Research Instruments

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Customer Testimonial

How Smart Eye Helps Tongji University Research Driver Psychology Related to Eye Movement in Personalized Driving Systems.

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By combining research on the lane keeping assist function and Smart Eye's detection function of the driver's head and eye gaze, our laboratory has developed a prototype of the lane keeping assist function based on the driver's state and the prototype of the automatic lane changing function based on the gaze interaction.

- Professor Hui Chen, the leader of the Chassis Electronic Control System Laboratory of Automobile College of Tongji University

Background

The School of Automobile of Tongji University was established in 2002 and is located on the Jiading campus of Tongji University. The School of Automotive has cooperated with many well-known domestic and foreign auto companies such as SAIC Volkswagen, FAW-Volkswagen, SAIC Motor, UAES, Continental AG, Geely Auto, etc. to establish school-enterprise joint training modes for students such as enterprise practice, engineers teaching in university, and joint training of automobile reserve engineers. At the same time, it has carried out dual-degree master training programs with well-known foreign universities such as Darmstadt Technology University and Stuttgart University to build a comprehensive platform for international exchanges and education cooperation.

The laboratory has a fixed base driving simulator platform based on the mass-produced EPS system and a real-vehicle platform. The laboratory has been engaged in the research of Lane Centering Control systems and Automated Parking systems for a long time. Recently, the laboratory is gradually conducting research on personalized systems and driver psychology related to eye movement.

The School of Automotive of Tongji Uni. has cooperated with many well-known domestic and foreign auto companies such as:

SAIC

一汽-大众 FAW-VOLKSWAGEN

GEELY

UAES 联合汽车电子有限公司 United Automotive Electronic Systems Co., Ltd

Continental

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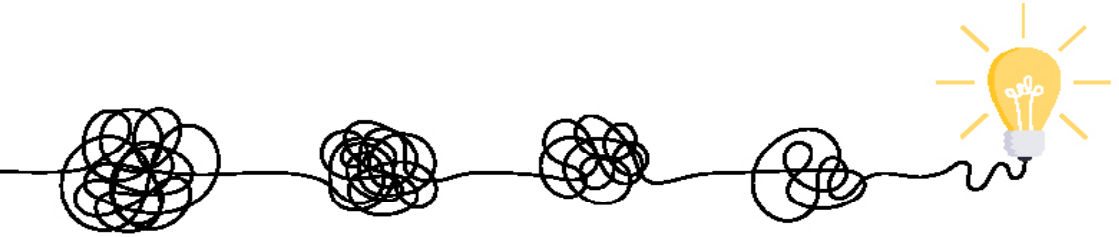
The Solution

Since the research content of the laboratory pays attention to the driver's condition while driving, Tongji University had known about the head-mounted detection equipment before, such as Tobii and Forum 8.

After an introduction by Toyo China, Tongji University became increasingly familiar with Smart Eye's products, including their non-invasive head and eye movement detection device. Smart Eye has high detection accuracy without requiring contact with the person being tested. It also provides the function of signal output through CAN bus, which can communicate with other hardware devices such as rapid control prototypes. It greatly facilitates the hardware-in-the-loop simulation experiment for vehicles. It can also realize the obtaining of driver state information when the driver interacts with the vehicle in-driving simulator.



By combining the previous research on the lane keeping assist function Smart Eye's detection function of the driver's head and eye gaze, the Tongji University laboratory has developed a prototype of the lane keeping assist function based on the driver's state and the prototype of the automatic lane changing function based on the gaze interaction. The lane keeping assist function based on the driver's state can better understand the driver's distraction and provide different levels of assistance in the distracted and non-distracted state. The automatic lane changing function based on the gaze interaction enables the driver to turn on the automatic lane change function only by gazing at a specific area without manually manipulating the buttons.

The Results

As a non-invasive head and eye movement measurement device, Smart Eye can greatly avoid the discomfort caused by the contact of the device to the tested person. At the same time, the quickness of the calibration for the device can effectively reduce the location accuracy requirements for device installation. Also, the 3D model can be customized in the software, which realizes the quick calculation of gaze target and viewpoint position of the tested person.

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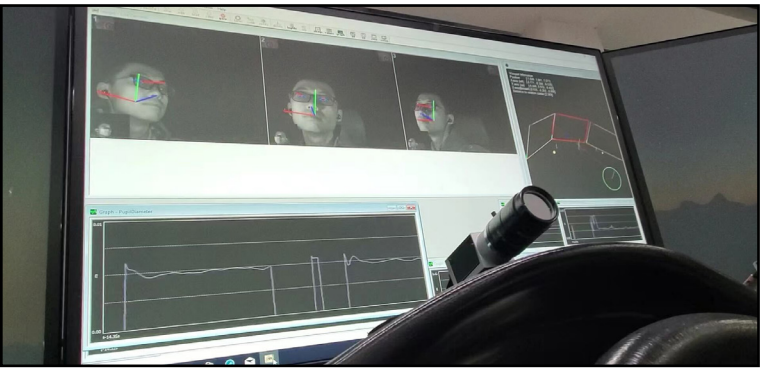

With the research and promotion of Level 3 autonomous driving, driver status monitoring will gradually become a necessary function for autonomous driving.

Smart Eye's high-precision and non-intrusive features can make it used as a calibration tool to calibrate and test the corresponding devices.

Moving forward, the 3D model in Smart Eye software can realize the fast calculation of the driver's gaze target, but the established process of the 3D model often requires professionals to build from scratch, which is often troublesome. When implemented in the automotive field, the import of commonly used model formats in the industry is extremely convenient for model establishment and model replacement. In addition, the establishment of a 3D model has high requirements for the position accuracy of the objects in the real world, which will greatly affect the accuracy of the viewpoint position. We hope that there will be a more accurate and convenient way to measure the position of the actual objects in the real world.

Smart Eye's high-precision and non-intrusive features can make it used as a calibration tool to calibrate and test the corresponding devices.

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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.