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Yazaki Corporation

HMI Design Challenge 2022 Group Winner

- Next-Generation HMI Design Proposal Contributes to Solving Trucking Industry Issues –

Yazaki Corporation (Headquarters: Minato-ku, Tokyo, President: Riku Yazaki), in collaboration with Accenture Song,[1] was named Group Winner of HMI Design Challenge 2022, an international competition co-sponsored by Epic Games and Car Design News (CDN). Yazaki earned the top place among all entries for its next-generation HMI (Human Machine Interface) concept, "Professional Driving Partner HMI."

About HMI Design Challenge 2022

HMI Design Challenge 2022 is a competition co-sponsored by Car Design News (CDN), a world-class car design media company, and Epic Games, a computer game and software development and sales company that produces "Fortnite," one of the most popular games in the world. The competition aims to present society with designs based on new ideas that use real-time computer graphics rendering technology to transcend the boundaries of conventional HMI expression.

This is the first time the competition has been held. More than 200 entries were received from around the world, and one entry each in the group and individual categories was selected the winner.

For further details, please see the Car Design News press release:
https://www.cardesignnews.com/interiors/winners-announced-for-the-unreal-engine-hmi-design-challenge/43052.article

Overview of the winning entry: Professional Driving Partner HMI

Challenges facing the truck industry

It is estimated that approximately 1.3 million people worldwide die in traffic accidents every year, and 74% of all serious accidents involve commercial trucks. [2] In planning this proposal, the causes of this issue were organized and extrapolated from the viewpoints of both truck drivers and transportation carriers. Large trucks have many blind spots and many points to watch out for while driving, so drivers are constantly under a great deal of stress. In addition, long-distance driving is a lonely experience, and driving conditions are evaluated using a point deduction system, making it difficult

for drivers to maintain their motivation to work. Carriers, on the other hand, need to anticipate road surface conditions, traffic congestion and various other types of information, and communicate this information to drivers at the most appropriate time. They also need to arrange the most appropriate vehicles for each load and make an efficient operation plan for the entire fleet under their management. To solve these issues, we have planned HMI designs for the next generation of trucks that will help reduce the psychological burden on drivers, improve their motivation to work, and help carriers formulate and execute stable transportation plans.

Features of the next-generation HMI

Aiming to solve the above issues, we have designed the following six HMIs that take advantage of the benefits of the "Unreal Engine" game engine, and in doing so, realize the concepts that led to the solution of the issues in the video.

	HMI concept	Functional description	Issue to be solved
1	Driver recognition and monitoring	Upon boarding, the truck automatically detects the driver and performs ID authentication and physical condition checks.	Roll call and alcohol checks can be performed in the vehicle to reduce the workload of the driver.
2	Auto pre-drive vehicle scanning	Truck automatically inspects each part of the vehicle to determine the safety of the vehicle and its surroundings.	Automatically perform pre-drive inspections and allow drivers to visually understand the inspection results to improve safety.
3	Route planning and communication	Drivers can communicate visually with shippers, other drivers, and their own vehicle's AI before departure.	Automatically reflect information shared by shippers and other drivers in the driving plan, leading to psychological relief for drivers and further improving the efficiency of delivery planning. This in turn contributes to improved fuel efficiency and more efficient driving.

4	Traffic forecasting, 3D visualization and re-routing	Distant traffic congestion information is displayed on the HUD (heads-up display) and the planned driving route is automatically searched again.	Drivers can intuitively grasp what is going on in the distance, leading to a sense of security while driving. In addition, this lowers the driver's workload by allowing the truck to automatically recalculate its driving route.
5	Safety alert via CGI simulation	If a motorcycle or other vehicle approaches the vehicle at a dangerous speed, the driver is visually alerted in advance.	By anticipating and visualizing the speed and potential danger of vehicles, drivers can perceive them at an early stage, leading to improved safety.
6	AI driving analysis and reward	After the driver has finished driving, the system displays the day's driving results and the driver's overall ranking on the truck, just like the results screen of a game.	By changing the driving evaluation from a conventional point deduction system to a point addition system, the driver's daily motivation to work will be enhanced. Feedback on driving results also leads to the improvement of driving skills on a daily basis.

Driver recognition and monitoring

Traffic forecasting,
3D visualization and re-routing

Commenting on the proposal, jury member David Leister, UI design lead at BMW, said:

"This was the most futuristic entry with nice ideas in regards to gamification and interior design (all digital). Also, the idea to use the windows for additional information and augmentation is really cool. Therefore, from our perspective it is the most complete package of all entries."

This proposal was created not only for its functional aspect of supporting safe driving by utilizing AI, sensing and visualization technologies, but also to motivate drivers to work by reducing their psychological anxiety, as well as to encourage women to enter the workforce.

Leveraging our many years of experience in developing and manufacturing HMI products, we will continue to promote the development of new products that will contribute to the safety of future society.

[1] Accenture Song has a team of creators and engineers equipped with the highest level of CGI image production technology. The company has produced visual effects for such popular dramas as "Game of Thrones," which used CGI to express an epic worldview, and in the case of a major automobile manufacturer, replaced 99% of its advertising materials, including new car configuration services, TV commercials, and catalogs, with CG based on its "digital twin" concept.

[2] Excerpted from an annual report by a U.S. government agency.