Editorial

From the Editor's Desk

Artificial Intelligence versus Doctors: Who Wins?

Technology has become an integral part of our lives today. We live in the era of SMARTness; Smart phones, Smart TVs, Smart watches, Smart cars, the buzzword is ***SMART****. Expectedly and justifiably so, the field of Medicine has also been impacted by the ongoing technological revolution. One such example is Artificial Intelligence (AI), which is finding wider applications in various specialities of medicine and ophthalmology in particular. Of late, AI has provided new automated tools for diagnosing and treating ocular diseases. Therefore, the question naturally arises: Can AI out****SMART*** *the doctors?*

To answer this, let us look at the role of AI and how it can impact clinical care. According to Encylopedia Britannica, AI is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Although the term AI originated in the 1950s, the concept started gaining momentum two decades ago. With technology giants like Google and IBM entering the fray, its potential use in ophthalmology is being explored as never before.

Image based screening programmes are the most suitable areas for application of machine learning, a sub-field of AI. Automated retinal image analysis systems that detect diabetic retinopathy on digital retinal images are already available. In 2016, researchers from the Google Brain ini¬tiative reported that their "deep learning" AI system had taught itself to accurately detect diabetic retinopathy and diabetic macular edema in fundus photographs. In a recent study, an artificial intelligence diagnostic tool was designed using a deep learning algorithm for identification of fundus of normal and diabetic retinopathy patients.[1] The algorithm was created based on more than 75,000 images and could identify all disease stages, from mild to severe disease. Screening for diabetic retinopathy in the diabetic population is extremely important for early detection. However, diabetes affects more than 415 million people worldwide. Given this large number, screening is a mammoth task, expensive as well as time-consuming. In this scenario, AI can greatly ease the pressure on healthcare, especially in countries like India with a large population and insufficient resources.

The potential benefit of AI has also been explored in other conditions such as age-related macular degeneration.[2] Deep learning has been applied in software that analyses OCT to differentiate normal from age-related macular degeneration. A recent investigation on normal and AMD subjects who underwent macular OCT extracted 2.6 million OCT images linked to clinical data points from the electronic medical records and selected 52, 690 normal macular OCT images and 48, 312 AMD macular OCT images. 2 A deep neural network was trained to categorize images as either normal or AMD. The investigators found that Deep Learning Is effective for classifying normal versus age-related macular degeneration OCT Images.[2] Glaucoma is another ocular condition where a large set of images are available to create a rich database and develop algorithms that can be applied to analyze visual fields and to identify glaucomatous disc cupping.[3] This could help screen for glaucoma and may aid in assessing the progression of the disease in visual fields and the optic disc.[3]

The use of these AI based algorithms has great potential in screening of diseases, especially in low-resource countries. The added advantage is that the algorithms do not require any specialized or expensive computer equipment to grade images. The software can be run on a common personal computer or incorporated into mobile phones. Immediate feedback may lead to increased patient compliance and improvement in care. By screening patients who would actually need treatment, AI aided algorithms could bring in more relevant patients to the ophthalmologist, remove the subjective element of decision thereby making it more consistent, and also pick up subtle changes that may be missed by the human eye. With all these advantages, it appears that AI will occupy an increasingly critical role in several areas of ophthalmology and also contribute to research.

One of the concerns ophthalmologists express about AI is that it may replace them. However, although AI may aid in better diagnosis, management decisions require collective work and a dialogue between the doctor and the patient to weigh the risks and benefits and treatment alternatives. While ophthalmologists need to learn how to utilize AI to be able to use it as an effective tool in their diagnostic armamentarium, there is no reason to feel threatened or insecure. We must not forget that there is both an art and science to medicine. AI may take care of the science involved, but there are certain unique qualities in the treating physician that cannot be acquired by any machine on earth. For instance, the ***3 H*** *in your personality- humanity, humility and humor can cure an ailment when all science fails! The verdict is clear…….doctors win hands down!*

Friends, let me end on this winning note. Yet another feast of scientific bonanza is here at your doorstep, to savour and enjoy! I am deeply grateful to Dr. Gyan Prakash from the National Institutes of Health, USA and Prof. Takeshi Iwata from Japan for their enlightening and intellectually stimulating Guest Editorial on the emerging role of Asian countries in the exciting field of ophthalmic genetics.

As always, a big thank you to our enthusiastic authors from all over the country for your valuable contributions. This is your hard work and your journal!

I look forward to suggestions and feedback from each one of you,

Very sincerely yours,
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