

New low cost device for automatic testing of visual acuity of tiny tots

Eye problems in children such as amblyopia, cataract and other developmental diseases often go undetected because the usual procedure for testing vision by recording the numbers of lines of different dimensions seen on a vision chart, is challenging in preverbal children.

In order to overcome this challenge and to aid in the detection of the vision related problems early, a team from Anna University, Chennai, has developed a Sweep Visual Evoked Potential (VEP) system that can compute the visual acuity automatically. VEP is recorded from the brain with this system during the presentation of different visual patterns on a monitor.

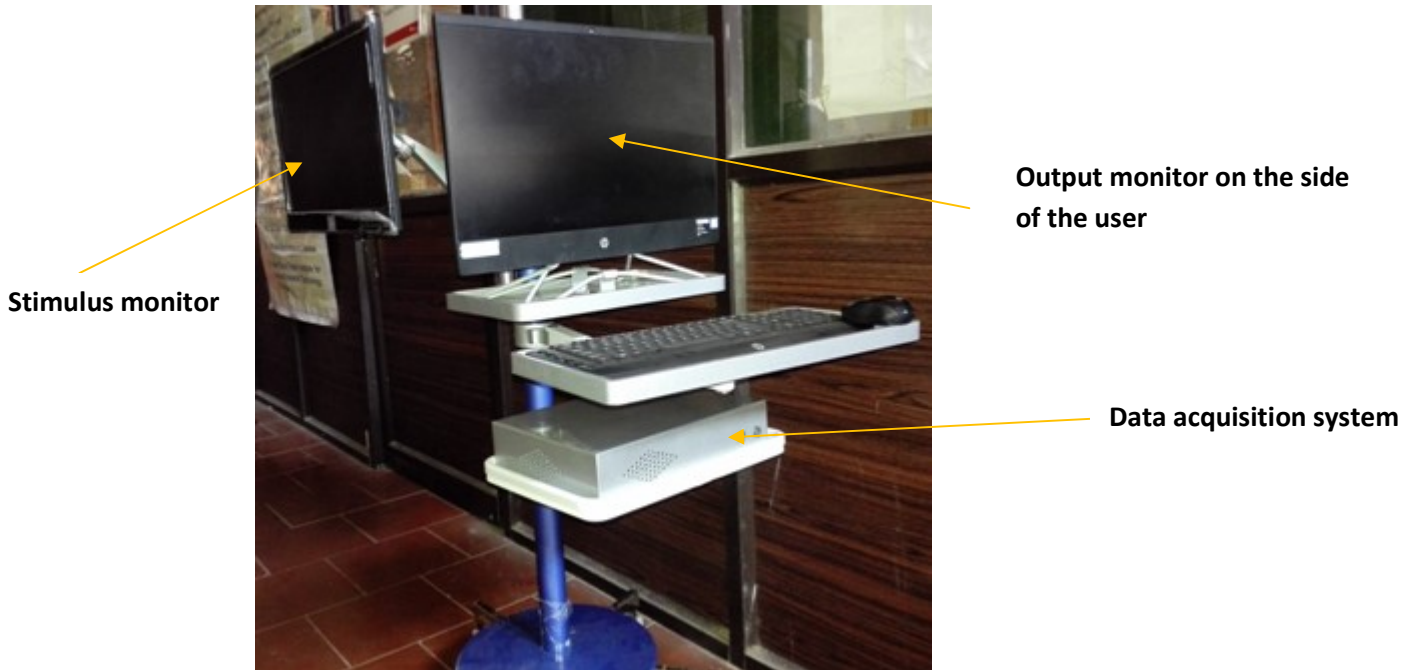
Electrophysiological systems available in the market which incorporate these VEP protocols are expensive and require expertise on the part of the clinicians and technicians. This makes it unaffordable in most hospitals. In contrast, the low cost system developed by Dr. S. Shenbaga Devi, Professor and Former Director, Centre for Medical Electronics and her team can be operated with limited training.

The technology funded by Technology Development and Transfer division of Department of Science and Technology, demonstrates a set of standard patterns, a checker board pattern for instance, with predefined number of reversals and with different frequencies on the computer monitor known as stimulus monitor which the patient is asked to look at.

These patterns generate a voltage called Visual Evoked Potential in the brain which is sensed by just placing 3 surface electrodes on the head. Since this voltage is embedded in the raw brain signal, the test is repeated for a number of trials and for each trial, the signal from the brain is acquired by the indigenously developed system. VEP is then extracted and the developed algorithm computes the visual acuity automatically. The computed visual acuity and the VEP waveforms are shown in a single panel of display in the computing system and this can be saved for future reference along with the patient details.

Since this procedure does not require the response from the patient and it takes less than 15 seconds, on a patient, to complete the procedure for visual acuity computation, it can be carried out on preverbal children, special kids with cerebral palsy or other neurological disorders and non-cooperative subjects. The system is developed in such a manner that a Graphical User Interface guides the user to complete the procedure in an easy manner.

Dr Devi has collaborated with clinical investigators and Retina Specialist Dr. Parveen Sen, and Dr. Ronnie George, Director Research and Glaucoma Specialist of Sankara Nethralaya, and the industry partner M/s Appasamy Associates, Chennai to bring out the final industry prototype.



Thus the proposed 'Sweep VEP' system will be very useful in accurately assessing vision and facilitating early treatment when required. Because of its low cost as well as ease of operation, it has the potential of being used by pediatric ophthalmologist across the country.