THE PROMISE OF AI

Once little more than fodder for science fiction novels and dystopian films, artificial intelligence (AI) has evolved into a promising tool to help ophthalmologists battle some of the biggest challenges the profession is currently facing: lack of access for rural patients, a shrinking number of providers, and burdensome levels of record-keeping.

In a remarkable development, researchers at Google recently designed an eye-scanning algorithm that uses *deep learning*—a way of using mathematical calculations inspired by the way neurons interact in the brain—to detect diabetic retinopathy.[1] Not only could this algorithm detect the disease, but it did so as well as or better than humans. Google researchers are now working with scientists at Moorfields Eye Hospital in London to expand these capabilities and look for signs of macular degeneration in OCT scans. In areas where access to ophthalmologists and ophthalmologic care may be limited, technology like this could be sight-saving.

It may also, incidentally, help physicians return to spending more time with patients than with patient records. Electronic health records (EHRs) have become time-consuming monsters for many doctors, who now spend up to two-thirds of their time on paperwork,[2] and this time spent is both burdensome and of limited value. In the future, doctors will enter orders and notes through language-recognition software without having to look away from their patients,[3] tackling the first half of the EHR dilemma. And the information they enter will be more streamlined and more valuable, thanks to a combination of blockchain technology and AI.

Blockchain technology has been described as a *distributed database*. The technology creates a secure, digital file that records transactions (eg, visits, diagnoses, prescriptions) that can be shared among providers, payers, and pharmacies. The file lets physicians review past diagnoses, treatments, and other information instead of having to repeatedly reenter the data. It also organizes data in a way that will allow AI to mine it for valuable trends and insights. When treating a patient with a rare condition, for example, a physician would be able to find all other patients in the cloud-based dataset with those symptoms and see how they responded to various treatments.

AI will be able to assist physicians with diagnosis and treatment decisions by harnessing the vast power of big data. Add in the capabilities of telemedicine, remote sensors, and even robots, and experts envision a future in which physicians can use technology to expand their own reach and meet the needs of growing numbers of patients more efficiently and more successfully. Although there is much work still to do, and bumps in the road can be expected, this future is closer than you may think. ∎

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