IMPACT OF ARTIFICIAL INTELLIGENCE IN MAKING BETTER MARKETING DECISIONS IN HEALTHCARE INDUSTRIES

1Prof. Swaraj Kumar Nandan, 2Prof. Mausumi Das Nath

1,2Assistant Professor
St. Xavier’s College (Autonomous), Kolkata
30 Mother Teresa Sarani
Kolkata - 700016

1Phone: +91-9831773711, Email: s.k.nandan@sxccal.edu
2Phone: +91-9830659302, Email: m.dasnath@sxccal.edu

*Corresponding Author: m.dasnath@sxccal.edu, Phone: +91-9830659302
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Abstract: In recent times, Artificial Intelligence (AI) took a flight making enormous changes in the technological industries. From booking cabs online to ordering of medicines and other daily necessities, people are now more accustomed to artificial intelligence every now and then without even realising it. Google Assistant, Apple Siri, Microsoft Cortana and Amazon Alexa are few of the AI Assistants which has proved its importance in the recent commercial world. These AI’s interfaces have become so popular that companies are now planning to establish their own AI system to support them into taking better business strategies and decision making. The main aim of this research is to show that Artificial Intelligence has a greater prospect in making better marketing decisions for the multinational giants from the view point of the healthcare industries. Through this research work, an effort has been made to show how Artificial Intelligence is (and will) change decision making for business with greater importance on the healthcare industries. The data used for the research work is secondary in nature. Various research articles have shown that the use of AI have been useful in different fields of research and industrial decision making in Finance, Automotive, Marketing, and Healthcare. Some common marketing systems such as CRM, Recommendation System, Expert System, Social Computing and Opinion Mining are also being powered by AI. This research work also focuses on the aspect that AI’s play a major role in medical industry and hence assist in decision making of the firm.

Keywords: Artificial Intelligence, Expert System, Healthcare, Decision Making, Marketing Strategies.

I. Introduction

Artificial Intelligence is the recreation of human brainpower performed by machines, specifically by a computer. It has the capability of learning and solving problems by three phases-learning (by acquiring the rubrics and information for using such information), reasoning(using rules and facts to gather knowledgeand drawing inferences) and finally by self-correction. The different applications of AI are speech recognition, expert system and machine vision. All these applications are dissimilar. In fact, artificial intelligence has shifted with the expansion in technology. Recently, the Artificial Intelligence (AI) and Business policies discover the exponential growth of artificial intelligence in the business horizon. It focuses on how AI is affecting the development and execution of multiple strategies in different organizations. AI can be applied in various sectors like finance, manufacturing, law, education, healthcare, business and so on. For instance, AI applications like Turbo Tax or Mintcollect personal data and offers financial advice to the clients. Even certain applications of AI help to buy a property. In manufacturing, industrial robots are being used in the workflow process which yieldsin higher productivity and efficiency. The same is also applicable in law where the process of documentation is automatized and is often helpful to the lawyers and their clients. It also saves the processing time. Moreover, artificial intelligence in education helps to automate the grading system which in turn reduces the knowledge-giver’s time in assessing the students. The students are also benefited by the AI support system and at times they are able to carry out their work without the intervention of their tutors. AI can be applied in business too, particularly in decision–making process. Earlier, executives and senior level managers had to depend on inaccurate, inconsistent and incomplete data. With the use of artificial intelligence, several business paradigms and simulation techniques can be applied which can be used reliably to carry out the same tasks repeatedly and accurately with high precision. It helps the firms to reduce costs by automating the tasks and also improves upon the customer experiences by suitably applying the appropriate data.
models. Mr. Rao of PwC specifies that there are limitless outcome modelling, and it is one of the breakthroughs in today’s AI systems. He further states that immense opportunity is available to use AI in all kinds of decision making. Presently, AI deals with big data, deals with the intelligence and help the officials with suitable data models to make the decision-making process easier. This paper focuses on how AI benefits the healthcare industry and the ways it helps the companies to take better marketing decisions.

The rest of the paper is organized as follows. Section II presents a brief overview of the relevant works. Section III briefly explains how AI technology can work to improve the decision making process. A theoretical analysis on impact of AI in health industry is discussed in Section IV. Section V concludes the paper along with the future scope.

II. Overview of Related Work

A few empirical studies have been conducted recently to determine the innovation and the challenges of AI in Healthcare. As the use of AI in Healthcare Industry is growing it had become a subject of great concern. Research has been conducted on AI interface and its use by consumers, officials, doctors for decision making and its related work in the field of healthcare industries.

Aanchal Aggarwal, Nupur Kapoor and Anchal Gupta (2013) focused their research on healthcare innovation and challenges and concluded that the recommendations given by High Level Expert Group on Universal Health Coverage on institutional reforms, to make quality health care reasonable, the medical insurance infiltration should rise from 15 per cent to at least 50 per cent of the population by 2020 and 80 percent by 2030.

Suman Devi and Dr. Vazir Singh Nehra (2015) made an effort in the area of health insurance to find out its problems and some solutions. The study discussed though health insurance is one of the growing segment of insurance industry but the problems are insurance companies, consumers (policyholders), Third Party Administrator (TPA) and hospitals also. Insurance companies have high claim paid-out ratio, consumers are less aware about health insurance basic terms, hospitals charges more expenses from insured patients and TPA make delay in payment of claims which are made on behalf of insurer to insured.

Dolores Derrington (2017) stated that it is indeed a worthy idea to feed in data of human anatomy into machine language, but it should also be noted that due to course of time the anatomy of human being changes in context of its size, quality and performance. To maintain each and every data of human anatomy in course of its changes may be burdensome and in due course may lose its integrity.

Nuffield Council on Bioethics (2018) focused on AI technologies which were used for detection of ailments, management of chronic conditions, delivery of timely health services, and drug discovery. It was explored for research activities too. They also stated that AI technologies have massive role to provide assistance and report several important health challenges, but might be limited by the quality of available health data, and AI is unable to possess some human traits like emotional health. A number of social and ethical issues crop up due to the use of AI, which often coincide with matters raised by the use of data and healthcare technologies more broadly.

The Academy of Medical Royal Colleges (2019) focussed on the fact that AI could alter the type of person who would prefer to become a medical professional. If sophisticated intelligent tools were to take on a dominant role in talking to patients, information processing and decision-making, the reduction in direct patient interaction and shift in professional role could immensely modify the daily scenario of medicine as a career.
III. Artificial Intelligence in Decision Making

Decision making has always been a judgemental factor for being an efficient leader. Experienced leaders who have been recognised for sound decision making have, at some point of time made drastically poor decision which has somehow affected their reputation. In an interview, John Kelly III, IBM Senior Vice President for Research and Solutions stated, “The success of cognitive computing will not be measured by Turing tests or a computer’s ability to mimic humans. It will be measured in more practical ways, like return on investment, new market opportunities, diseases cured and lives saved. “Artificial Intelligence has paved a way for effective business decisions on the basis of the following fields.

1. **Better Human Judgement**: Emotional intelligence is far more effective in better decision making compared to any AI factor. Cases where decision making is far simpler in context machines can be used to make decisions which do not require emotional intelligence neither experience. But in case for complex situations where the probability and cost of mistakes are high, a human mind is a better option for decision making as it understands the organization in terms of values, risks and goals and hence provide a sound judgement. But, Artificial Intelligence should be still instilled in decision making as it provides human with all the facts and possible predictions.

2. **Quality Decision making**: Psychological studies stated that with multiple decisions within a short span of time depletes the mental energy and declines the quality of decision making. Machines with strong algorithms are not prone to fatigues and hence can compute multiple decisions each day accurately. Executives who have adopted AI have an advantage over the edge of decision making irrespective of human mental constraints.

3. **Assist in predictions**: Business now use predictive analysis for better decision making. Currently Data mining is a popular approach that provides a best seat to the businesses in adopting prompt and quality decisions in this competitive market. Predictive analysis with the use of data mining and studying the various datasets anticipates the future events and trends. Machine language and algorithms which are programmed to identify and understand data sets provide proper solutions and assist in predicting future models which in turn yield an effective marketing strategy for the company.

4. **Acquisition of best fit talent**: Recruitment and selection of the best possible candidates are some of the most complex decision a leader has to face and hence it becomes difficult to sort the best out of it. Hiring leaders and recruitment managers has to go through loads of applications and acquire the best fit talent. Currently, Artificial Intelligence and automation can provide enough support by automating multiple tasks, siting through different applications and CVs, analysing the data and provide the best fit for the organizational culture on the basis of the set of skills and competencies. Bruhat Insights Global, a new age manpower consulting company uses AI and Big data to prevent ghosting, whereas Phenom People, a Talent Relationship Marketing (TRM) Company uses AI based solution to cover the entire recruitment procedure including CRM and internal recruitment facilities.

IV. 

**Artificial Intelligence in Healthcare Industries**

The waves of Artificial Intelligence has not only flourished in the business sector but also have highly impacted on the healthcare industries. Particularly in the case of machine learning, automation,
hospitals, doctors, insurance companies and organization that have contracts with healthcare have been impacted in more positive way than any other industries. Initially the effort and the time consumed on focusing both minor and major healthcare issues were quite difficult. Recently with the use of AI and the Internet of Medical Things (IoMT), consumer health applications have been a boon to mankind. With the advent of voice assisted installed base in many smart gadgets, consumers are more dependent on AI for their regular updates which also includes healthcare. As per xappmedia.com the user for Amazon Alexa devices are more than 100 million whereas for Microsoft Cortana are 400, Google Assistant and Apples Siri are more than 500 million users in 2019. With the growth of AI, healthcare specialists are facilitated to understand and recognise the day to day patterns of patient’s need and with the inferences drawn can provide better feedback and support to maintain a healthy life. According to American Cancer Society, AI is already being used to figure out terminal diseases like carcinomas more accurately in their early stages. Initially a high rate of tests were recommended which yielded false results, but AI is enabling reviews and translating mammograms 30 times faster which yielded in 99% accuracy. Thus, it reduced the need for unnecessary biopsies and significantly lowered the mental and physical stress among patients and their relatives.

Recent studies portray that patient-interface creation is a new area of research which has significant Figure 1: Number of Users Using AI Assistants applications for some patients. In certain trauma and neurological disorders, patients lose their capacity to talk, carry out movement freely and even unable to communicate properly with friends and relatives. But, applications of AI and Brain-computer interfaces help the patients to perform their activities with ease. This has helped in improving their quality of life and overcome emergency situations like stroke or any kind of locked-in syndrome.

Certain diagnostic centres and some clinicians still prefer and depend on physical tissue samples having received through biopsies, although non-invasive techniques like CT-scan, MRI machines are available. This might create a risk of infection. Artificial intelligence will help to replace the requirement for tissue samples in some cases, as predicted by clinical experts. Imaging information of certain tumours help the medical practitioners to get a clear understanding about the nature of the unwanted growth and thus, can offer an accurate treatment decision. In certain developing countries, there is a dearth of skilled technicians, healthcare providers and even radiologists. This restricts in quality health care for the patients. AI could solve the deficiency of such people in extending adequate care to those in need. Artificial Intelligence tools and techniques can perform screening for certain diseases like cancer, tuberculosis which yields a higher level of accuracy.

Electronic health records play a significant role in the healthcare sector, but the shift from manual data has invited numerous problems concerning the user's involvement in documentation and their tiring efforts. This too, has been solved by the use of artificial intelligence by automating some of the routine tasks that take away user's time on order entry, medical documentation and arranging the records. Dictation and Voice recognition system acts as a saviour and virtual assistants extend a helping hand to the medical practitioners too. AI helps the clinicians carry out their task easily and efficiently.

Furthermore, it is noticed that thousands of patients succumb to their injuries due to antibiotic resistance. Data from Electronic health records helps to identify the infection pattern and figures out the potential risks before they show up as symptoms. AI tools and machine learning help in analysis and help in more accurate and faster delivery of alerts for clinical practitioners.

It is known from several reports and studies that seventy percent or more of all decisions in healthcare are based on pathology results. Digital pathology result and usage of artificial intelligence tools delivers more accurate images which might escape the human eye. Thus, this expert system helps in drilling down the fact
whether carcinoma infection in patients is progressing slowly or at a faster pace or not which, in turn help the doctors to choose the method of treatment. Hence, this increases the efficiency level of both the pathologist and the clinician.

People are highly dependent on smart devices and gadgets. It has taken over the medical environment too. These devices are used to monitor patients’ health in the ICU and other areas also. AI enables the ability to identify any complications, health deterioration, etc., which can drastically do cost-cutting for the hospital as well as for the patients. Acquiring unstructured data and organizing them for early intervention of the doctors for the critical patients is something which humans cannot do it easily and efficiently. All these are taken care of by incorporating intelligent algorithms in the devices and thus patients receive quality care on time. Recently, it has been noticed that oncologists do not have any reliable method for finding out which patients will respond to the current treatment for cancer called immunotherapy, and which option would suit best to a particular patient. AI with its machine learning algorithms comes at a rescue for both the healthcare professional as well as the patient.

Moreover, extracting, integrating and analysing from a huge set of unstructured and inconsistent patient data leads to an effective, accurate and faster prediction and better clinical decision with the help of special intelligent tools. Although it has some limitations, the deep learning algorithms significantly improve clinical care.

IV. Conclusion

Artificial Intelligence is becoming the crux of healthcare and now it is rapidly evolving to make its presence in the medical field. AI is becoming extremely sophisticated at human level intelligence and performs tasks more quickly and at a lower cost. It is needless to say that AI and robotics are taking its place in our medical eco-system. IBM’s Watson for Health is assisting healthcare institutions by influencing them to apply cognitive technology to explore wide range of health data and diagnosis. It can identify and store loads of medical information such as case studies, past records, symptoms, treatments much quicker than human. On the other hand, Google’s Deep Mind Health is associating with researchers, doctors and patients to identify the various issues and solve practical healthcare issues. Through technology combining with machine language and systems, algorithms are framed as similar to neural networks that replicate or mimic the human brain. Hence, it could be understood that improved and quicker results through AI provides appropriate timely decisions and predictive analysis that can assist in decision making and framing strategies to come out with innovative ideas for the betterment of the healthcare industries.

In Indian market, AI is yet to take a leap in the healthcare industries but due to several factors such as shortage of qualified physicians, lack of uniformity in accessible healthcare facilities, low accredited hospitals and high private expenditure on healthcare, the impact of AI in healthcare industries are considerably low. As per the data of PWC, India provides 4.6% budget in healthcare industries while 1.3% in national GDP compared to the other BRICS countries. The challenges faced by India in adopting AI and IoMT in the Indian healthcare ecosystem are basically absence of healthcare regulatory body, low collaboration between various stake holders, privacy and security of data, affordability, interoperability and lack of effective data. But it can also be concluded that in a developing country like India, the scope of AI in healthcare is also vast provided the changes that are expected to drive the adoption of IoMT could be taken into consideration. Indian market are expected to adopt AI and IoMT in healthcare provided India adopts emerging technologies for better framework, adopt budgets for emerging technologies, formulating and implementing stronger regulations, collection of suitable data and providing incentives. Using the recognisable patterns fed into the machine language, AI’s would hence begin to take a major hold in the healthcare industries.
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