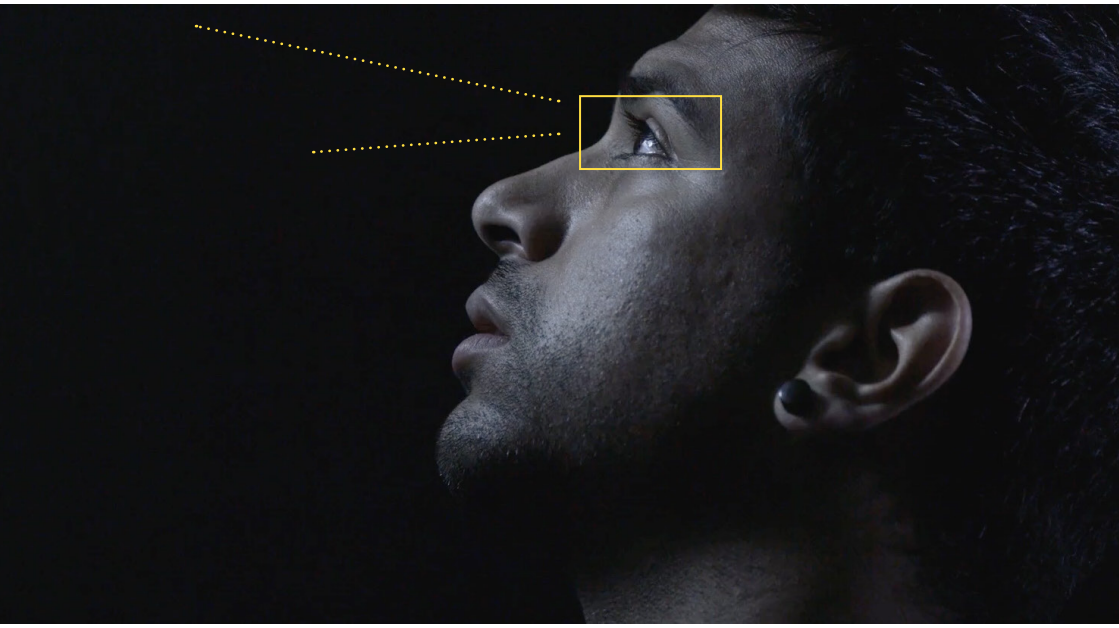
Sonification Lab



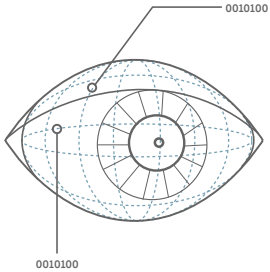
Research Instruments

Georgia Tech

smart eye

How Georgia Tech Sonification Lab is Using Smart Eye Research Grade Eye Tracking to Understand Driver Gaze and Behavior.

Customer Testimonial



My overarching goal is to ensure that technology is developed with the end user in mind. All aspects of design, implementation, adoption, and use of a system or device can be enhanced by considering the perceptual, cognitive, and social needs and abilities of those who will use it.

At Georgia Tech's Sonification Lab, we are looking forward to the next generation of product offerings that Smart Eye is rolling out, and I'm personally excited about the emotion capabilities, even more accurate gaze tracking (especially in eccentric views) and potential behavioral inferences and categorizations.

I'm looking forward to collaborating with Smart Eye beyond data collection, but rather pushing the envelope to see what else we can collect and how to go about collecting it.

- Professor Bruce Walker - Georgia Tech in Atlanta, GA

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Background

The Georgia Tech Sonification Lab is an interdisciplinary research group based in the School of Psychology and the School of Interactive Computing at Georgia Tech. Under the direction of Prof. Bruce Walker, the Sonification Lab focuses on the development and evaluation of auditory and multimodal interfaces, and the cognitive, psychophysical and practical aspects of auditory displays, paying particular attention to sonification. Special consideration is paid to Human Factors in the display of information in "complex task environments," such as the human-computer interfaces in cockpits, nuclear power plants, in-vehicle infotainment displays, and in the space program.

Georgia Tech had a recent interest in eye tracking for driving research - they wanted to know where people are looking in a dynamic way. When driving a car, people gaze all over the world outside of the vehicle - from traffic signs, the road, to points far ahead of the vehicle to plan future maneuvers, or a novice driver looking closeby. Driver gaze also varies on the inside of the car as well.

For this study, they wanted to investigate how the design of the human-vehicle interface (HMI) in an automated vehicle can affect emotional responses like excitement, perceived risk, psychological comfort, and even fear. Tracking where people look (for example, at the book they are reading, versus the HMI, versus the roadway, etc.) along with their pupil changes and other physiological metrics, can tell researchers how people are reacting to the behavior of the car and the HMI messages.

The Solution

To achieve this, Georgia Tech needed an industrial research grade eye tracking solution. This means that the equipment, hardware, and even the data rate has to be suitable for research purposes. It needed to have the flexibility and be able to push the boundaries of what it could do, including providing tech support and people in the company that are willing to collaborate and explore.

Their requirements included understanding subject pupillometry - or the size of the pupil for all the various measures that it provides. They also needed a configurable and reconfigurable setup with multiple cameras that can be installed in a driving simulator, desktop, or around a kiosk - which gives the opportunity to collect data in multiple situations. The Sonification Lab also needed an eye tracker that could be quickly calibrated, as well as good interaction with other data collection (HR, EEG, GSR, O2 Saturation, and more.)

Smart Eye checked many of these boxes: and with the recent acquisitions of Affectiva and iMotions, they are beginning to check even more.

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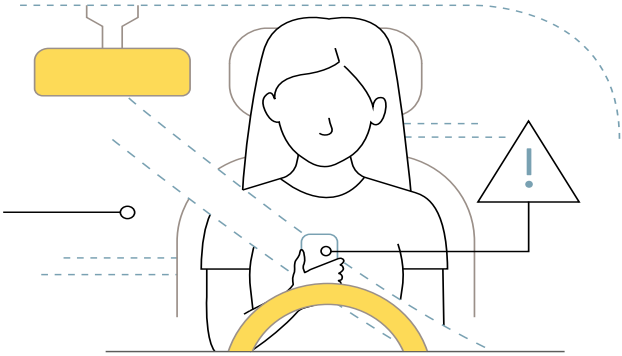
The Results

With Smart Eye, the Sonification Lab had the opportunity to collect a whole other channel of data beyond what can be collected in the driving simulator alone.

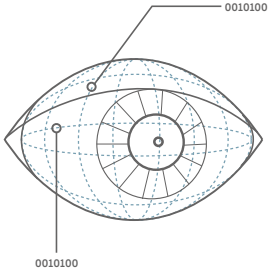
Most data that will be published involves largely state of the vehicle data, but by using eye tracking, they will be able to see what's happening with the driver and correlate that with what is happening with the vehicle to get much more insightful research.

Using eye tracking tools in their driving simulator, Georgia Tech researchers were able to show quantitatively that a carefully designed HMI can have a major impact on the overall experience of passengers in an automated vehicle.

This eye tracking technology allowed them to go beyond surveys and questionnaires, and have a more systematic method for studying performance, preference, and emotional aspects of human-automation interaction in vehicles.



Looking towards the future with Smart Eye's recent acquisition of Affectiva Emotion AI capabilities, Georgia Tech is looking into research around emotion using pupillometry, as well as behavioral categorization such as texting while driving, coffee in hand, and more.



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About Smart Eye

Smart Eye is the global leader in Human Insight AI, technology that understands, supports and predicts human behavior in complex environments. We are bridging the gap between humans and machines for a safe and sustainable future. Our multimodal software and hardware solutions provide unprecedented human insight in automotive and behavioral research—supported also by Affectiva and iMotions, companies we acquired in 2021.

Smart Eye offers road-ready Driver Monitoring Systems and next-level Interior Sensing solutions built on two decades of automotive experience. Smart Eye's technology is embedded as OEM or Tier 1 solutions in more than one million vehicles on the road today and has been selected by 14 of the world's leading car manufacturers for 94 car models, including BMW and Geely. Smart Eye also provides complete hardware and software solutions for fleet and small-volume OEMS, powering vehicles on the road today. As the preferred partner to the automotive industry, Smart Eye is leading the way towards safer, more sustainable transportation and mobility experiences enhancing wellness, comfort, and entertainment.

In behavioral research our advanced eye tracking systems provide unparalleled performance in complex situations, offering deep insights into human behavior and human-machine interaction in automotive, aviation, assistive technology, behavioral science and many more fields.

Today, our technology is used by NASA, Airbus, Boeing, Daimler, Audi, GM, Harvard University and hundreds of research organizations and universities around the world. Smart Eye was founded in 1999, is publicly traded and headquartered in Sweden with offices in the US, UK, Germany, Denmark, Egypt, Singapore, China and Japan.

For more information visit [www.smarteye.ai.](http://www.smarteye.ai)