Toyota’s New Risk-ATTEND Program Is On the Fast Track To Help Keep Teen Drivers Safe

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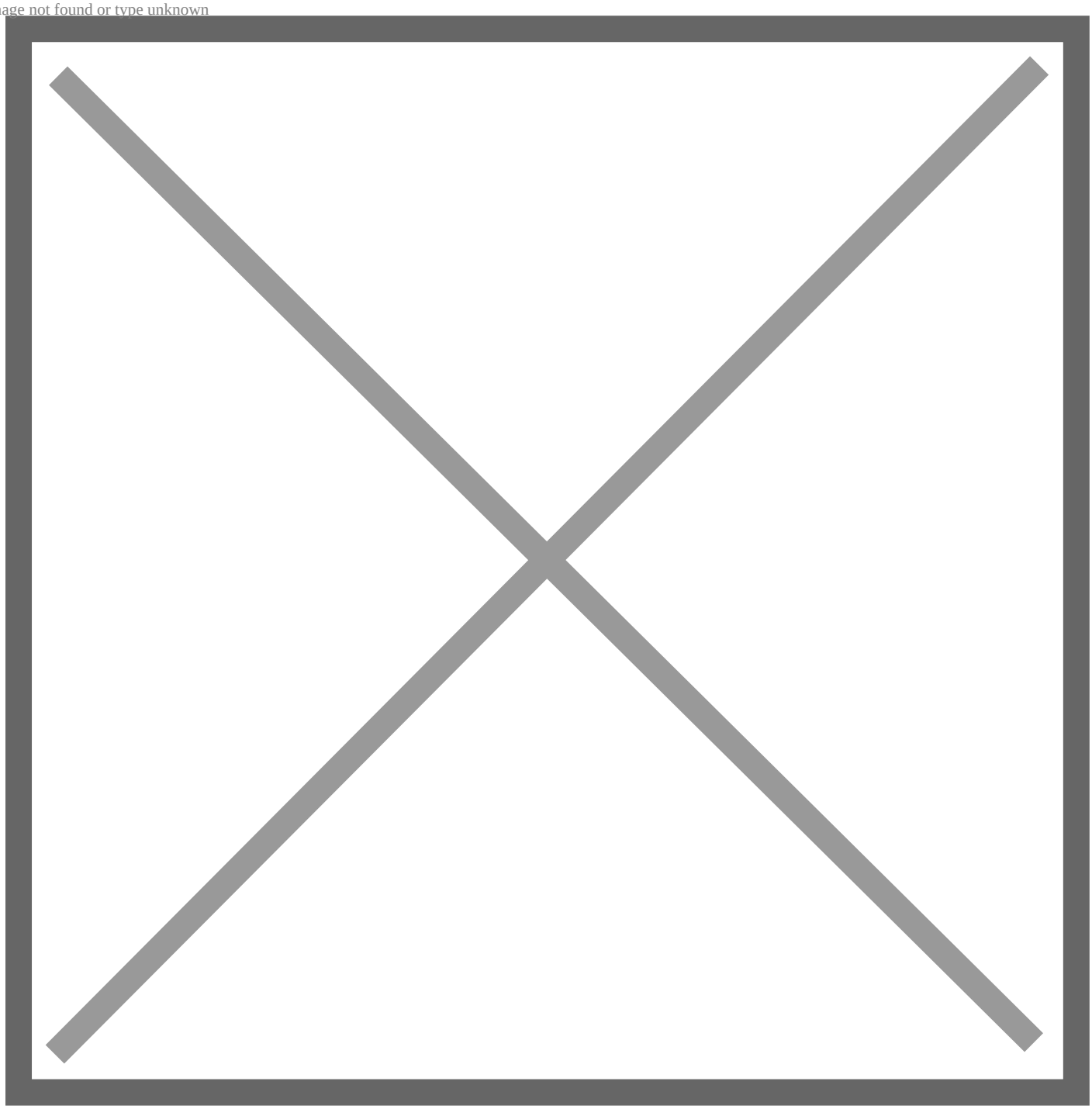


Getting a driver's license can be a major milestone for anyone. For teenagers, it's even more significant, as it symbolizes another step toward independence.

In fact, young drivers (ages 15-20) accounted for 11.7 million (5%) of all licensed drivers in 2021, according to the U.S. Department of Transportation. With that many novice drivers on the road, it's important to help keep them as safe and well-informed.

That's why Toyota's Collaborative Safety Research Center (CSRC) team is doing its part to help educate teen drivers. In partnership with Discovery Education and the University of Massachusetts Amherst (UMass-Amherst), CSRC developed Risk-Anticipation Training To Enhance Novice Driving (Risk-ATTEND). The web-browser-based training program was developed to find ways to accelerate a novice driver's skill of detecting and anticipating latent hazards.

"What we are trying to study in this project is the ability to anticipate risk," says Zhaonan Sun, a principal scientist with CSRC. "Most teen driver crashes are due to three critical errors: lack of scanning, speeding and distraction. We're trying to deal with lack of scanning or lack of meaningful scanning. Even if you see something, if you don't know what it means or what to anticipate, it's meaningless scanning."

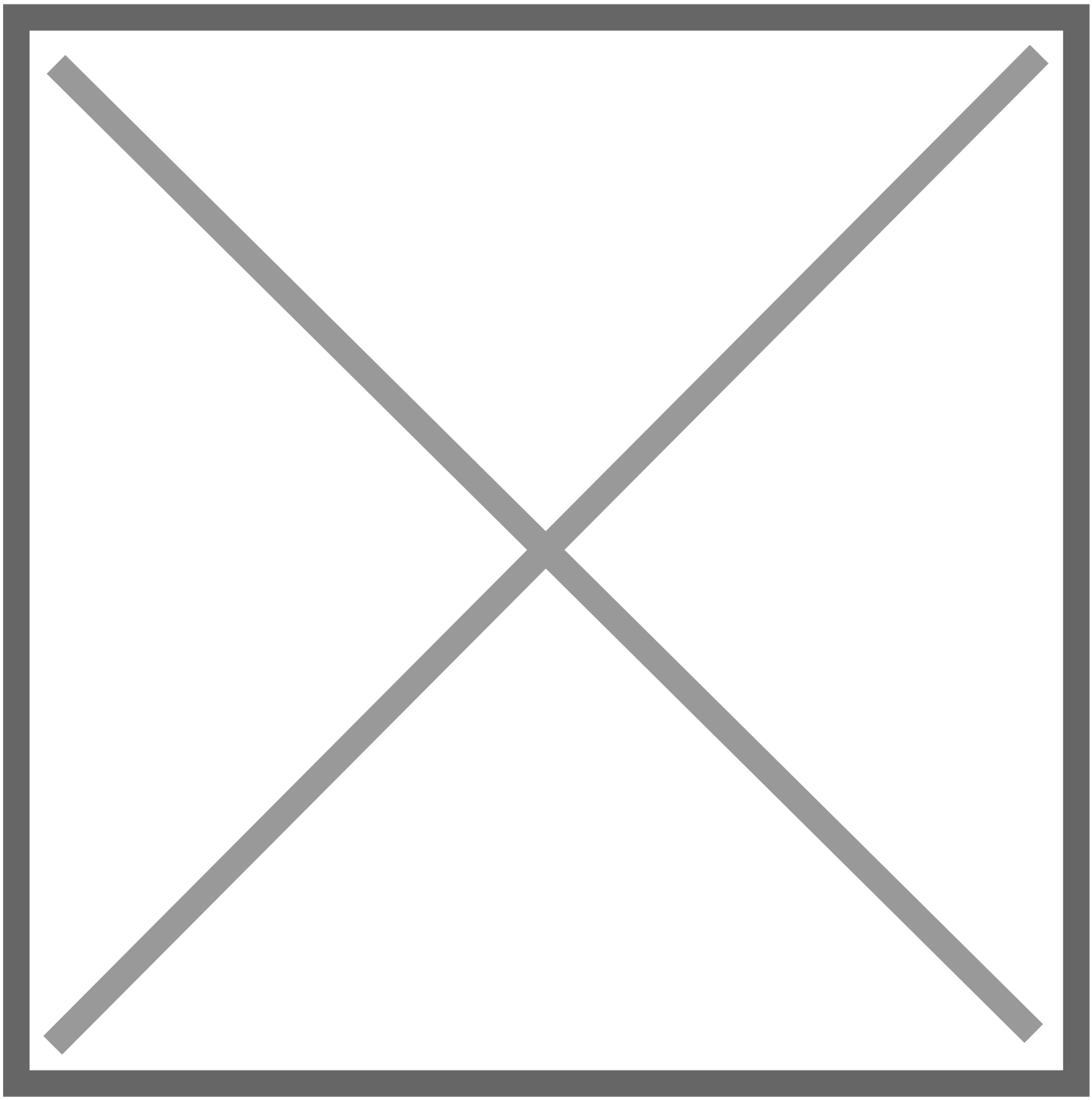
So far, statistical analyses have shown a significant improvement in hazard anticipation accuracy post training as measured by eye glances. In addition, 84% of the 53 participants increased the number of full stops at stop signs after training, compared to stop sign adherence before the training.

"Given our history in developing training programs for teens, we expected to see improvement in teen driving skills, but our expectations were exceeded when we saw the actual results," says Shannon Roberts, an associate professor at UMass-Amherst. "The next step underway is to confirm that the improvement in teen driving skills seen in the simulator translates to improved driving behavior on the road."

A Fresh Perspective

For Sun, working on Risk-ATTEND was exciting and rewarding.

"My previous experience involved what happens when the crash has already happened, but I think it's very important to help prevent that crash from happening both from the system level and from a driver perspective," he says. "I think it's very exciting if we work from the source to educate teens through the internet to enhance their skills and help decrease their risk of a crash— that would be beneficial for society, for the teens and for the families."



Broadening Accessibility
For Risk-ATTEND, the goal is to make the program accessible to the public and make it easier and more convenient for teen drivers.

“So, basically people need to set up a semi-professional environment with the steering wheel and everything else to make driver education happen, which is good,” Sun says of previous driver education programs. “We know it’s effective, but it’s not super accessible to the general public.”

He adds, “With the age of personal computers, cell phones, tablets, we want to do something that can be accessed on any personal devices through the internet, and teens from anywhere can access it at any time.”

Jason Hallman, the senior research manager for CSRC who’s been with Toyota for over 12 years, said working with the community is important.

“CSRC is uniquely an open and external entity within Toyota’s North American R&D Center where we’re finding new ways to enhance safe mobility with university collaborators and sharing what we learn openly for the entire safety community to benefit from it as an industry,” he says.

Community Support Is Essential

Working with education partners like UMass-Amherst was essential to bringing Risk-ATTEND to fruition. The institution was responsible for recruiting 53 participants between the ages of 16 and 18 with less than or equal to six months of licensure in the state of Massachusetts. Participants were exposed to a pretraining and a post-training drive of 10-15 minutes each in the simulator.

“UMass has a rich history of conducting impactful research on teen driver safety,” says Anuj K. Pradhan, an assistant professor at UMass-Amherst. “Toyota has been an amazing partner on this study. The company’s vision and resources allowed for creativity and rigor in the research, and because both teams spoke a common language of safety, the collaboration was a seamless and ideal one.”

Roberts agrees that it was a harmonious partnership. “Working with Toyota on this process was a pleasure,” she says. “In the beginning, we developed a straightforward plan to achieve our goals, and we were successful. Throughout the process, Toyota was consistent, supportive, and overall, a great partner.”

Additionally, Toyota worked with Discovery Education, a company that provides digital learning resources for schools, to develop a public-facing version of Risk-ATTEND on TeenDrive365 — a comprehensive program designed to promote safe driving habits and help put an end to distracted driving for teens.

“They’ve got deep expertise in how to reach the teen audience, and they were very instrumental in this,” Hallman says of Discovery Education’s expertise. “They are also helping to amplify this training into school systems.”

Discovery Education has worked with Toyota since the launch of TeenDrive365 in 2016.

“At Discovery Education, we nurture student curiosity by connecting the real world to the classroom,” says Amy Nakamoto, executive vice president of Corporate Partnerships at Discovery Education. “Engaging digital tools like the Toyota RISK-Attend self-paced module help students build critical skills and better prepare themselves for a future of possibilities.”

Together, all three entities created a training program that they hope will help make teens better drivers and decrease the number of car crashes within this demographic.

“Toyota provided the research-informed prototype developed by Toyota CRSC and the University of Massachusetts at Amherst, and we leveraged our expertise to design and build an engaging module for students,” says Nakamoto.

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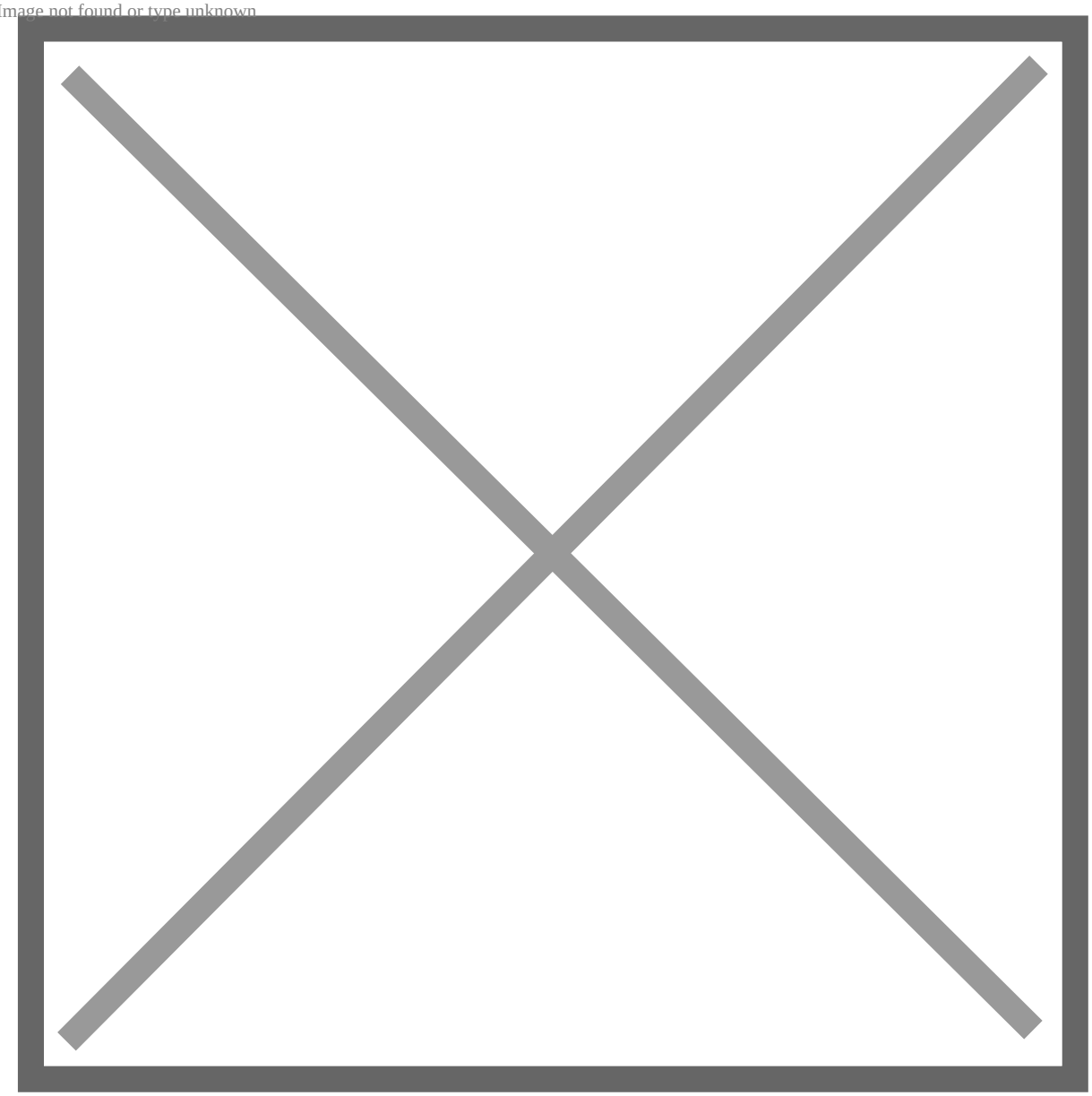


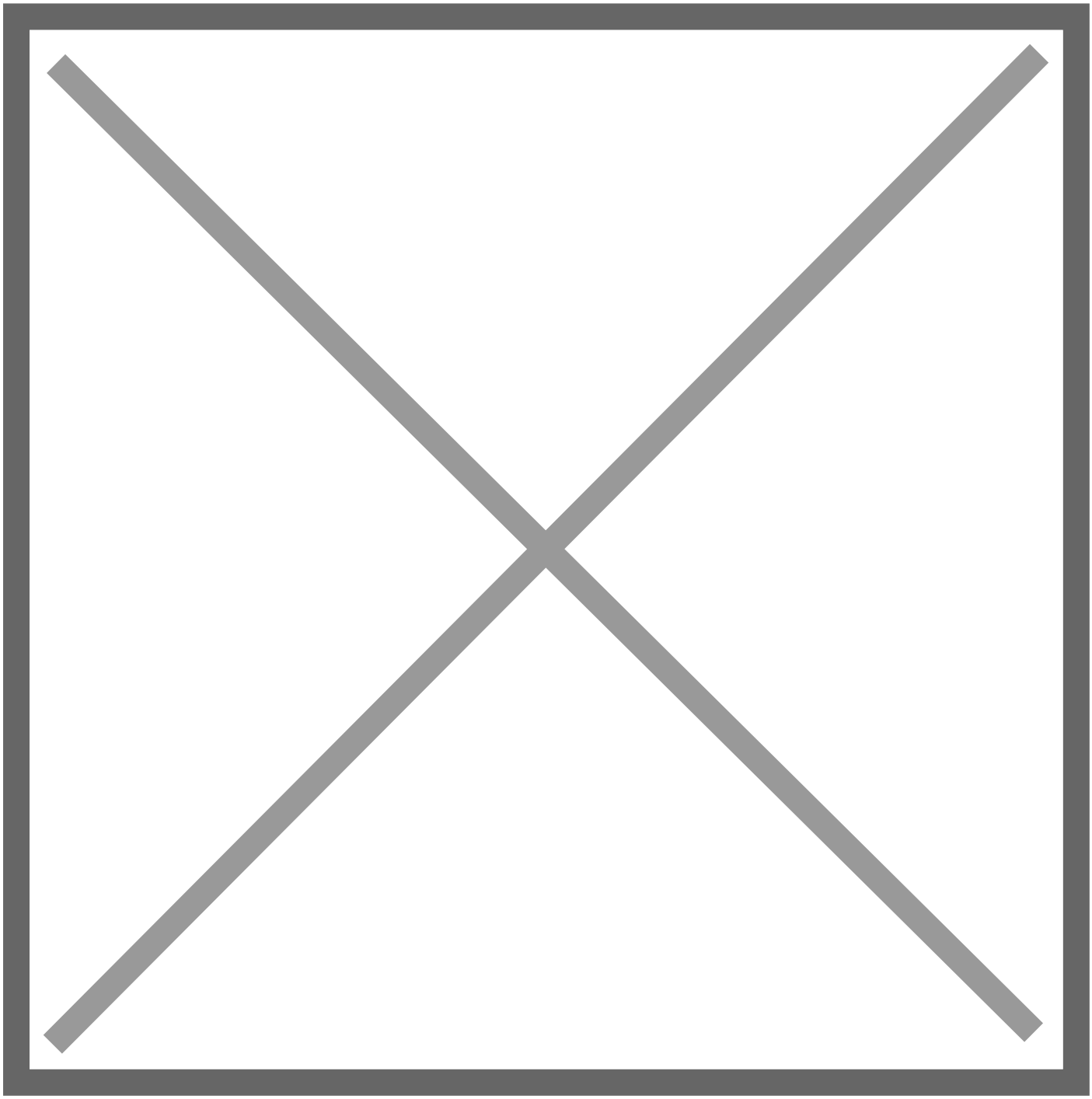
Evaluating the Data
Based on the initial findings, which show a vast improvement in hazard anticipation, Toyota believes the training program can help educate new young drivers.

“We proved it in the driving simulator by looking at the hazard anticipation forecast skills, which is calculated by various factors,” says Hallman. “For example, the gaze where their eyes are looking. We also know that the number of full stops at stop signs increased after training.”

During this evaluation process, participants wore eye-tracking glasses to track where the participant is looking and whether they’re looking at the scenarios or not.

“From there we can calculate and understand whether they’re actually anticipating the risk,” Hallman adds. “This is very different from the open platform we’re launching, because there we cannot track people’s gazes or where they are looking if they’re on their personal device. So, we just ask them to use the mouse to click where

the risk is. But we know this is an effective method. We have proved it through statistical analysis using eyesight and other proctors."



Setting Up the Scenarios

The team used data to determine what 13 driving scenarios would be the most beneficial for teens.

"Teens are more likely to be involved in certain types of crashes, such as failure to yield and run-off-road," says Hallman. "So, the scenarios that were picked emphasize those types of potential crash scenarios, like how

another vehicle exiting a hidden driveway might cause an inattentive driver to veer suddenly off the road to avoid a collision."

At the start of each scenario, participants are given an overview of what they're going to navigate through. For example, if there is a bus at the stop light on the left, but it's blocking the driver's view, they may not see any vehicles on the adjacent lane of the bus.

"So basically, if we turn left and we don't anticipate that an oncoming vehicle may be obscured behind a larger oncoming vehicles, we may face a sudden brake situation if we're very attentive or a potential collision if we're not being super attentive," says Sun of his favorite scenario in the program. "This is something hard to learn in the real world."

The training uses scenarios that are common but are typically hard to anticipate. It gives them the advantage of playing out potential risks in advance.

"To learn that from a natural perspective may take months and it could be after licensure for one year," says Sun. "If you're driving in a suburban or rural environment, you probably have never seen that. So that's very meaningful to anticipate where the risk would be and what could be blocking your sight and what could be in your blind spot."

Each of the scenarios is at an intersection or going around a curve. When the training starts, participants are presented with five images that go by quickly, and users must click where they should be looking. Participants' outcomes are explained at the end of each scenario.

Steering Teen Drivers in the Right Direction

Risk-ATTEND is also a program that could help parents and educators come together and teach the rules of the road to teens in an engaging way that's stimulating and straightforward.

"Interactives and self-paced modules meet today's students where they are, increase engagement and help with retention of critical information," Nakamoto says of the program. "It is my hope that every novice teen driver takes the module and increases their ability to spot and avoid hazards."

Roberts shares that sentiment. "Through the partnership with Toyota, thousands of teens will be exposed to Risk-ATTEND and will improve their driving behavior. My biggest hope for the Risk-ATTEND program is that it will continue to be effective in improving teen driving skills."