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Electrical & Computer Engineering News

Georgia Southern University

Intelligent Vehicles Research Presented at 2015 GURC Conference

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Electrical Engineering undergraduate students, Imani Augusma and Mary Thomas, presented their research findings on Intelligent Vehicles at the 2015 GURC conference on Nov. 2015. Their research consists in the design and development of an autonomous navigation vehicle that has capabilities to drive independently and cooperatively on roads. The vehicle was built using differential drive mode, an Arduino microcontroller, ultrasonic sensors, infrared sensors, and wireless transceivers. The main goal of the project is to have an intelligent vehicle that will be able to drive autonomously on the roads and will increase road safety, lower congestion rates, and decrease CO2 emissions.

The intelligent vehicle relies on a high performance microcontroller and sensor information obtained from the environment to make appropriate decisions to ensure its safety and the safety of neighboring vehicles. Ultrasonic sensors that emit longitudinal mechanical waves (40 kHz) and receive echoes to detect obstacles were used. Also infrared sensors equipped with LEDs and a bipolar transistors that detect change in light intensity were utilized to identify road lanes. A microcontroller that performs calculations to compute distance and implement the adaptive cruise control was included. Wireless transmitters and receivers (433 MHz) perform vehicle-to-vehicle communication, and the vehicles communicate their current speed and acceleration to each other in order to maintain a constant distance and avoid collisions and traffic congestion.

Imani and Mary are part of the student's research teams working in the Robotics and Intelligent Operation Systems (RIOS) Lab where Dr. Fernando Rios and Dr. Alba Flores are the faculty researchers. The present research projects in the RIOS Lab include:

- EMG signal detection for the development of human-robot interfaces.
- Efficient energy use for autonomous robot applications
- Mimicking robotic arm
- Fuzzy Logic controller for autonomous navigation
- Humanoid robot controller for human-robot interaction
- Classification of EMG signals for prosthetic applications
- Robot control using inertia sensors
- Gesture identification for the control of manipulators

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