New software provides free framework for collaborative research in visual field analysis

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Vision researchers have developed new software that will analyze visual fields in an open-source platform to improve and encourage collaborative research among independent labs. An analysis of the free tool is presented in a *Journal of Vision* (JOV) paper, The visualFields package: A tool for analysis and visualization of visual fields.

In the paper, authors introduce and demonstrate the visualFields package , which can work separately or in conjunction with the Open Perimetry Interface—an open-source software developed by Andrew Turpin, PhD, and described in a previous JOV article (The Open Perimetry Interface: An enabling tool for clinical visual psychophysics). The interface allows researchers to operate commercially available instruments called perimeters that are designed to examine the visual field of patients.

"With open-source resources like these, research can be conducted in a completely transparent manner," said author Iván Marín-Franch, PhD, of the University of Valencia (Departamento de Óptica at Universitat de València) and formerly of Indiana University School of Optometry. "And unlike with most proprietary software, results can be verified and methods more closely scrutinized by independent researchers."

The visualFields package contains analytical and visualization tools, including methods for detection and follow-up of glaucoma. To demonstrate the visualFields package, the research team used the right eye of a patient with glaucoma who participated in the Bloomington longitudinal study. Results included four examples of visual field

analysis along with the corresponding code used for their generation.

"The necessity for moving from proprietary software into a fully open-source framework has been in the psyche of the glaucoma research community for many years," said Marín-Franch. In looking at the future, he and his colleagues suggest that Open Perimetry Initiative (OPI) would allow groups or individual researchers to test their models with large datasets of real data that they would not have access to otherwise. They also propose centers with good infrastructure would be able conduct clinical trials using state-of-the-art methods for analyzing their data right away and without incurring any cost.

"But, the success of OPI relies strongly on active collaboration from every end of the research community: Some by donating their datasets, some by donating the implementations of their research methods," cautions Marín-Franch.

The researchers make clear that the visualFields package is not intended to replace well-tested, commercially available stand-alone software; rather, it is meant to be an environment for experimentation and research that is free and open for scientists to use and offer ways to improve upon it.

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