JADE SYSTEM WINS INNOVATION AWARD

At the age of five, Ray Hidayat fell in love with mathematics. At age 11 he got an A+ in Computing 101 during a semester at Lincoln University in New Zealand's South Island. And at 14 he developed a computer program for a project led by his father, Dr. Rudy Hidajat, which has won the Silver in this year's Asian Innovation Awards.

The innovation is a quick method of administering the Farnsworth-Munsell (FM) 100-hue color-vision test - a highly sensitive way of detecting eyesight problems that can indicate the early stage of optic-nerve diseases, glaucoma, diabetes, drug toxicity and tumours, among other conditions.

Color-vision defects develop much earlier than those in visual acuity or visual field. Combined with other tests, FM can "help ophthalmologists make correct diagnoses" and catch diseases in their more treatable stage, says Hidajat, an Indonesian-born scientist at Christchurch Hospital's ophthalmology department.

But despite being valued worldwide by ophthalmologists, FM is underused because of the time taken to administer it and because it is difficult to interpret the results. The idea was to cut the time down by computerising the process. The result: The test now takes four minutes instead of an hour.

To get the computer program written, Hidajat turned to his son after a colleague with a doctorate in computing had declared himself stumped. At the time, Ray was looking for a project for his school programming competition. He took all of two minutes to come up with an idea, his father says, and wrote the manual for the software in the week of Christmas 2002.

The FM test asks a patient to arrange 85 coin-sized colored caps in order. The number and types of errors tell how much the patient's color vision has deteriorated. Recording the errors manually by turning over each cap and reading its number is laborious and not foolproof. Ray's program records and weights the errors statistically, adjusting for age (people see colors differently as they age) and presents the data on a polar graph - which shows deviations from the centre of a circle - familiar to ophthalmologists everywhere. The program is written in JADE, a software platform developed by New Zealand's largest software company, Jade Software Corporation.

Christchurch Hospital ophthalmic technician Jan McLay suggested using bar codes on the colored caps and worked out how to align them so that they could be read by a commercial bar-code scanner. The Hospital has used the system for a year. In one notable success last year, the four-minute FM test led to the diagnosis of an optic-nerve tumour causing depression and migraine in a young woman. She recovered after surgery.

In June, Hidajat's team won the New Zealand health-innovation award given by the Ministry of Health. In early October, a paper on the project by Hidajat and his team was accepted for publication by the internationally peer-reviewed journal Documenta Ophthalmologica. The Munsell Color Company, the Baltimore-based maker of the FM test, has inquired about marketing the system and a number of foreign companies have expressed interest in it.

The Jade Kids Program provides adolescents aged 11 to 17, with training in the JADE technology using the latest programming methods, and is facilitated by the educators and developers of the technology.