AI Bias in Healthcare

Mariam Hersi
HER22555014
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***Abstract*— In this report I will be discussing two articles that evaluate bias in AI that is used in healthcare. I would like to look at how these biases affect the patients and the medical field.**

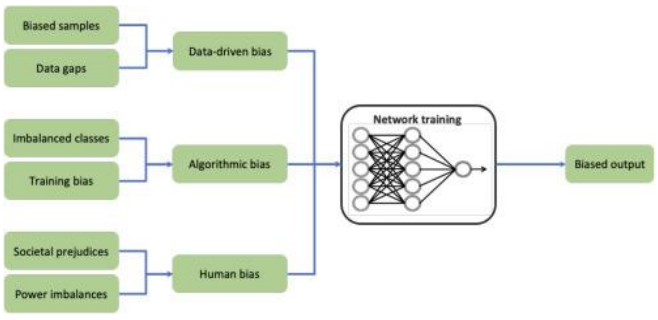
I. Introduction

Healthcare is a basic human necessity and deeply affects lives. AI being introduced into healthcare can improve diagnosis and treatment. However, a bias in the algorithm can also negatively impact this process and lead to a misdiagnosis whilst minimising the credibility of medical institutions. More importantly, it would impact the patient and their health. This will lead to a reduced quality of life and feeling that they are being discriminated against further impacting our society.

II. Article 1

The first article *'Addressing bias in big data and AI for health care: A call for open science'* investigates the consequences and impact of AI bias in healthcare. It identifies three types of bias; data-driven, algorithmic, and human (1). These biases eventually lead to a misdiagnosis whether that is a false positive or a false negative which causes significant implications on the patient or health professional. I will explore the main themes of this article and how it came to those conclusions.

It is clear to see that bias in AI may be present in most, if not all, stages of the algorithmic development process (1). When an algorithm is trained on biased data, it is likely to reinforce patterns from the dominant category of the data it was trained with (1). Then if that algorithm was created by a biased individual this creates a continuous cycle of reinforcement.



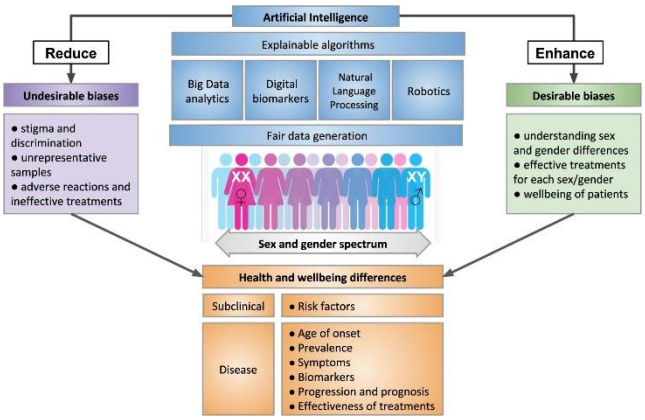
A. Main Themes

An AI bias can negatively impact minority ethnic groups that are already underrepresented in healthcare and trials (1). It is known that clinical trails are usually conducted with a white male population. Most AI algorithms need big datasets to learn from, but several groups of the human population have a long history of being absent or misrepresented in existing biomedical datasets (1). This makes it difficult for AI algorithms to accarutly account for them.

One article highlighted in the example is the Pulse Oximeter, it measures oxygen saturation by sending infrared light through the skin (1). However, it is known to be affected by the patient's skin colour, as the device systematically overestimates oxygen saturation levels in non-white patients(1). This is extremely dangerous for non-white patients as this kind of false positive will lead health professionals to miss a drop in oxygen levels which can be the difference between life or death for a patient.

III. Article 2

Reading my next article, *'Sex and gender differences and biases in artificial intelligence for biomedicine and healthcare'* explores how AI supports precision medicine - the tailoring of healthcare to individual patients. So AI enables the identification of biomedically relevant patterns, facilitating progress towards individually tailored preventative and therapeutic interventions (3).



A. Main Themes

This article uniquely had a strong understanding of what a bias is. Not all biases are undesirable and there are some desired biases such as gender which has an influence on a diagnosis and even the effectiveness of medicine. This means that it is important to take this into consideration. Ignoring such biases can compromise patient outcomes. For instance, considering gender-specific factors is crucial for accurate diagnoses and treatment plans. The article argues for the careful inclusion of necessary biases while eliminating harmful ones.

IV. Methodology

It is important to evaluate and look at where these articles are looking into and sourcing their information from. The first article looks at the overall AI technologies used in predicting and diagnosis of already known diseases an illness. On the other hand, the second article looks at biomedicine and the

technologies used for to find the cure for diseases and illnesses.

This is key as they both understand that AI bias negatively impacts the patient in the same way regardless of what area of healthcare you are in. The first reflects the consequences of bias in diagnosis whereas the second shows that the consequences are not as straight forward in research and precision medicine.

V. Conclusion

Overall, both articles allow us to see the impact that comes from bias in AI in healthcare. It shows that a bias can negatively impacts the patient and the credibility of the healthcare industries. However, it is also important to understand that in the case of healthcare some biases are important to consider. Therefore overall, the importance of bias lies with making sure to eliminate the bad ones and including the good ones. To address these challenges, we will need to close those gaps in data to include minority groups and erasing bias surrounding those groups. However, to make sure we are not removing desired biases we start introducing getting an explicable justification of how and why these AI models reach their conclusions to understand the specific parameters used to draw clinical conclusions (3). I believe that this will lead to better AI technologies that can be used in healthcare.

Acknowledgment

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References

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