Networked lighting to eliminate auto blind spots

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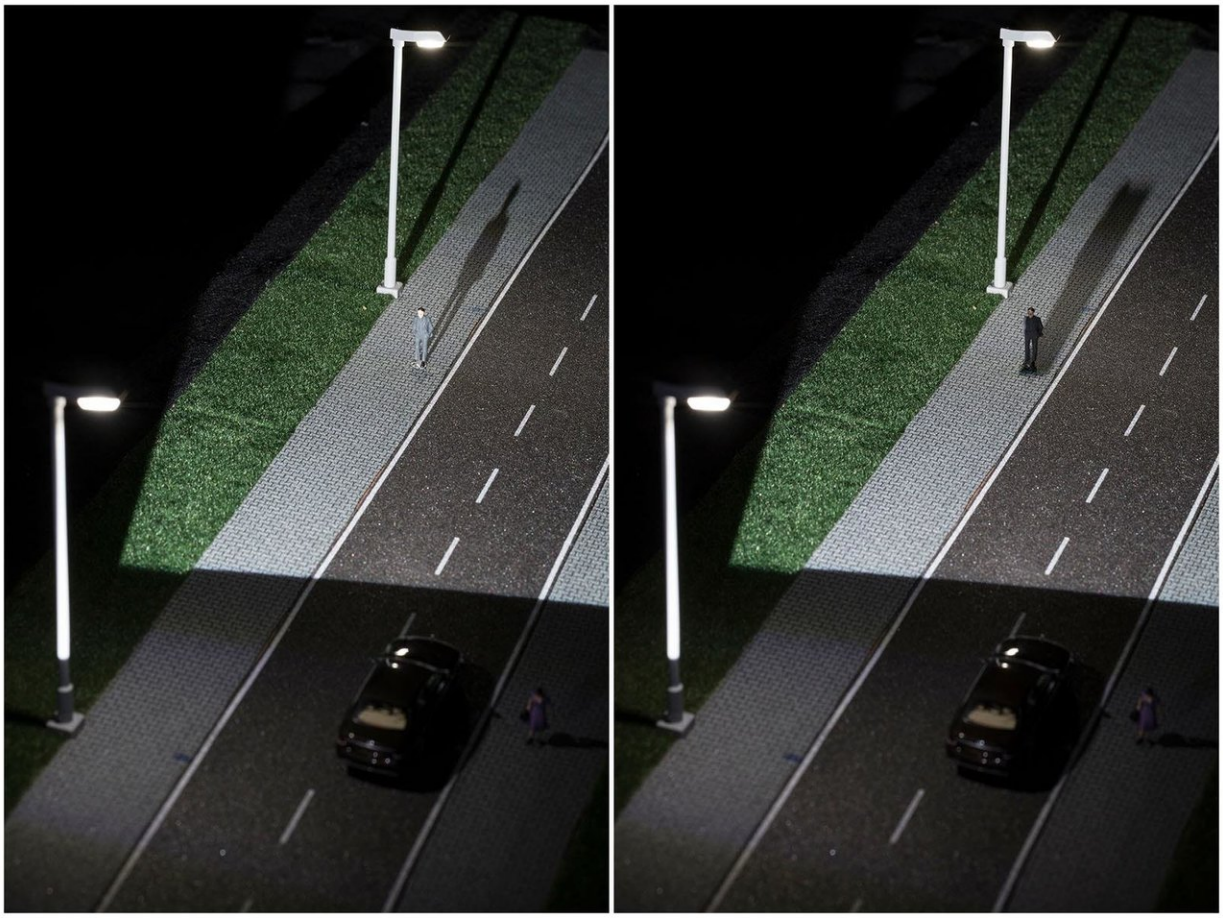

The camouflage effect (left) makes pedestrians invisible for car drivers in spite of good lighting. Smart interconnection of headlights and street lighting reverses this effect (right) and enhances safety. Credit: Markus Breig, KIT

It is a horror scenario for every driver: Suddenly, a previously invisible pedestrian comes out of the dark between two street lights or the shade of two parked cars. Researchers at Karlsruhe Institute of Technology (KIT) are working on a method to optimally adapt car headlights to local conditions with the help of external sensors that may be located at the roadside or in other vehicles.

When lighting conditions blur the contrast between an object and its surroundings, experts refer to it as the "camouflage effect." The human eye cannot perceive the object under these conditions. The same applies to camera eyes of autonomous vehicles.

The "Propix" (the acronym of projector pixel light) headlight developed at KIT's Light Technology Institute (LTI) a few years ago was the point of departure of the scientists. Propix can adapt its light distribution to the environment, i.e. suppress certain areas completely, whereas others are illuminated brightly.

Now, the researchers are working on interconnecting Propix with other ultrasonic, radar or lidar (using laser radiation instead of radiowaves) sensors on the car. In case the sensors detect an obstacle located in a blind spot of the eye or camera, the headlight will react autonomously and illuminate the spot or dim the light. "By combining stationary street lights with variable headlights, optimum visibility will be achieved," Professor Cornelius Neumann, Head of LTI, says.

And the goal is far more ambitious: Propix control is to be supplied not only with information from sensors on the driver's vehicle, but also from sensors onboard other vehicles or at the roadside. "The challenge consists in the interaction between the different sensors and the headlights," Neumann says. In human terms, the scientists want to equip the car with additional sensory organs. "No matter whether we see a person coming our way or we only hear this person's steps, the

information is the same: Somebody is approaching us," Neumann explains. "If we can equip a car accordingly, we can make road traffic safer."

The researchers plan to test their new technology on the Baden-Württemberg Test Area for Autonomous Driving that was opened in Karlsruhe in May this year. The project OpEr (Optimization of visibility of pedestrians based on interconnected infrastructure), hence, will be one of the first research projects executed on this area.

Provided by Karlsruhe Institute of Technology

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