Applications

Driving/Piloting Evaluation and Training
Human Factors Evaluation
Military Simulation and Training
Vision Research
Psycho-visual Experiments
Drug and Alcohol Response Testing
Surgical Simulation and Training
Handicapped Communication
Advertising/Web Evaluation
Retail Effectiveness Assessment
SYSTEM OVERVIEW

Head Mounted Eye and Scene Imaging Subsystems
Ultra-lightweight miniature electronic and optical components generate clear, in-focus eye and scene video images for virtually any subject. Tiny eye and scene imaging components are available mounted on a baseball cap or headband or can be affixed to virtually any headgear.

A transparent dichroic mirror mounted in front of the subject’s eye generates the eye video, by reflecting the eye image into a highly sensitive head mounted video camera. A single LED provides low level IR illumination.

The miniature scene camera, mounted above the subject’s line-of-sight, provides a true, non-reversed, color image of the viewed scene, which yields a parallax-free scene image suitable for direct input to the autocalibration system. Initial calibration is maintained when looking at any scene, whether closer up or farther away from the initial point of calibration.

SYSTEM COMPONENTS

A PC based unit containing the following hardware and software:

HARDWARE
Eye Tracking Processor
The eye tracking processor automatically tracks the center of a subject’s pupil, the reflection from the corneal surface, and measures pupil size, all in real-time. Horizontal and vertical crosshairs automatically center over the pupil and corneal reflection to indicate proper tracking of the two targets.

Autocalibration Processor
Calibration is straightforward and can be completed in a few seconds. The autocalibration processor precisely calculates the subject’s point-of-gaze with respect to the scene being viewed using raw eye position data generated by the eye tracking processor. A 24-hour clock is used for video frame-by-frame analysis of the output data.

SOFTWARE

On Screen Video Processing
Both the eye image and the scene image, with the superimposed point-of-regard, are viewed within the GUI.

Data Acquisition, Control, and Analysis Software
Windows® XP based VisionTrak Raw Eye Movement Data Acquisition Software (DAQ), allows the eye imaging and tracking data collection process to be adjusted for any subject from the operator’s computer console. Incoming data can be seen graphically in real-time and instantly analyzed or exported in real-time to other devices. The software includes provisions for file storage in native binary and ASCII formats along with complete data review capabilities.

UPGRADE OPTIONS

Data Analysis Software
VisionTrak Point-of-Regard Analysis Software (PRZ) further analyzes raw Point-of-Regard data, breaking down where the subject is looking and correlating it to what the subject is looking at. The raw data can be quantified into eye fixations according to user adjustable criteria, which can then be viewed in tabular lists or graphical display formats to indicate the subject’s visual scan path. The number of fixations, total fixation time, and scan path parameters are also automatically computed. In addition, objects in the stimulus scene can be designated, and the eye fixations can be correlated to indicate the visual response to particular scene elements. A variety of table, bar, and pie chart formats can be selected to present the results.

Optional Head Tracking System
Using FASTRAK, PATRIOT, or LIBERTY, in conjunction with VisionTrak, enables users to track eye motion simultaneously with head motion. This allows 6DOF head tracking in conjunction with eye tracking for a complete line-of-sight real-time solution.

VisionTrak Global System
This option includes Line-of-Sight software which combines eye and head vectors for Point-of-Regard output and Point-of-Regard software for advanced analysis. The Global Imaging system includes an additional camera that provides a view of the users’ Point-of-Regard, overlaid on the scene. Manual cursor control allows object to be delimited for quantitative gaze/object correlation.

Binocular System
The Binocular system is an eye-tracking system, monitoring both eyes simultaneously while offering all the features and benefits of the standard VisionTrak system.

VisionTrak Digital Recording Wireless Option
The wireless option is an untethered system that allows the subject to move naturally in any environment without restriction while offering all the features and benefits of the standard VisionTrak system. The system digitally records for playback and provides post processing data without sacrificing frame rate while data gathering.

Auxiliary Outputs, Inputs and Synchronization
Standard system - 4 TTL inputs
4 TTL outputs
3 Analog outputs

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