

 TECHNOLOGY WATCH

## AI can diagnose diabetic retinopathy

Patients with diabetes mellitus require early screening for diabetic retinopathy to prevent diabetes-related visual impairment. Existing screening programmes, however, are struggling to deal with an ageing population and increased financial pressures. Now, Daniel Ting, Tien Wong and colleagues have shown that a deep learning system (DLS) can be used to identify diabetic retinopathy with a high sensitivity and reduce the grading workload in established screening centres. “In our study, we evaluated a DLS that was able to detect diabetic retinopathy and other related sight-threatening ocular conditions, including glaucoma suspect and age-related macular degeneration,”

explains Ting. “We collaborated with screening programmes from around the world to evaluate the performance of a DLS at detecting diabetic retinopathy using real-world screening data.” For countries with existing screening programs, the authors simulated different pre-set DLS sensitivity thresholds and studied whether a DLS could reduce grading workload when implemented in a semi-automated fashion (stage 1 grading by DLS, followed by the manual grading of referred images).

Ting and colleagues report that the DLS had a clinically acceptable performance of >0.9 AUC in detection of referable diabetic retinopathy and vision-threatening diabetic retinopathy. In addition, the

DLS semi-automated model was able to reduce grading workload in established screening programmes by ~40%.

“We are currently in the midst of designing and building this algorithm into the national diabetic retinopathy screening program in Singapore,” concludes Ting. “Furthermore, many developing countries with suburban and rural areas do not have the facilities to set up a screening programme, a DLS could solve this inequality of healthcare access.”

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**ORIGINAL ARTICLE** Ting, D. S. W. *et al.* Development and validation of a deep learning system for diabetic retinopathy and related eye diseases using retinal images from multiethnic populations with diabetes. *JAMA* **22**, 2211–2223 (2017)