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Exploring the Use of Artificial Intelligence to Achieve Sustainable Development Goal #3: Affordable Healthcare in Impoverished Countries

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Introduction

Residents in impoverished regions worldwide suffered severe impacts from the COVID-19 pandemic. These residents have limited access to basic healthcare services facilities, facing difficulties and health challenges such as high infectious diseases while living in poverty. In these regions, only 23 percent of the population in low-income countries had received at least one dose of the COVID-19 vaccine in 2022 (Wolf et al., 2022). Without essential living being guaranteed, it is difficult to improve their quality of life and achieve sustainable development. Hence it is essential to take more measures to address these issues.

The purpose of this paper is to give insight into the use of artificial intelligence (AI) in making medical resources more accessible to people living in poor urban areas in developing countries from two different perspectives. The first part discusses AI applications/practice in medical treatment, while the second part focuses on how AI can assist in the development of molecular medicine. Two examples are provided and may serve as a reference for those interested in the topics and may also suggest potential solutions for improving healthcare access in low-income urban areas.

The Sustainable Development Goals

The UN 2030 Agenda formulated an unprecedented collective goal and call to action for a prosperous, peaceful, inclusive and equitable world, based on 17 sustainable development goals (SDGs) that focus on three dimensions including economic, social, and environmental aspects and address challenges such as poverty, hunger, disease, inequality, and climate change.

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The SDGs agenda encourage all countries, world leaders, and stakeholders' collaboration to achieve specific goals by 2030 to eliminate poverty, protect the planet, and promote sustainable economic growth (United Nations, 2015).

SDG#3: Good Health and Well-Being

SDG#3 focuses on health and aims to ensure affordable healthcare service that everyone can access. Health is a fundamental part of being human, a healthy economy, and a prosperous society, and poor health can be the main cause of poverty (e.g., COVID-19 influence on the global economy). Progress has been made in achieving this goal, such as widespread immunization and vaccine development, which contribute to reducing maternal and child mortality rates. Current obstacles include the accessibility to healthcare services, the shortage of medical workers, and the widespread pandemic (United Nations, n.d.).

Findings and Discussion

AI has significant potential to revolutionize medical science in various fields, including medical imaging and drug research. According to El Naqa et al. (2019), AI has become the forefront and center of radiology, and machine/deep learning application in radiation therapy has been an area with significant progress. El Naqa et al. argue that using AI as assistance can improve the efficiency, accuracy, and effectiveness of clinical treatment while reducing costs. For example, AI can assist radiologists in image analysis and classification. Manually examining a substantial amount of images cost energy and can have a great influence on efficiency. AI can be used to assist radiologists in checking and classify medical images, including but not limited to: Reviewing the volume of images, improving image quality, assist the radiologist "in the detection and classification of abnormalities" without loss of accuracy. El Naqa et al. argue that with proper development and usage, AI can have outstanding performance compared to manual

evaluation, this method can be faster, cheaper, and more precise. El Naqa et al. conclude that with the help of the most advanced AI technology, imaging informatics has enormous potential that can provide more accurate and personalized healthcare and simultaneously reduces the cost burden for society. On the other hand, healthcare professions have a significant burnout rate (60% caused by bureaucratic work), which might affect performance and cause medical errors. This change could bring out a better outcome.

Furthermore, AI has great potential in molecular medicine and drug development. AlphaFold is an open-source and free AI system that can predict protein structures from its amino acid sequence. It has the potential to accelerate drug discoveries and development. One case is DNDi, a research team that aims to address neglected tropical diseases (NTDs), which affect the communities that were neglected and get little attention. Leishmaniasis is an NTD that affects over a million people a year; Dr. Benjamin Perry, a medical chemist in DNDi, used AlphaFold to make further progress against Leishmaniasis (DeepMind, 2022). It proved that protein structure prediction, or use of AI is useful for drug discovery.

Investing in vaccine development has great value as a single technical breakthrough can benefit humanity. One case is the creation of COVID-19 vaccines. According to Dave Johnson (Ransbotham & Khodabandeh, 2021), AI played a significant role in the development of one of the earliest released COVID-19 vaccines in the U.S. in 2020. It's noteworthy that the company wasn't intended only focus on the development of this one drug, which highlights the potential of the system to adapt quickly with minor modifications while ensuring a quality outcome (Ransbotham & Khodabandeh, 2021). The possibilities are truly fascinating.

Conclusion

To conclude, low-income urban communities have difficulties to access to affordable and effective healthcare, the focus of SDG3. To address these challenges, AI can aid physicians in diagnosis and decision-making, making healthcare services more efficient, and cost-effective. AI can also play a significant role in molecular medicine and accelerate the progress of drug discovery, both simultaneously lower the cost-burden.

Medical experts, governments and society should realize AI's potential and limitations, fully utilizing the potential of artificial intelligence and collaborating, ensuring affordable and accessible, quality healthcare services for all, with ideas such as assistance in medical imaging and accelerating drug development, more possibilities are waiting to be discovered.

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