores of certainties imply low values of tenacity and leveling, the consumers are not confident and they don't have assurance on the current applications of AI in health care industry. Low score of Realism implies low values in familiarity and awareness. The consumers are not totally aware and familiar about all the applications of AI in Health care industry.

The respondents of the in-depth interview revealed that consumers are reluctant in using applications of AI in this field of health care. They do not trust this technology and they don't expect any machine to do the diagnosis of their health problems. Hence, they are not confident and feel that it does not help in accomplishing the tasks. Few of the AI applications which are there for health care are not convenient for usage to the consumers. Most of the consumers are only aware about the robot surgery which is an application of AI, this shows that awareness level is completely low in this field. Most of the consumers are of the opinion they prefer an individual only diagnosing their health problems rather than trusting a machine for this particular problem in Table 8.

Défense

Table 8
OUTPUT OF THE DICTION SOFTWARE

Matrices	Score	Normal-Range (Low)	Normal-Range (High)	Out-of-Range
Activity	38.38	46.74	55.48	*
Optimism	26.28	46.37	52.25	*
Certainty	42.44	46.9	51.96	*
Realism	34.47	46.1	52.62	*
Commonality	49.17	46.86	52.28	

Scores for the Defense industry.

Scores of Activity, Optimism, Certainty and Realism are out of range. Low score of Activity implies low values of accomplishment and communication. The consumers feel that the applications of AI in Defense are not generally made public because of the confidentiality and the consumers are not sure whether the applications are really accomplishing the tasks. Low score of Optimism implies low values of satisfaction and praise. The consumers are not satisfied with the current applications of AI in this industry. Low scores of certainties imply low values of tenacity, the consumers are not confident on the current applications of AI in defense industry. The consumers are not sure whether the government is keen on using AI in Defense. Low score of Realism implies low values in familiarity and awareness. The consumers are not totally aware and familiar about all the applications of AI in Defense industry.

The in-depth interviews revealed that many of the consumers are not aware of the applications of AI in the field of defense. They are aware of only a few applications like drones and RADAR. The awareness level is very low for defense. One of the reasons for this could be the country does not publicize their defense equipment's because of confidentiality issues. Hence consumers are not directly end users of applications of AI in defense apart from the military, therefore consumers are not in a position to comment whether AI is helping defense field.

The growth of AI in India is that we have to factor on the current strengths in AI and the growth of this technology requires intervention of the government as well as the private sector. India's contribution in the research of AI is limited till now both in quantity and quality. India has not produced any impactful research. With the advent of AI in all the sectors, it will disrupt the nature of jobs of today and tomorrow and skill would be required in order to harness this disrupting technology. New jobs would be created that do not exist today as most of the existing jobs would be automated.

Following are the recommendations for the marketers to develop potential products/services for the consumers which are based on tapping their latent needs.

1. Primary research revealed that there is gap in understanding the technology of AI among the consumers and this has led to low awareness. Hence marketers should focus on creating more awareness about the applications of AI.

2. A recent data hack like the data of the consumers becoming public in the online space has created more anxiety among the consumers in sharing the data with the companies digitally. Consumers are not confident about the security of the AI systems; hence considerable research has to be put in making the security system of AI more secure and consumers are not scared with using the system.
3. The concern the consumers reported is that currently interaction between AI systems is cumbersome and most of the times the commands are not understood by AI systems. Hence the mode of interaction of the AI systems should be easy to use for the consumers. Therefore, to solve this problem gesture commands of the user should be understood by the AI applications and more research should be done in improving the Natural Language processing (NLP).
4. Consumers are not currently satisfied with applications of AI in the Financial services and Health care industries, hence there huge potential in scope of improvement for these sectors.
5. The awareness of the marketing and the advertisements of AI is very low among millennial, hence appropriate targeting of AI advertisements should be on various platforms (mainly online) to target millennial and increase awareness of AI applications.
6. In order to create awareness online, Companies can adopt social media marketing by uploading posts on Facebook, Instagram and LinkedIn. This is help in creating a brand image of the company and AI among the consumers. Video marketing on YouTube by uploading short videos about AI will help in creating the awareness. Companies can also put banner ads on popular websites to create a perception about AI. Content marketing can also be adopted by writing blogs about AI and its benefits.
7. Major concerns of many consumers are AI being expensive, hence marketers can go for penetration pricing strategy in order to capture the market and increase the awareness of AI. By this pricing strategy, consumers will be able to afford the AI applications and devices.
8. Forrester study (Jill Avery, et.al 2018) claimed that worldwide 57% of the firms are already using chatbots. This is a great potential for the marketers to introduce chatbots in all the applications so that awareness about the AI also increases and consumers start adopting the AI technology.

By considering the above points, marketers will be able to develop Potential product for the consumers.

To leverage the advantages of AI and help in the growth of the economy, AI can be implemented in all the sectors. The following points emphasize on how implementing AI in the following sectors can help in the growth of the economy. Further research on how the following can be facilitated and what are the challenges to overcome the probable plethora of wonderful possibilities can be studied.

1. Health care: In India, for a population of 1,000 people we have only 0.76 doctors and 2.09 nurses and the WHO (World Health Organization0 has recommended 1 doctor and 2.5 nurses per 1.000 people. With the AI applications we can increase our reach and to all those who are deprived of basic health care and with smart applications early Detection, Diagnosis, and Remedial care can be provided. AI can also be implemented in areas of research and development and vaccines for many probable fatal diseases can be created. Decision-making in Health care can also become faster and effective.
2. Agriculture: Agriculture accounts for 16% of the country's GDP. AI can be used can be implemented in this sector to monitor soil health and crop health. Value added services like providing guidance and real time advice to the farmers can be implemented. Farm productivity and yield improvement service can be commissioned.
3. Financial Services: AI can be implemented in P2P payments, Remittances, customer onboarding in order to achieve progress in this sector.
4. Further study of the barriers of growth in each sector and how AI technology can be used to provide solutions can be done, which will boost the growth of these sectors.

Need for Data Analytics will grow exponentially and NASCCOM study has predicted that in the year 2020 there will a shortfall of 200000 Data Analytics professions and as high as 46% of workforce will be relinquished of the nature of work that they are doing today and will be engaged in work with entirely new skillsets. This shows that India can witness a significant growth in its economy with the investment sand adoption of AI technology.

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