Commentary: Artificial intelligence–A game changer

Artificial intelligence (AI) has become popular in the recent years due to the increase in the computing power of devices, availability of massive amounts of training data via the Internet, and availability of less-expensive cloud data storage. With the emergence of autonomous vehicles, face recognition, and language processing, artificial intelligence has revolutionized our lives.

In this manuscript, the authors have described a very robust AI algorithm for DR screening with good sensitivity and specificity using different fundus cameras to eliminate bias using predominantly mydriatic Fundus images.[1]

Deep learning (DL) has the ability to identify intricate structures in datasets without the need to specify rules. DL is a neural network with multiple layers between the input and output layers.[2]

The steps for building an AI model include preprocessing image data, training, validation, testing, and evaluation of the trained model's performance.

Artificial intelligence would help us by increasing the compliance of the patients for regular screening and it would decrease the dropout rate as the cost of screening would be lowered; it would also save time by nonmydriatic fundus imaging. Fundus cameras with built-in AI could be installed in shopping malls, railway stations, and temples where patients could be screened. AI would help in optimizing the workflow for a busy ophthalmologist by screening all the patients for retinopathy and referring only cases with the pathology, thereby enabling the retina specialist to evaluate only the referable cases.

As a part of "Digital India" campaign, even the Indian government has shown interest to adopt AI across different sectors in healthcare. However, there are certain challenges in implementing AI on a large scale as the need of huge amount of data remains the most fundamental problem. Although recent AI algorithms with multiple accessible datasets such as EyePACS, Messidor, and Kaggle's dataset can make breakthroughs on the different ophthalmic diseases, having more number of images of the same disease pathology and severity will not help to increase the AI sensitivity and specificity.[3,4]

A research group carried out the work of applying DL to automatically detect different retinal diseases with fundus photographs. When only normal and DR fundus images were involved in the DL model, the classification accuracy was 87.4%. However, the accuracy decreased to 30.5% when all 10 categories were included.[5]

When data is to be shared between different centers, regulations and state privacy rules need to be considered. These usually vary between different countries and while they are aimed to ensure patients' privacy, they sometimes form barriers for research initiatives and patient's care.[6]

To enhance the application of AI in clinical practice, there should be more efforts to build intelligent systems that can detect various retinal diseases with high sensitivity. Multimodal clinical images such as slit lamp and fundus-based

imaging, optical coherence tomography, and visual fields maybe integrated together to build a generalized AI system for accurate diagnosis.

AI would be most useful in screening camps and teleophthalmology which could help to offset the skew of majority of the doctors being in urban areas.[7] AI could also be applied in virtual clinics to reduce the number of referrals to higher centers.[8]

Future AI technology needs to focus on improving the general health of the population to improve patients' perception to lower the costs and increase access of healthcare. AI-based systems are the most promising to tackle these issues and it has the potential to revolutionize all aspects of how we live and provide healthcare.

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