

Commentary: Artificial intelligence for everything: Can we trust it?

The growing prevalence of using artificial intelligence (AI) for everything is visible virtually in all aspects of modern life. In the accompanying article,^[1] the authors examined the rising popularity of AI in ophthalmology^[2] by tracing its history across multiple research databases and various crucial studies. They also emphasized the dangers of implicitly trusting machine learning (ML) and AI-based technology.

Conventional software programming vs machine learning

Conventional “explicit programming” of software follows definite written rules, and a well-written software produces the expected output from a given input with no mistakes. If there is a mistake, the programmer can look through the source code to find the reason for the mistake and correct the bug.

In machine learning, the software learns by making mistakes. Even after extensive training of the software, AI can still make new mistakes that the programmer cannot predict, understand, or debug.

Hidden danger?

Due to the Black Box nature of most AI, the process by which the software arrived at the conclusion – whether right or wrong, is hidden from everyone including the programmer who created the AI in the first place. One might recall the advice of Arthur Weasley from the Harry Potter books “Never trust anything that can think for itself if you can’t see where it keeps its brain”. This unpredictable nature of AI and ML is the reason why Stephen Hawking and Elon Musk warned that the global arms race for AI may cause World War 3.^[3] However, others like Bill Gates and Mark Zuckerberg were more optimistic about the

advantages of AI and suggest that it will only enhance human intelligence and make our lives easier.^[4]

In addition, apart from making unintentional mistakes, rogue AI can create fake patient information similar to what Mirsky *et al.* had presented at a conference wherein they used a deep learning AI to insert fake cancer lesions in CT scans by hacking an active hospital network.^[5]

AI for ophthalmologists

AI can now be used in ophthalmology for fundus evaluation for diabetic retinopathy, glaucoma, retinopathy of prematurity, age-related macular degeneration, retinal vascular occlusions, retinal detachment, and other retinal conditions. AI can predict how many injections of anti-VEGF (vascular endothelial growth factor) a patient might need. Hill-RBF IOL calculation formula is based on ML.

More interestingly, AI can predict seemingly unrelated characteristics such as age, gender, smoking status, systolic blood pressure, refractive error, cognitive impairment, dementia, neurological diseases, Alzheimer’s disease, risk of stroke, and cardiac arrest from only the fundus photographs.^[6]

AI can potentially predict the future progression in visual fields of glaucoma, myopic progression, the response of retinal edema to anti-VEGF, expected surgical complications, and more.^[6]

Great power, great responsibility

As we may develop more powerful gadgets, machines, software, and AI, patients may trust the AI more than they may trust the doctor. However, that trust is misplaced, and we should be wary of this. Researchers have been studying how to build trust in AI.^[7,8] Even if trust can be earned, responsibility has to be assigned appropriately. Medicolegally, the lines are not clear about responsibility related to the mistakes of AI.

A doctor's clinical skills and judgment should never be replaced by AI. As the physicians of the future, it is our responsibility to use the power of AI as an adjunct and never let it become a replacement.

John Davis Akkara^{1,2}, Anju Kuriakose³

¹Department of Ophthalmology, Little Flower Hospital and Research Centre, ²Angamaly and Glaucoma Department, Westend Eye Hospital, Cochin, ³Department of Ophthalmology, Jubilee Mission Medical College, Thrissur, Kerala, India

Correspondence to: Dr. John Davis Akkara, Glaucoma Department, Westend Eye Hospital, Kacheripady, Cochin - 682 018, Kerala, India.
E-mail: JohnDavisAkkara@gmail.com

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