
Improved Automated Vehicle Obstacle Detection in Bad Weather and/or Low Light

Background

Automated vehicles exclusively depend upon sensors for safe navigation. Unfortunately, bad weather and low light limits sensors' obstacle detection. To overcome this limitation, more advanced auto manufacturing companies are developing matrix (color) lights composed of tens to hundreds of LEDs that are switched on and off with altered luminosity levels. However, even advanced systems still fail to detect an obstacle(s) in low visibility conditions.

Innovation

The innovation detects one or more objects in a vehicle imaging system while externally located to the vehicle. The system trains a first neural network to detect objects in a color video stream. An infrared (IR) second neural network is coupled to the color neural network and the IR video stream. A pixel-level invisibility map is generated from the color video stream and the IR video stream by determining differences between mid-level color features at the first neural network and mid-level infrared features at the second infrared neural network. The result is coupled to a fusing function. If both color and IR lights cannot ascertain the absence of obstacles, the system lights up the appropriate IR lights and LEDs using the vehicle's automation. The resulting combined IR-Color matrix light provides the best obstacle detection for poor visibility conditions.

Advantages

- Superior obstacle detection system in poor visibility conditions (bad weather and/or low light)
- Improved automated vehicle safety
- Compatible with vehicle's on-board controller system.

Stage of Development

Research Prototype