



# D-LAB

## ICA

### INDEX OF COGNITIVE ACTIVITY



// As users operate in increasingly difficult environments, it is essential to understand their cognitive workload. Also many research questions can benefit from this additional information as conclusions then incorporate the mental workload. The Index of cognitive activity (ICA) is an innovative technique that provides an objective measurement of a persons cognitive workload based on a complex analysis of the pupil dilation.

# MEASURE HUMAN COGNITIVE WORKLOAD

The Index of cognitive activity is based on the rapid pupil reflex caused by effortful cognitive processes. While pupils react with their circular muscles on changes of light, they also react on mental effort with their radial muscles. The ICA successfully separates the light reflex from the dilation reflex. It has several advantages over other techniques that measure changes in pupil dilation. First, it does not require averaging over trials or over individuals. Second, it can be applied to a signal of any length. And, third, it can be computed in nearly real time (i.e., within a few seconds). The index is computed as the number of times per second that an abrupt discontinuity in the pupil signal is detected. Dikablis Professional Eye Tracking Glasses support the measurement of ICA.



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### TECH SPECS

Type of product

Purpose

Necessary Hardware

Necessary D-Lab Module

Necessary third party software

Software

Calculates and visualizes the cognitive activity

Dikablis Glasses 3, Laptop

D-Lab Eye Tracking Head Mounted with ICA module

Workload RT from Eyetracking Inc.



## FACTS AT A GLANCE

- Fully integrated in D-Lab
- Online calculation of ICA
- Synchronously display ICA with other data
- Different visualisation options
- Definition and calculation of user defined metrics based on all available data (scripting language)

## APPLICATION EXAMPLES

- Measure the level of difficulty experienced in a simulator
- Compare workload across multiple iterations of an interface
- Optimize training materials
- Identify opportunities to improve ease of system operation
- Demonstrate workload differences between user groups
- Diagnose specific features of a task that are associated with high workload



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