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Ethics in Use, Implementation and Governance of Artificial Intelligence and AI Technologies in Global Health and Health Care Industry

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ABSTRACT

This paper presents the insight on the Artificial Intelligence Technology a recent and most talked development of the decade and its impact on various fields. The use of Artificial Intelligence are many folds and it can proved to be very beneficiary if applied in the appropriate field with the use of various underlined AI technologies. This paper further discusses about various technologies which use AI have tremendous potential to extend the support to government of underlying region or country to give a tremendous leap in diagnosis, treatment, prevention of existing diseases with focus on new drug trials and forecasting or analysing any disease to chalking out plans for ensuring public health and improving health care industry in total. While considering all these advantages ethics in use of AI in health governance should not be leg behind and various Global health ethics should be followed about which the WHO is also concerned about. This paper would also deal with certain ethics that should be enforced strictly and the potential threat and dangers of the violation or breach of ethics that could affect the entire mankind.

Keywords: Artificial Intelligence, Public Health care, Ethics

1. INTRODUCTION

Artificial Intelligence [2] is a term that is most widely and talked about in recent tech talks.AI is a recent advancement in the computer field that has affected the human kind in a way never before. So before discussing further about AI, AI technologies and ethics and taking some further leap in this context we will try to explore the term "Artificial Intelligence" itself.

Also as the paper talks about ethics in conjunction with the term AI and governance with reference to health and health care industry we would also try out to make some words about the term ethics and why it should be followed in every aspect of human life and why there is so much noise about the strict implementation of ethics when it comes to the health /health care industry and especially when AI and AI related technologies are to be or being used in this field.

As we further move forward in the discussion we would try to relate ethics, AI and possible remedial solutions if amalgamation of both these 2 concepts are not perfectly implemented in health/health care industry.

1.1 Terminology and Definitions

Artificial Intelligence is a relatively new field of computer science that involves a set of technologies that can be used to learn reason and perform the task to accomplish the tasks that would otherwise require human intelligence. That is as the term Artificial Intelligence itself has the word artificial in it indicates that AI infuses intelligence in machines to accomplish the task where the intelligence is not human or natural but machines [12] are trained to become self or artificial intelligent [7]. Further we can say that AI is "Human intelligence exhibited by machines".

There are a verity of application areas in which AI is currently being used such as robotics, finance, smart car and drones, navigation systems, smart home appliances and successfully in health /health care industry.AI can be categorized into 2 categories namely AI based on capabilities and AI based on functionalities.

Now we come to the term "ethics". Ethics [1] can be defined as philosophical study of morality. Ideologically ethics should be followed in each and every face and field of human life and endeavour. The practise of moral or ethics values is deep rooted in our Indian cultural values also.

AI has the great potential in the field of public health, medicine and healthcare industry. In order to fully benefit from the technological advantage of using AI and AI tools in this industry implantation of ethics and ethical challenges [10] should be fully addressed. Whether or not AI can contribute positively for betterment of public health in short for the patients depends on how effectively and meticulously we can implement ethics abiding laws and practises.

2. Potential AI influenced areas in health / health care industry

As we have already a short glimpse of AI and its impact on various fields but for now onwards we would go deeper in the context in which AI has or can affect in particular health/ health care industry. We have identified some crucial areas of study. Let us hover them one by one.

2.1 Health Care

The use of AI in Health care industry [17] can be manifolds. AI can be used to diagnose diseases and in clinical decision making. Currently AI and its related technologies are extensively being used at present in oncology, ophthalmology, brain imaging, and colonoscopy to name a few. AI and its models like deep learning are proved to be very successful in fast and accurate diagnosis, prompt detection of adverse condition of the patients well before affecting them in the above mentioned areas based on their clinical data on predictive basis.

AI can also be used as an expert system which can diagnose non critical patients also by listening their disease symptoms and prescribing the RX treatment on primary basis for common cold, flew, fever and such other viral infectious diseases which doesn't require immediate attention to reduce the potential load on hospitals and other medical or health care resources. AI can also be used to allocate scare resources and made them available on priority basis. To give an example "Deep SOFA" is an AI tools that is used for this purpose.

2.2 Public health

With the development on new AI technologies and tools can be used to predict certain disease outbreak in a particular region based on complex and effective data centred models. After the COVID disease outbreak all over the world the need and importance of such AI tools and associated techniques are manifolds. One example of the use of AI is prediction of Ebola virus disease in West Africa in 2014.

AI has also been used in tracking to map the movements of individual persons so that to strictly follow government orders to remain in certain confined areas as it was during COVID disease outbreak thus the tracking of containment zone and quarantine concept can be more effectively implemented using AI. AI and associated tools [10] can be used for micro targeting particular area of population groups and identify them for health communication or health awareness so that the particular group could probably save themselves from adverse medical conditions after such awareness.

2.3 Genomics

Genomics [22] is the branch of science in which the study of the genetic model of an organism in done. Humans are estimated to contain around 3 billion DNA base pairs. There is an associated Genomic medicine study in which an individual's genome base is considered and a personalized treatment and diagnostic plan can be chalked out. Here AI can be perfectly used to study such large around 3 billion DNA base pairs and various new discoveries like conclusive treatment can be finalized for a particular patient.

2.4 Medicine research and new drug development

The development of new drugs [16] for treatment of ailments is one of the prime focuses in health / health care industry. Understanding of the disease first and then developing new medicines and vaccines is a big and challenging taks.Before AI this was a labour oriented process that was both time consuming and involved great human efforts with chance of errors but the entry of AI in this arena has converted drug discovery and development process in a data centric process with use of the models of genetic targets, drugs, organs, diseases and their progression with AI.

3. Ethics for implementing AI and AI technologies in health and health care industry

The ethics are need of the hour for implementation of AI and related technologies in the above mentioned health and healthcare industry. The ethics [5] are required to be implanted by 3 pillars that are developers, users and regulators so that human dignity, moral values, human rights and above all the humanity can be withstand upon. There are various ethics that should be implemented and we would now try to discuss them one by one.

3.1 Protecting Human Rights and values

Human rights can be defined as an elementary set of legal and moral requirements which every person posses by birth and human rights are uniform and can't be granted or denied on the basis of cast ,creed ,religion, sex ,nationality, language ,social status etc. These include privacy, freedom, human dignity, equality, non-discrimination, participation, solidarity and accountability.

The use of AI should be used in a way so as not to violate or corrupt or neglect core human right [4] values. Although in many countries and regions human rights have been protected by legal framework but it is the ethical duty for all of the above mentioned 3 pillars especially the developers should be cautious enough to take continuous and pro active measures so as not to violate or abuse human right values in order to implement AI and AI tools for just monitory or competitive gain.

AI should be used in such a way so as to give that complete freedom to a health care person to override the decisions make by AI system if he or she finds in any way that AI generated decision can violate human rights by any means.

AI and related technologies should not be used for any unethical experimentation [6, 9] or manipulation of humans in a health-care system [17] and if it is necessary in any means then prior consent should be taken that is also abiding by legal frameworks of that particular country or region. Further extending this argument if the persons involved withdraws the consent in later course than no bribe or unethical favours should be showered upon him or her by any means.

3.2 Removing biasness and fostering inclusiveness during development and after implementation

AI should be developed in such as way that while development the stake holders that will use the system or those who will be affected by development of such systems must be included in the process. Extending this concept these stakeholders should again be included when finally evaluating the system before launching. This would foster inclusiveness and up to some extent would remove biasness about the system development process or system evaluation.

Again while development of such systems the interface or front end [18] and communication mechanism should be so designed that once developed this AI system can be used around the globe not restricting to any particular country or region benefitting only those who are privileged in terms of belonging to a citizen of a particular country ,belonging to some specific region, in terms of colour and follower of a particular religion or financially sound and not to be used by those who are not so privileged .Because morally or ethically the technology should benefit entire human kind not a specific bunch of people based on certain bias. For example if the AI system considers skin colour as an input data then system should not only be useful for only those who have a fair or white skin tone or colour.

3.3 Ensuring human safety with accountability

AI use must ensure that its implementation would not affect well being of humans in any way and worth mentioning that human safety measure would be taken utmost care of while developing or while implementing or testing these fully developed AI systems. After implementation of these systems the two pillars other than the user (that is developer and regulator) have additional responsibility to assess and continuously monitor whether the implemented systems have any detrimental impact on individual patients or groups or society. The detrimental effect can be measured on two levels that is physical and mental.

Another aspect of ensuring human safety [9] is that when AI is used to develop new drugs then the trial on humans should be dealt with utmost care to ensure human safety first .This is although the moral or ethical duty of developer and regulator both but in some countries and regions there are pertinent guiding and abiding laws that ensure human safety in above said issue.

Sometimes the things don't go in the designated and planned way and so can happen with AI technology, but unfortunately if it happens then there should be accountability. Certain mechanism should be there for redressal for individuals and the community of people negatively affected by this technology. Any type of monetary compensation along with remedial and appropriate measures according to the level of adverse situation happened should be followed.

3.4 Environmental concerns

We all on this mother earth have some ecological and environmental responsibilities to share and to make this mother earth a better and safe place to live not only for the humans but for all living and non living species .AI

systems are also not excluded to share this responsibility. The AI systems should be in line with society's efforts to reduce the impact of human beings on the earth's environment [7] and entire ecosystem.

4. Elements of global governance of use of AI and technologies for health and health care industry

The ethics that are suggested in above discussion only ensures and places certain moral obligations about how AI and related technologies must be used but the task can't be left alone on the shoulders of following ethics only because until and unless there are other certain measures we can't be assured and governance is one of them.

Governance in health can be defined as certain rules and regulations of the government, decision makers and international health agencies to achieve universal health coverage. Governance can be defined for various levels but we all agree that the governance of health data is of utmost importance among other governance levels because it is the health data that creates the base for the development of AI and AI tools [19]. There are various principles and legal models used by the governments in this direction and these can be summarized below.

1. Such mechanism should be implemented that if health data [8] is to be shared or collected then prior consent from the originators of that data should be law abiding in nature. These consent may vary from one time consent to dynamic consent where consent may be monthly or yearly updated This consent mechanism can be waived off for the government in case of any emergency or pandemic situations where the sharing of public health data is necessary for well being of a society and better quality of life.
2. If the hospitals and clinics are sharing the health related data to private companies without the patients prior concern then serious legal actions should be empanelled on such hospitals and clinics because it comes under the breach of privacy. This concept is sometimes called "data altruism".
3. Governance measures for the data that are collected from various electronic gadgets that are wearable such as health bends, smart watches etc should be keenly looked upon. This can be more challenging as the data collected from such wearable could not be limited under international boundaries for example an electronic gadget developed in Japan , used by users all over the world and that data can be collected through the internet for all users worldwide without their knowledge[13] .
4. The issue of benefit sharing is another serious concern for the governance. It states that if the health data is shared with consent and if by use of such data successful AI systems develops then its benefit should also be shared with the providers of that health data.

In order to get deeper insight in this issue let us divide the governance into two broad categories that is Private sector and Public sector governance.

4.1 Private sector governance

Private sector is the one that include companies from a novice small start-up to big giant private proprietary companies. Pharmaceutical companies, private hospitals, private clinics, diagnostic and medical device firms and health-care providers to be named among a few examples. One strong reason why private sector governance should be discussed is that there is a large chunk of private companies that are engaged in development of AI and AI tools with big data analysis, data mining etc that's why they are crucial to consider for governance. Several issues should be addressed that can be summarized below

1. It's a fact that major private companies have their origin from the western world and developed countries. While developing AI systems it is very common that the companies adapt the values and belief [14] of that particular country which may be not appropriate for other countries.
2. AI is a relatively new technology and governance [15] is needed because it is very difficult to follow high ethical norms because a private company may overlook or bypass ethics in order to generate profit for their masters in a highly professional competitive world.
3. One interesting issue to note is that it is generally the data collected from the government forms the basis of the development of high end AI systems and tools. Private companies can launch the products that could replace the process once run by the government and in due course of time the private company can use this AI system as a monopoly AI system and forget ethical values [20] in turn to generate revenue for their masters overlooking social. human responsibility
4. Many private firms hire former government officials and regulators and then they are forced to influence policy-makers and regulators that are involved in the use of AI for health care. This can affect the ability of governments to provide health care facility. This is one of the most overlooked ethical issues to be dealt with.

4.2 Public sector governance

The use of AI in public sector has increased in recent times. The importance can be shown by the fact that according to a survey approximately 36 countries have launched or planning to launch national Artificial Intelligence strategies for public sector AI including India. Several issues should be addressed that can be summarized below.

1. Government should not be an entity that uses the algorithm of AI and don't disclose it. We can argue that governments are not biased but in fact transparent but this transparency can't assure that AI algorithms will not harm when implemented. There are many legal frameworks [3] that require that decision pertaining to the health and health care system should not be dependent 100 percent on of AI systems .So the algorithms in service should be disclosed by governments so that if any scrutiny has to be done regarding an decision can be done.
2. Governance in public sector must also ensure that the collection and use of the gathered health data should follow ethical rules .Government of any country or region must ensure this because this health data is to be used in chalking out new policies and further more this health data would be shared to the private sector also as mentioned in point no 3 above.
3. Governments naturally would try to provide AI based services to their native citizens. The use of AI enabled services would most of the times be online or internet based. This may create a digital divide [1] among rich and poor because in developing or under developing countries there is a major chunk of population who is not digitally connected and digital affordable so this issue should be addressed so that the benefit of AI system should benefit entire society not to the scared ones.

5. CONCLUSION

This paper has tried to summarize the discussion about ethics and goes through various terminologies and definitions pertaining to ethics .Then the term Artifical Intelligence are properly explained and its use is

highlighted. AI continues to revolutionize the present world by its various head boggling benefits in every relm of life but we have tried our discussion limited to the point that how AI and related tools have a big role in health and health care industry. The use of ethics in implementing AI pertaining to health and health care industry is thoroughly discussed. The discussion is then turned towards the global governance of use of AI and technologies for health and health care industry. We have seen how deliberately there is a need of governance in this sector. Further the governance is broadly divided into two categories namely public sector and private sector governance. The ethical issues are sometimes guarded by legal frameworks in many countries and regions yet some suggestions about the governance in public and private sector are taken into account in this paper.

This topic covered here is a candidate for continuous research and development in near future because the impact of AI in coming years is beyond our imagination. We conclude that AI is having a bright as well as dark side of implementation but if there is a perfect blend of the use of AI and related technologies with essence of ethics in it then AI can be proved to be a boon to the society and in particular a boon to health and health care industry because it affects the entire population all across the globe.

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