AI in Healthcare:
Disease Prediction, Analysis, and Assistance

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ABSTRACT

The world and technology are becoming more and more advanced as each day passes. Almost every activity that involved human intervention earlier is now becoming automated through use of Artificial Intelligence (AI) and Machine Learning (ML). Previously, there were actual people sitting at call centers who handled customers' enquiries, who are now replaced by AI-based technologies that accounts for 80% of customer interactions. Furthermore, healthcare is a sector that deals with the fundamental part of humans' lives – such a sector will never grow older and will always require novel and better ways to handle the situation. This work aims to provide solutions to problems of the human population – providing accurate insights to biological data, but also help in the development of future technologies and discoveries using AI and ML setting a foundation for future research and technologies.

INTRODUCTION

The term "technology" time changed the world to great extents ever since it was coined. What was considered a mere imaginary product or fiction is very much the reality and norm now. Single-purpose computers went on becoming smaller and smaller, and yet their abilities broadened and became utilitarian, even fitting in one's wrists now. Furthermore, in recent times, the World also witnessed an upsurge in smart devices and assistants of all sorts – these technologies help find the causes for problem and also suggest remedies and possible actions to undertake.

Specifically, in terms of healthcare, there have been an increasing number of cases of heart attacks and strokes in people. Most of them are not even aware of such deadly disease presence and that they might have the risk. In a country like Australia, a heart attack occurs every 9 minutes (Figtree, 2023). Also, looking at the busy lives of people, poverty and smart device availability to everyone with internet access and which is quite common, there should be some mechanism to utilize technology to solve current problems at the comfort of these devices. Mobile devices and smart devices are common to everyone and no matter the education and knowledge of a person, they know how to operate a phone. In 2024,

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there are about 17.08 billion Internet of Things (IoT) connected devices across the world (Statista, n.d.). Moreover, finding experienced and reputed doctors' in an area is very important and is often a tedious task for many, especially when one is unaware and unfamiliar of the area they are in. If one is new to a particular location and region, one might not have much information about the good and reputed doctors. For that, they might have to consult several people before coming up with a conclusion about who the best doctors are. It wastes a lot of time and is highly subjective too. Therefore, if a system could suggest some good doctors in the users' location, it would be very good and time-saving. Furthermore, in recent times, 'R' has emerged as very useful language for performing data analysis and analytics (Kelley, Lai, & Wu, 2008). But there are not many research works around using such helpful tools, other than Python lately. This work also addresses the issue by proposing algorithms to predict disease from certain parameters using machine learning and providing remedial actions in an assistive way, using 'R', as well as developing a complete application using R Studio that provides a web interface for the proposed solution.

Development of explainable and fair artificial intelligence (AI) systems have become increasingly sought after due to the drastic technological progressions. Many works recently hinted and discussed in details about the development of ethical AI systems. When it comes to healthcare and dependency on AI, an explainable and bias-free solution is of paramount importance. As the complexity of any system increases, it becomes more complicated to explain the processes that run the system. So is the case with machine learning algorithms, therefore, this work uses primitive machine learning classification algorithms to ensure explainability of results. However, complex models often produce more accurate results. Consequently, development of explainable and fair solutions come with the cost of a primitive model, which however can be more useful than a complex one for such cases. This justifies the use of primitive models in this work.

As a result, there is a dire need to look for a possible combination of two important aspects - humans and technology - which would lead to a solution that solves problems not restricted to organisms and species per se, and support the development of future technologies and discoveries. In this work, Disease Assistance, Prediction, and Analysis using Machine Learning, a similar work is proposed, that addresses one of several problems that are faced by society today, along with the use of technology and machine learning to come up with a solution that could benefit people.

Hence, through this work, data analytics is used to ease up the process of finding the risk of heart attacks, so as to serve a bigger purpose by solving the health related problems faced by people at the comfort of their location, resource access and economic background.

BACKGROUND

Healthcare is a sector where everything should be immaculate and free of even mere possibility of faults, along with negligible uncertainity in the methods. When AI is used, measures should be taken to prevent precarious conditions. There are always concerns on enthical implications of AI deployment, data security, and patient privacy, alongside socioeconomic impacts of AI on healthcare accessibility.

Till now, most of the works have been done using Python language. R is a better language in terms of statistics and data analysis.

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