

Cognitive Eye Tracking

Index of Cognitive Activity (ICA) is a ground-breaking mathematical technique that monitors rapid changes in a person's pupils to determine his or her level of cognitive effort. The technique produces a real-time, second-by-second estimate of cognitive workload that can be used in a wide range of scenarios such as to drive adaptive automation systems, or to monitor the individual's response to training (and hence allow tailoring of that training to be more closely aligned to the individual's ability and physiological state).

The ICA is computed for each eye independently. This is an important factor as different cognitive processing occurs in different areas of the brain, and will therefore be reflected in each pupil differently.

Correlation of the cognitive activity estimate with standard eye tracking point of gaze information reveals a powerful picture of the cognitive demands a person is undergoing at any point in time, and why. To date, the technology has been used in numerous settings including to evaluate usability for mission critical interfaces for FAA Air-Traffic Control, to validate Command and Control interfaces for the Navy, for on the job training studies for the TSA, and to provide real-time input to Uninhabited Air-borne vehicle control stations for DARPA (through Boeing Phantom Works).