

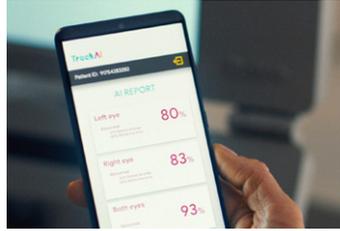
TrackAI

Stopping blindness in its tracks

Every day, 11,000 babies are born with a visual impairment and, according to World Health Organization estimates, around 19 million children in the world have a visual impairment. Early diagnosis is essential for these children. With timely intervention, 70 to 80 percent of all cases are preventable or curable. However, diagnosing children can be difficult because they can't articulate what's wrong with them. Now, AI is making early diagnosis a very real possibility.

By Zhang Ruonan





Most eye diseases occur in the first five years of life. Unfortunately, a lack of parental knowledge and awareness leads to many children missing the optimum diagnosis period. Only a third of children with an eye disease receive early treatment. Most children remain undiagnosed for months or years, which affects their eyesight, educational opportunities, and development. In low- and middle-income countries, going blind can be a deadly threat for some children.

Traditionally it has largely fallen to professional ophthalmologists to detect eye diseases in children. To diagnose their condition the doctor will attract the child's attention by moving their finger or an instrument and then observe the child's reaction.

However, in many developing nations, professional ophthalmologists are in extremely short supply. In developed countries, rigorous referral systems mean that ordinary

ophthalmologists are not qualified to give specialist tests for eye diseases. And once a patient is transferred to a specialist, the waiting time can be as long as three months to half a year.

TrackAI: Creating value with on-device AI

To tackle the lack of eye doctors and difficulty of diagnosing eye diseases in children, the Spanish medical research institute, IIS Aragon, and the startup DIVE Medical have been developing a new type of medical device named DIVE (Device for an Integral Visual Examination). The partners have designed it to provide automatic, high-speed, and accurate visual function testing for children and infants as young as 6 months old.

At the start of 2019, Huawei teamed up with IIS Aragon and DIVE Medical to jointly launch the TrackAI project. It will make use of Huawei smart devices and AI to save more children from eye

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diseases. TrackAI’s complete detection system consists of the DIVE device, a Huawei P30 mobile phone, and a Huawei MateBook E tablet.

The system can display visual stimuli on the screen and track the child’s focus with an eye tracker. It can also learn the differences between children with and without an eye disease.

During the test, the patient watches the stimuli displayed on the MateBook E screen. The DIVE tracks the movement and reaction of the patient’s gaze in real time and then sends the data to the Huawei P30.

Finally, the Huawei P30 smartphone runs a pre-trained machine learning model powered by HiAI 2.0 to detect whether the patient has a visual impairment.

As is also the case for most conventional techniques, TrackAI’s test results still need to be verified by an ophthalmologist, because the system relies on expert interpretation of the test results. Using AI to judge the

results makes it easier for non-specialist pediatric ophthalmologists to interpret visual assessments and identify which children have visual impairments.

The co-founder of DIVE Medical, Victoria Pueyo said, “As researchers, we need the support of technology companies. Huawei is helping us to globalize DIVE’s impact and bring technology to every corner of the world.”

At present, a number of medical institutes in China, Spain, Vietnam, Mexico, and Russia have started the data collection phase required to train the AI algorithm, with gaze data from over 2,000 visually impaired children gathered so far. By continually collecting data and adjusting the machine learning model, the researchers can increase accuracy.

Developing the technology for TrackAI is more of a marathon rather than a sprint. There’s still a long way to go before it is perfected, but a world where no visually impaired child goes undiagnosed is closer than ever. [WINWIN](#)