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Intelligent Smart Real Time Vision (ISRTV) as an Embedded System for Advanced Applications:" A Student Educational Platform on Vehicle Collision Avoidance and Driver Safety

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Abstract

Vehicle technologies can be designed to reduce the number of crashes and save thousands of lives every year. Today, technological advances have brought to the forefront a new generation of intelligent devices that exemplify a breakthrough in driver safety and collision avoidance sophistication. Although today's vision devices are capable of capturing images, the implementation of Intelligent Smart Real Time Vision (ISRTV) devices will capture/detect high-level descriptions of a scene and analyze object movement (Figure 1). These devices could support a wide variety of applications including human/animal/object detection, surveillance, motion analysis, and facial identification. The use of Intelligent Smart Real Time Vision devices as embedded systems inside a modern vehicle can minimize driver distractions and significantly improve driver safety. This development of automotive real time visioning sensors are widely utilized by the majority of the OEMs. Consequently, educators are redesigning curricula to prepare students for positions requiring the skills to solve advanced real-world automotive safety challenges. The objective of this paper is to develop a multi-discipline ISRTV diverse student education platform on vehicle safety and collision avoidance, focusing on embedded systems through the integration of acoustic cameras, as a real time visioning system with control algorithms.

Keywords

Collision avoidance, Real time vision devices, Embedded Systems (interconnected device), Driver Interface, and Data Analytics.

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Biography

Dr. George P. Pappas is an Assistant Professor of Electrical and Computer Engineering at Lawrence Technological University, Southfield, MI, USA. He has also taught Biomedical Engineering courses in biomedical devices and imaging processing. He has over 10 years of teaching and research experience in embedded systems. He has been the PI for a resent DENSO grant in machine vision safety system in vehicles. He is with the Electrical and Computer Engineering Department since 2016. He received his masters and Ph.D. from Oakland University, Rochester MI, USA. He has taught and mentored students in the areas of embedded systems, encryption and security, imaging processing in medical and automotive applications, microcontrollers, High-Performance Computing systems, artificial intelligent and machine learning algorithms.

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