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How the Toronto Research Institute is Leveraging Robust Eye Tracking in its DriverLab to Improve Road Safety Outcomes.

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Background

The research arm of the Toronto Rehabilitation Institute, KITE is one of the principal research enterprises at the University Health Network (UHN). KITE is a world leader in complex rehabilitation science, and is dedicated to improving the lives of people living with the effects of disability, illness and aging. It is home to DriverLab, a state-of-the-art driving simulator featuring a large 7 degree-of-freedom motion system and 360-degree field-of-view visual dome. With vehicles as the leading cause of death in Canada, DriverLab uses simulation to help develop tests for fitness and safety for driving, recommendations, and investigating effects of health and medications on driving. DriverLab is the only simulator of its kind in Canada and is comparable to the most sophisticated driving simulators in the world, with rain and glare systems that make it truly unique.

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UHN Toronto Rehabilitation Institute

The research objectives of DriverLab

are to develop sensitive methods for driver assessment, more effective methods for driver training, better recommendations for vehicle design, mitigation of drowsy and distracted driving, the effects of prescription and illicit drugs on driving, and a careful evaluation of the interactions between drivers and integrated-vehicle technologies. To achieve its objectives, the DriverLab vehicle maintains its original internal components (e.g., steering wheel, gas/brake pedals,seats, dashboard), but also required customizable interfaces and sophisticated measurement tools, including a state-of-the-art eye tracking sytem.

The Solution

In order to meet each of its objectives, researchers evaluate driving performance across a wide range of populations (individuals of different ages, with sensory, cognitive, or physical impairment) and across a wide range of driving scenarios. Scientists work closely with collaborative partners including the Ontario Ministry of Transportation, driver examiners, clinicians (including geriatricians and family physicians), automobile manufacturers, and simulation development companies. Specific research objectives include assessing the effects of medications on driving performance, and investigating the role of cognitive and physical training programs on safe driving outcomes.

Selecting Smart Eye Pro for integration into DriverLab was an easy choice, as it was the only remote tracking solution on the market able to repeatedly demonstrate robust tracking. When KITE began to use the system, they were able to get it up and running quickly, and the tracking performed well, meeting all expectations.

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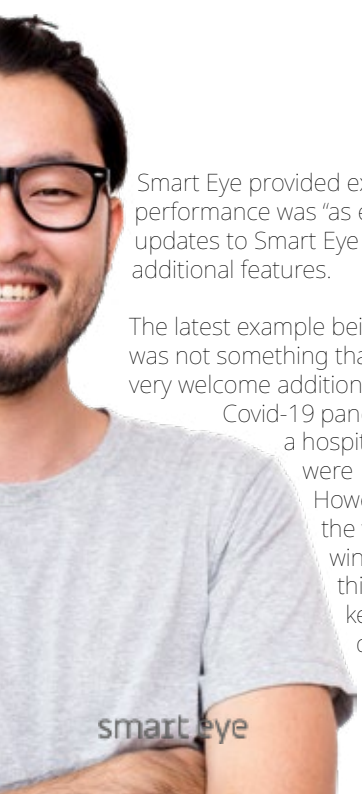

Results

Smart Eye provided excellent technical and product support. While the initial performance was “as expected” based on demonstrations, subsequent software updates to Smart Eye Pro provided useful performance improvements and additional features.

The latest example being the ability to track a masked face in Smart Eye Pro 9.1, which was not something that was remotely considered in the initial purchase but became a very welcome addition to solve an unforeseen niche problem for the time. Early in the Covid-19 pandemic, all in-person research was paused as the lab is located in a hospital. When in-person research resumed, precautionary measures were required, including distancing and the use of medical masks. However, being a simulator with motion, we require a researcher in the vehicle for safety, but do not have the option of opening vehicle windows for airflow as a real vehicle would. Until the release of 9.1, this left us with the choice between no eye tracking or an unmasked participant in an enclosed space with the researcher for the duration of the experiment. As a result, we were able to continue our research as planned.

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We would happily recommend the Smart Eye Pro system to any researcher that needs robust remote eye tracking, and in fact have demonstrated the system to visitors when asked. We also expect that when the funds allow, we will upgrade to the latest 'DX' system, allowing for even better tracking performance, with smaller less intrusive cameras, and all of the positive features we have become accustomed to.

- Bruce Haycock
Scientist at KITE and the lead engineer for real-time
computing in the Challenging Environment Assessment Laboratory

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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. Bridging the gap between humans and machines for a safe and sustainable future. Smart Eye was founded in 1999, is publicly traded and headquartered in Sweden with offices in the US, UK, Germany, Denmark, Egypt, Japan, Singapore and China. Through our Research Instruments, Smart Eye offers the world's most advanced eye tracking systems for analyzing human behavior. Offering unparalleled performance in complex environments, our carefully crafted instruments enable unparalleled insights into human behavior and human-machine interaction in automotive, aviation, assistive technology, media & marketing, behavioral science and many more fields. Today, our technology is used by NASA, Airbus, Boeing, Toyota, Daimler, Audi, GM, Harvard University and hundreds of research organizations and universities around the world.
For more information visit www.smarteye.ai.