New AI software speeds up detection of **diabetic eye disease**

SELENA+ is a deep-learning programme that significantly reduces the time taken to analyse eye scans.

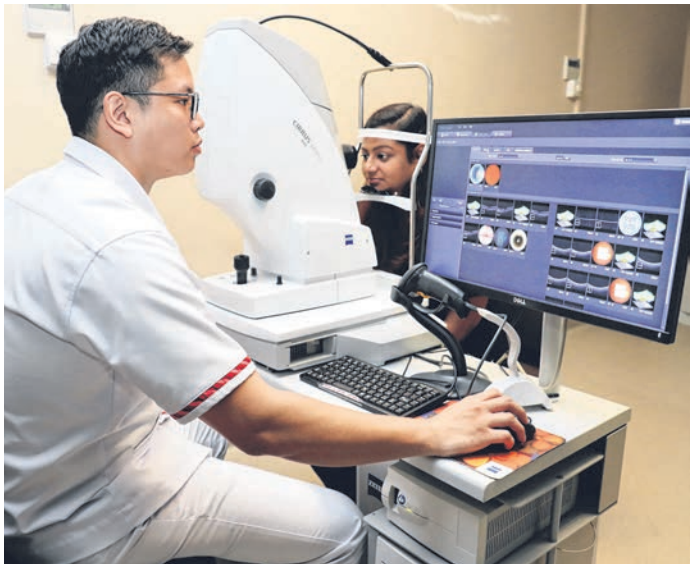
A new artificial intelligence (AI) software system that can greatly reduce the time taken to analyse an eye scan has been co-developed by a research team from SNEC, SERI, and the National University of Singapore's School of Computing.

Named SELENA+ (Singapore Eye Lesion Analyser Plus), the software is licensed to a local start-up EyRIS, and is able to detect retinal images for signs of three eye conditions – diabetic retinopathy, glaucoma, and macular degeneration.

As a deep-learning system, its accuracy improves as it processes more images. Currently, SELENA+ has been trained on more than half a million non-identifiable images from the Singapore Integrated Diabetic Retinopathy Programme (SiDRP), a screening initiative that was launched in 2010.

A BIG STEP FORWARD

Currently, retinal images are assessed by trained graders in the SNEC Ocular Reading Centre (SORC) and at another centre in Tan Tock Seng Hospital. SORC receives more than 2,000 images daily, all of which are processed manually via a strenuous and time-consuming workflow that involves up to three levels of grading.



During screenings with SELENA+, images of the patient's eyes are taken with a specialised fundus camera and uploaded to a secure platform on H-Cloud, and then sent to the AI software for assessment.

Preliminary tests showed that the time taken for SELENA+ to complete the analysis of an image is one minute, compared to three minutes by a human grader. The software is set to replace the first round of assessment, where images with abnormalities are picked up and a percentage of normal eye scans are sent for secondary grading.

As such, SELENA+ will address the increasing demand for manpower to tackle diabetic retinopathy, the leading cause of vision loss in working-age adults worldwide.

SELENA+ has received regulatory approval from the Health Sciences Authority as a Class B medical device in October 2019, and is the first AI product in the world to be used by a national healthcare system for screening for three eye conditions. The software, which can be adapted into different languages, has received the CE Mark certification in March 2020. It is an important validation of SELENA+'s AI algorithm and will allow the product to be used in Europe.

"There are huge markets where there aren't enough trained graders. The scalability of an AI solution can alleviate a lot of problems. That's why this is a very exciting technology," said Dr Danny Belkin, head of SERI's Technology Development and Commercialisation team.