ERGONEERS
FROM SCIENCE TO INNOVATION

HOW TO...

USE THE INDEX OF COGNITIVE ACTIVITY IN D-LAB?

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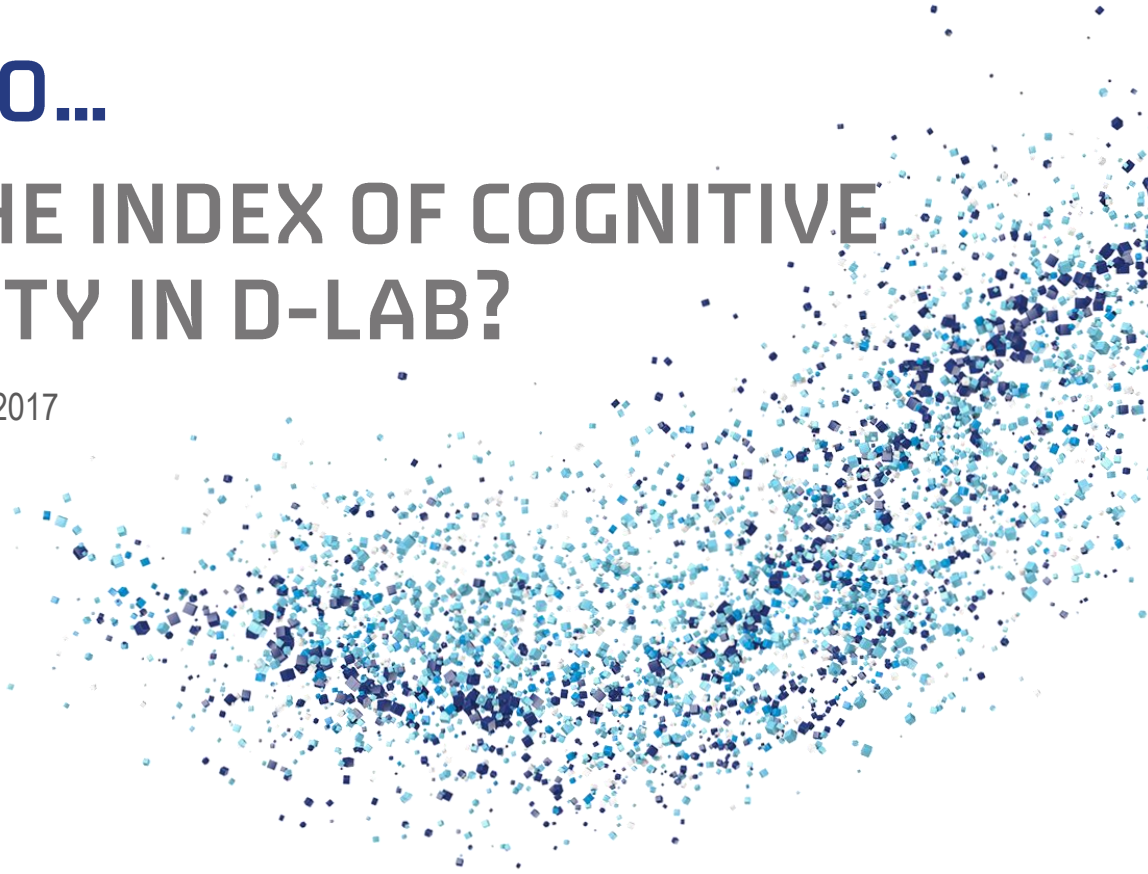


SUMMARY

The Index of Cognitive Activity (ICA) uses pupil dilatation to quantify the level of Cognitive Workload objectively and unobtrusively in real-time. This method was developed and patented by EyeTracking Inc.. In cooperation with Eye-Tracking Inc., we enabled our software D-Lab to measure the ICA via the Dikablis Professional Eye Tracker. For more information about ICA refer to related literature.

EQUIPMENT

Hardware

Dikablis Professional Cable Eye Tracker (default configuration: 60 Hz) from Ergoneers

PC that meets the D-Lab requirements. Find more specifications here.

NOTE: Disable all LAN and Wi-Fi connections on the D-Lab computer!

Software Requirements

D-Lab 3.50 with the following licenses

- Eye Tracking Head Mounted
- ICA

You can download the latest D-Lab version here.

Workload RT (by EyeTracking Inc.) with a valid license.

NOTE: Before you start with the step-by-step section, please make sure D-Lab and Workload RT are properly installed on the PC and valid license dongles are connected to the PC. Both software-packages need to be installed on the same computer.

MEASURE THE ICA WITH D-LAB STEP BY STEP

#Step 1: Connect Dikablis Professional Eye Tracker

Connect the Dikablis Professional Eye Tracker to the D-Lab computer.

NOTE: For more information refer to you DIKABLIS Quick start Guide.

#Step 2: Start Workload RT

Start Workload RT. Double-click on the Workload RT icon on the desktop.

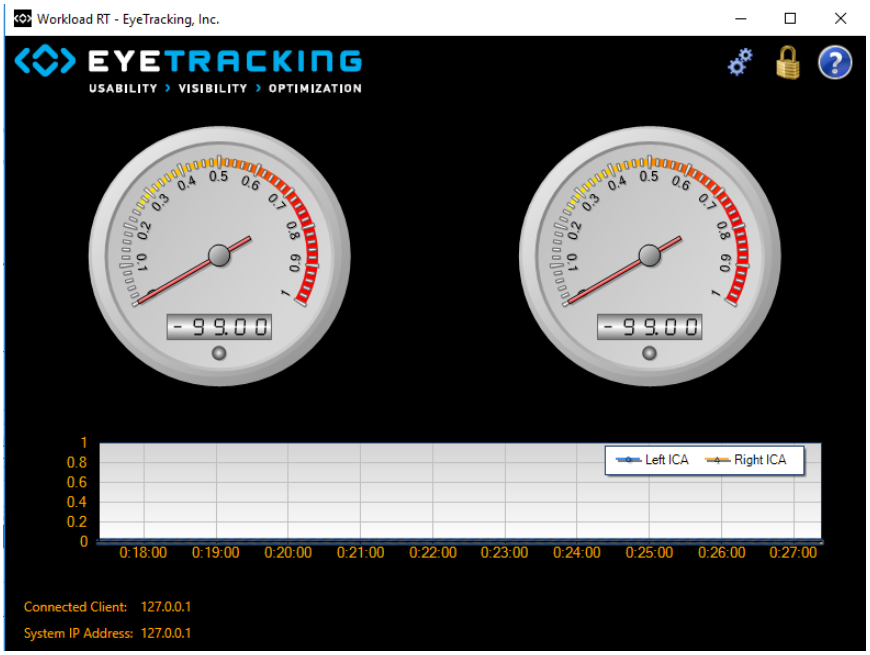


Figure 1: User Interface of the Workload RT Tool (by Eye-Tracking Inc.). When D-Lab is connected to the Workload RT, all data is transferred to and can be processed in D-Lab. No further actions are required in this tool. However, the Workload RT must be active during the measurement.

NOTE: D-Lab measures the size of both, left and right pupil and forwards this information to Workload RT. Workload RT uses this information to calculate the values "Index of Cognitive Activity Sample" and "Index of Cognitive Activity Average" and returns them to D-Lab for further processing (recording, storage, visualization).

Index of Cognitive Activity Sample:
Value per Eye-Camera Frame: Detected "ICA Event" = 1
No "ICA Event" = 0

$$\textbf{Index of Cognitive Activity Average} = \frac{\text{Sum of ICA sample in the last second}}{\text{Number of frames in the last second}}$$

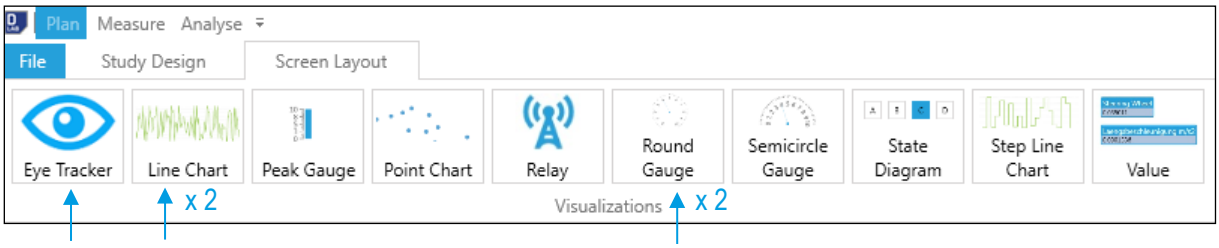
#Step 3: Start D-Lab and arrange D-Lab visualisation

Start D-Lab. Double-click on the D-Lab icon on the desktop and create a new study or open an existing one.

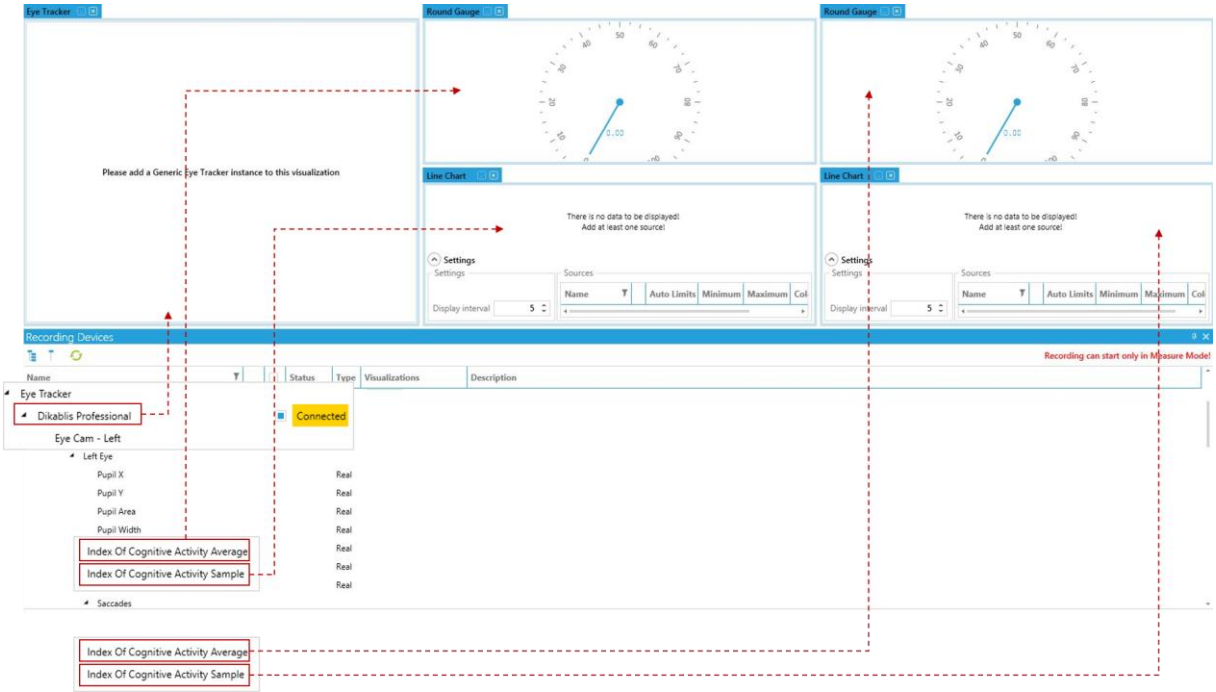
Open an Eye Tracker visualisation. Go to the Screen Layout Tab and click on the Icon.

Open two Round Gauge visualisations. Go to the Screen Layout Tab and click on two times

Open two Line Chart visualisations. Go to the Screen Layout Tab and click on . Arrange the line charts beneath the Round Gauge visualisations.



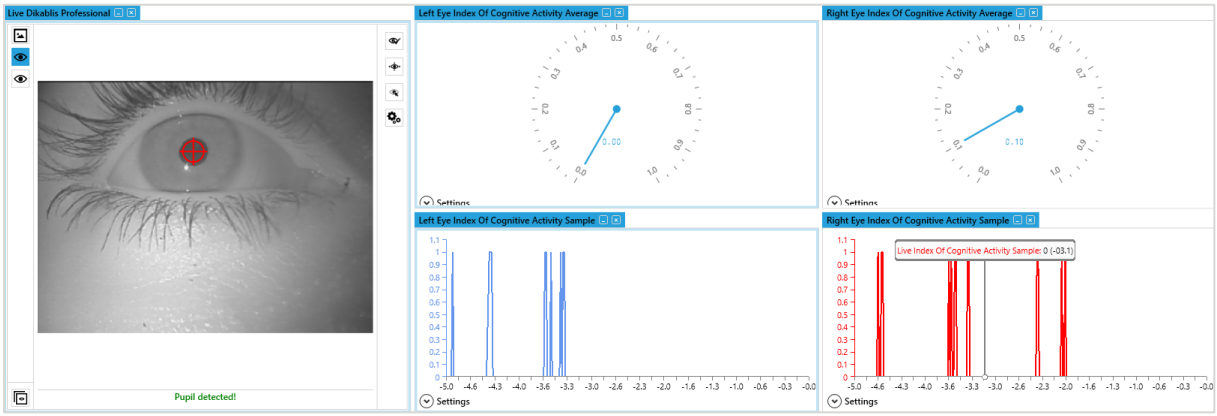
Drag & Drop Eye Tracker Data to the visualisations. Start with "Dikablis Professional" and drag the whole Eye-Tracker into the Eye-Tracker Visualisation-Window. Continue with the "Index Of Cognitive Activity Average" for the left eye and drag it to one of the Round Gauge windows. Assign the "Index Of Cognitive Activity Sample" of the same eye to the line chart underneath. Repeat this for the ICA values for the right eye.



NOTE:

- It is necessary to visualize the ICA data in order to establish the connection to Workload RT.
- The visualizations above are only a suggestion given by Ergoneers. It is of course possible to use any other visualizations provided by D-Lab.

Adjust the Eye Cameras. Carefully adjust the eye cameras in a way that each eye is completely visible in the according camera.



NOTE: In case you only want to measure the ICA without doing actual Eye-Tracking, it is not necessary to calibrate the Eye-Tracker. You can immediately start with the measurement.

#Step 4: Record an ICA measurement

Go to D-Lab Measure Mode and select the subject to which the recording shall be assigned.

NOTE: Make sure the visualisations of the ICA Average and ICA Sample are still open.

#Step 5: Export the ICA-Data

Go to Data Export. File → Options → Export → Data. Select the ICA Data (Index of Cognitive Activity Average and Sample) you want to export.

NOTE: For further information about the Export of D-Lab data, please refer to the main D-Lab manual.

GET HELP

You can find answers to your questions, as well as instructions and troubleshooting information, in Ergoneers FAQ (http://www.ergoneers.com/faq).

In case of other questions regarding the Ergoneers Product Family (Dikablis, D-Lab), please refer to support@ergoneers.com.

Please be aware that Ergoneers cannot provide any interpretation for the ICA value. The development and calculation is done by EyeTracking Inc.

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