IMOTIONS®

Medical / Healthcare

Psychophysiological insights for human health

Medical / Healthcare

Multimodal biosensor platform

Measurements of psychophysiological responses are routinely used in human behavior research in order to test potential differences between patient groups. Applying such measurements to patient-doctor interactions, or medical protocols, additionally allows an objective understanding of the healthcare context. iMotions provides a platform for integrating and synchronizing the entire experimental setting, in any environment.

○ Integrate 50+ sensors from 20+ partners in one software

○ Single platform for the complete experimental process

○ Widely validated methodologies and software

iMotions enables research in a wide variety of fields concerned with improving medical treatments, healthcare interactions, and psychiatric diagnostics.

HARVARD MEDICAL SCHOOL   BAYER   MASSACHUSETTS GENERAL HOSPITAL   novo nordisk

UNIVERSITY OF OXFORD   UCLA   gsk   NIH National Center for Complimentary and Integrative Health

Some of the universities and companies that are currently using iMotions in their medical and healthcare research.

Watch the video below to see how Professor Roger Azevedo from North Carolina State University uses iMotions in his research.

Medical / Healthcare Research Benefits
The complete human behavior research platform

Seamlessly integrate multiple biosensors

Effortlessly integrate and synchronize 50+ different sensors from 20+ independent vendors, across 10+ modalities (including a wide range of medical grade devices). Add even more sensors through the Lab Streaming Layer. Forward data in real time and import external sensor / software data and loop it back into the platform via the API.


Portable data-collection methods for naturalistic studies

iMotions enables the synchronized collection of data from multiple wearable biosensors including eye tracking, electrodermal activity, ECG, EMG, and EEG. Use one or multiple biosensors to learn about human behavior in realistic settings.

VR eye tracking integration

Single or multisensor studies can be readily created in virtual environments with our VR integration (with or without eye tracking). Study physiological responses to stimuli in fully immersive settings, allowing you to both control the environment while also ensuring a high degree of ecological validity.
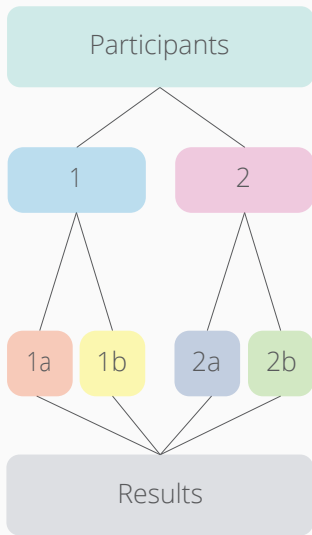
Study design control & flexibility

Design studies with complete freedom - assign the full experimental process within iMotions. Build advanced study designs by point and click. Easily set up participant groups, randomizations, and block designs as needed.

Go further with the data

Use cloud-based processing to easily obtain relevant metrics. Access automatically calculated frontal asymmetry and power spectral density for EEG recordings, electrodermal activity peak data, and heart rate variability for ECG recordings.
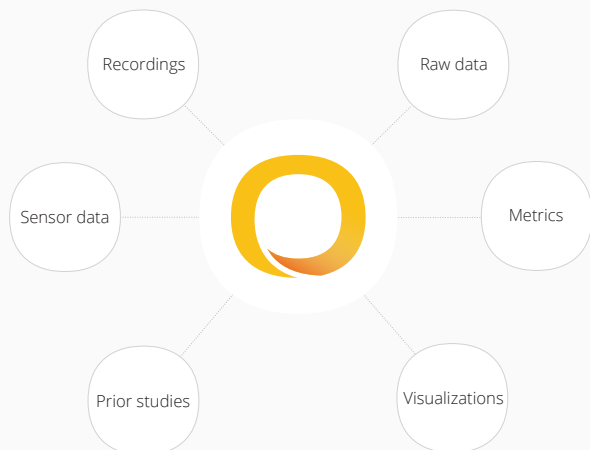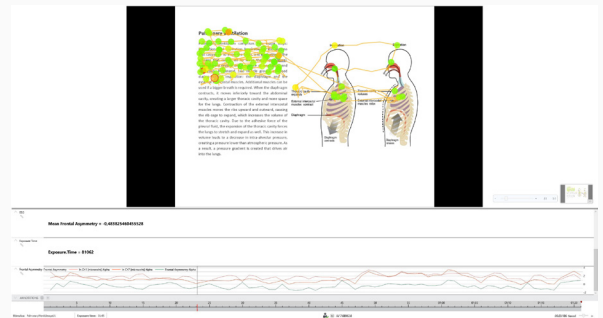
Flexible data import / export options

Export raw data, results, and metrics in file formats suited to Excel, SPSS, MatLab etc. Export visualizations on top of images, videos, websites, etc. Import prior data or recordings for analysis and synchronization on the iMotions platform. Keep full control of your data.

Medical / Healthcare Application Areas
The ideal solution for diverse research approaches

1. Autism / Psychiatric Disorder Research

Improved treatment and care for individuals with psychiatric or neurological disorders ultimately requires a better understanding of how these disorders develop and manifest. iMotions can facilitate incisive multimodal research, by providing a single stimulus presentation and data collection platform.

Examples include:

Can biosensor data provide a basis for early detection of Autism or neurological disorders?

A range of published research has demonstrated early identifiable physiological differences across autistic and non-autistic children. Use eye tracking and other biosensors to build upon this research and gain a better understanding of how autism develops.

Do significant differences in physiological responses exist across patient populations?

Test different clinical populations to investigate how characteristic physiological signals may differ in the presence of varying stimuli or situations.

Do medical treatments affect responses on a physiological level?

Physiological biomarkers or stereotyped responses can indicate the presence of neurological disorders. Study how these may change in response to treatments.

2. Therapeutic Applications

Therapeutic environments can benefit from the collection of data beyond self-report data in order to add a more objective understanding of therapy progress. This data collection can also take place within simulations, environments that could be particularly useful in the treatment of PTSD, phobias, and anxiety.

Examples include:

Do physiological responses differ objectively across several therapy sessions?

Investigate how physiological responses of fear with electrodermal activity may differ across exposure therapy sessions, and / or use eye tracking to see how attentional biases develop.

Is behavior altered in real-world environments following treatment?

The portability of most biosensors allows researchers to examine how physiological arousal or attention could be impacted within everyday scenarios, enhancing the validity of treatment findings.

How do patients respond to therapy delivered in a VR environment?

Immersive VR allows the experimenter to control the environment the patient is placed in. Use biosensor signals to examine how therapeutic interventions affect the patient / client in real-time, or analyze session data later.

3. Patient-Doctor Interactions / Medical Training

Understanding how medical staff interact with patients is the first step in being able to improve patient care. Biosensors provide a methodology to objectively track interactions. Understanding expert behavior can also lead to better training and protocols.

Examples include:

### How can doctors ensure optimal interactions take place with patients?

Use eye tracking glasses and facial expression analysis to objectively quantify attention and exhibited emotions in patient-doctor interactions. Use this playback to identify areas of improvement.

What can be learnt from experts to improve training of new medical staff?

Study the visual behavior of radiologists using eye tracking when inspecting X rays, or examine the cognitive load of surgeons with EEG to provide information about the behaviors and demands that medical staff are placed under, and how to achieve optimal performance.

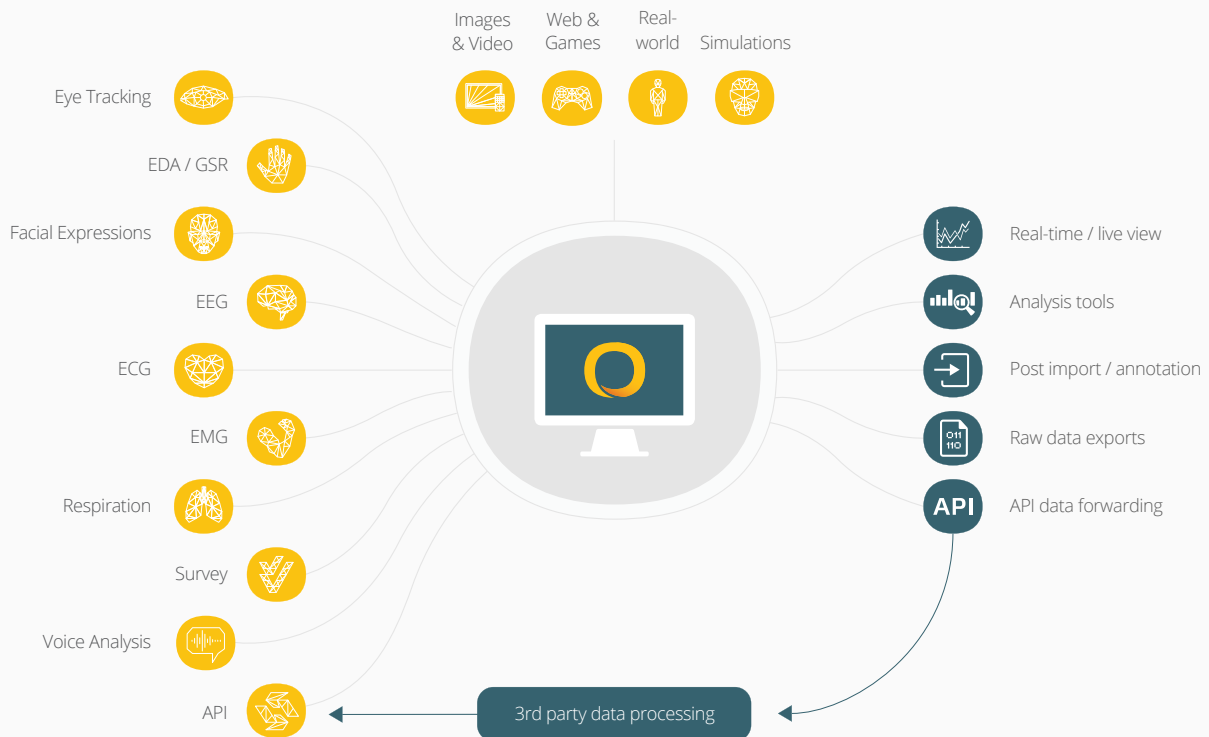### How can medical protocols be adjusted to improve patient safety / recovery?

Use eye tracking, electrodermal activity, ECG, or EEG to see how gaps or errors can occur in medical processes, or the points at which physiological arousal may signify that mistakes are likely to occur. Use this data to redesign procedures to avoid the occurrence of negative consequences.
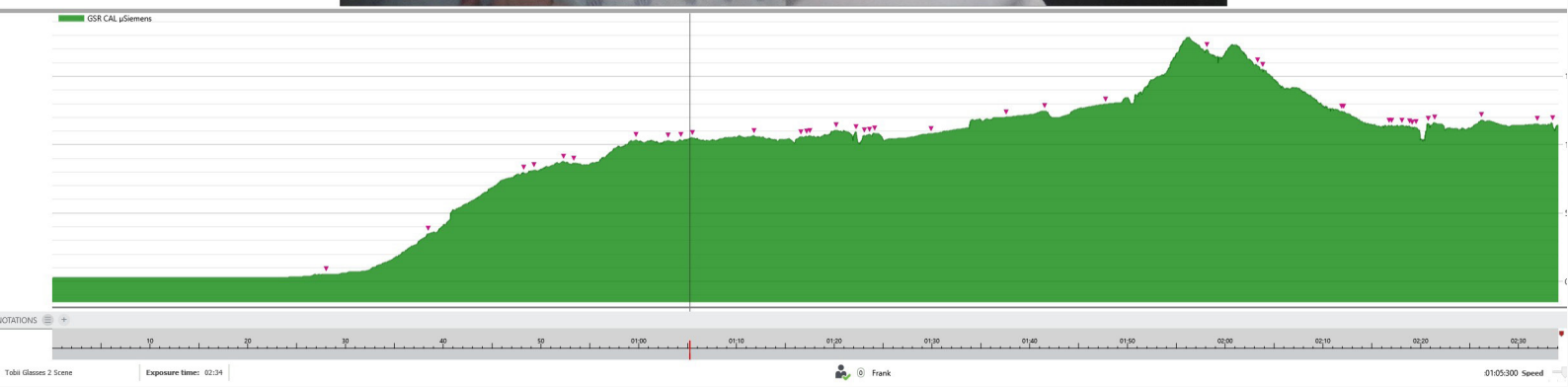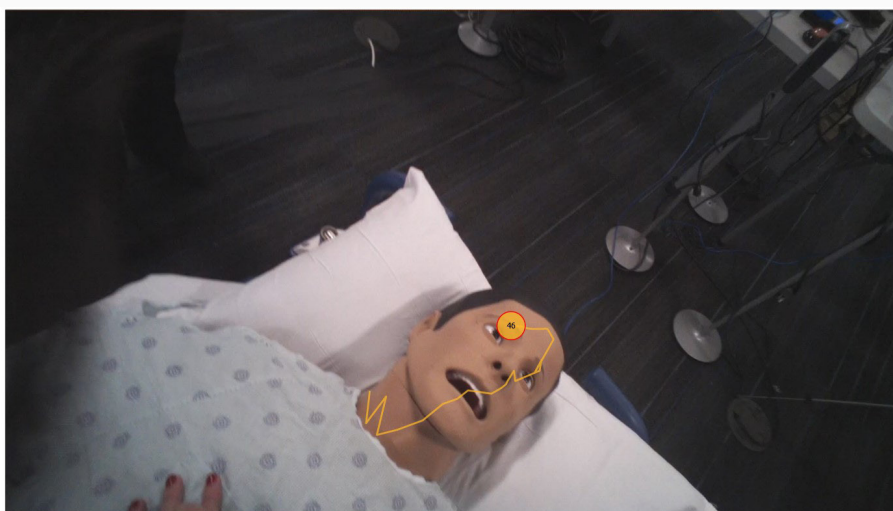
iMotions Software Solution
Multimodal research in any environment

iMotions reduces the complexity of carrying out multimodal research, enabling a wide array of sensors to be seamlessly connected. By combining these different physiological measurements, it's possible to get a better understanding of human behavior in any environment.


Images & Video · Web & Games · Real-world · Simulations

Eye Tracking
EDA / GSR
Facial Expressions
EEG
ECG
EMG
Respiration
Survey
Voice Analysis
API

Real-time / live view
Analysis tools
Post import / annotation
Raw data exports
API data forwarding

3rd party data processing

iMotions enables multimodal research to be carried out in an array of research scenarios.

Lab-based studies

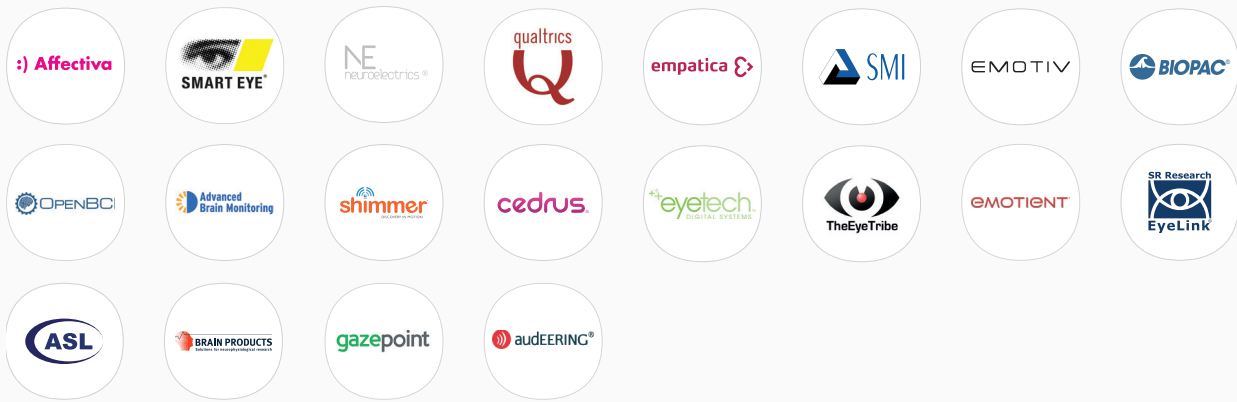### Natural environments
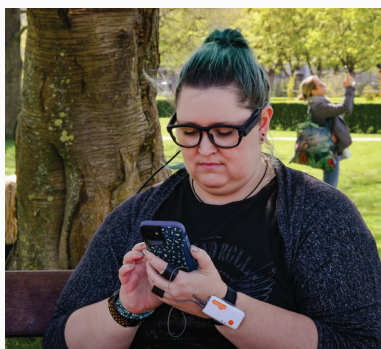
VR environments

iMotions supports leading 3rd party sensor products. Additional sensors can be integrated via our API.

Biosensors

iMotions has a suite of partners that provide biosensor hardware like EEG, electrodermal activity (EDA), ECG, EMG, etc that are suitable for automotive research.

- Eye tracking: SMI, Smart Eye, EyeTech, Gazepoint
- EEG: Advanced Brain Monitoring (ABM), NeuroElectrics, Brain Products, Emotiv, OpenBCI
- EDA: BIOPAC, Shimmer, Empatica
- ECG: BIOPAC, Shimmer
- EMG: BIOPAC, Shimmer
- Respiration: BIOPAC

Additional sensor integration

iMotions has a powerful API equipping researchers with the tools to:

- Integrate new sensors with real-time data capture in iMotions
- Live synchronize all data streams
- Live forward all synchronized data streams
- Control the iMotions application via remote control
- Supports standard sensor protocols like LSL and TTL

EEG	EDA	ECG / EMG

Selected Publications

Medical research made possible with iMotions

JAKE® Multimodal Data Capture System: Insights from an Observational Study of Autism Spectrum Disorder

Authors: Ness, S. L., Manyakov, N. V., Bangerter, A. et al. Institutes: Janssen Research and Development, Duke University School of Medicine, Northeastern University, University of California, University of Washington

View publication

Towards Automated Pain Detection in Children using Facial and Electrodermal Activity

Authors: Xu, X., Susam, B. T., Nezamfar, H., Diaz, D., Craig, K. D., Goodwin, M. S., Akcakaya, M., Huang, J. S., de Sa, V. R.

Institutes: University of California San Diego, University of British Columbia Vancouver, Northeastern University, University of Pittsburgh

View publication

Software-based video analysis of functional outcomes of face transplantation

Authors: Fischer, S., Diehm, Y., Dorante, M. I., Kotsougiani, D., Kueckelhaus, M., Alhefzi, M., Bueno, E. M., Pomahac, B.

Institutes: Harvard Medical School, University of Heidelberg, University of Münster

View publication

Psychopathic Men: Deficits in General Mental Ability, Not Emotion Perception

Authors: Olderbak, S., Mokros, A., Nitschke, J., Habermeyer, E., Wilhelm, O.

Institutes: Ulm University, University Hospital of Psychiatry Zurich, Ansbach District Hospital

View publication

Subtle behavioural responses during negative emotion reactivity and down-regulation in bipolar disorder: A facial expression and eye-tracking study

Authors: Broch-Due, I., Kjærstad, H. L., Kessing, L. V., Miskowiak, K.

Institutes: Copenhagen University Hospital, University of Copenhagen

View publication

Objective, computerized video-based rating of blepharospasm severity

Authors: Peterson, D. A., Littlewort, G. C., Bartlett, M. S., Macerollo, A., Perlmutter, J. S., Jinnah, H. A., Hallett, M., Sejnowski, T. J.

Institutes: Howard Hughes Medical Institute, Salk Institute for Biological Studies, University of California, University College London, Washington University School of Medicine in St. Louis, Emory University, NIH

View publication

How Does Food Taste in Anorexia and Bulimia Nervosa? A Protocol for a Quasi-Experimental, Cross-Sectional Design to Investigate Taste Aversion or Increased Hedonic Valence of Food in Eating Disorders

Authors: Garcia-Burgos, D. Maglieri, S., Vögele, C., Munsch, S.

Institute: University of Fribourg, Bern University of Applied Sciences, University of Luxembourg, Université Libre de Bruxelles, Shaanxi Normal University

View publication

Alexithymia, but Not Autism Spectrum Disorder, May Be Related to the Production of Emotional Facial Expressions

Authors: Trevisan, D. A., Bowering, M., Birmingham, E.

Institute: Simon Fraser University

View publication

Automatic Recognition of Posed Facial Expression of Emotion in Individuals with Autism Spectrum Disorder

Authors: Manfredonia, J., Bangerter, A., Manyakov, N. V., Ness, S., Lewin, D., Skalkin, A., Boice, M., et al.

Institutes: Janssen Research & Development, Northeastern University, Duke University School of Medicine, University of California San Francisco, University of Washington

View publication

Transdermal neuromodulation of noradrenergic activity suppresses psychophysiological and biochemical stress responses in humans

Authors: Tyler, W. J., Boasso, A. M., Mortimore, H. M., Silva, R. S., Charlesworth, J. D.,Marlin, M. A., et al.

Institute: Thync Inc.

View publication

Want to know more?

GET IN TOUCH

IMOTIONS®

Copenhagen, Denmark
Kristen Bernikows Gade 6
4th floor
København K, 1105
TEL +45 71 998 098

Boston, USA
38 Chauncy Street
Floor 8, Suite 800
Boston, MA 02111
TEL +1 617-520-4958

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www.imotions.com

China
NO.1 Fortune Avenue,
Room 2902
Yubei District, Chongqing
TEL +886 931684806