Autonomous Robotic Vehicle Earns Student IEEE Scholarship

Her project aims to improve the transportation system

By JOHN R. PLATT 19 August 2011

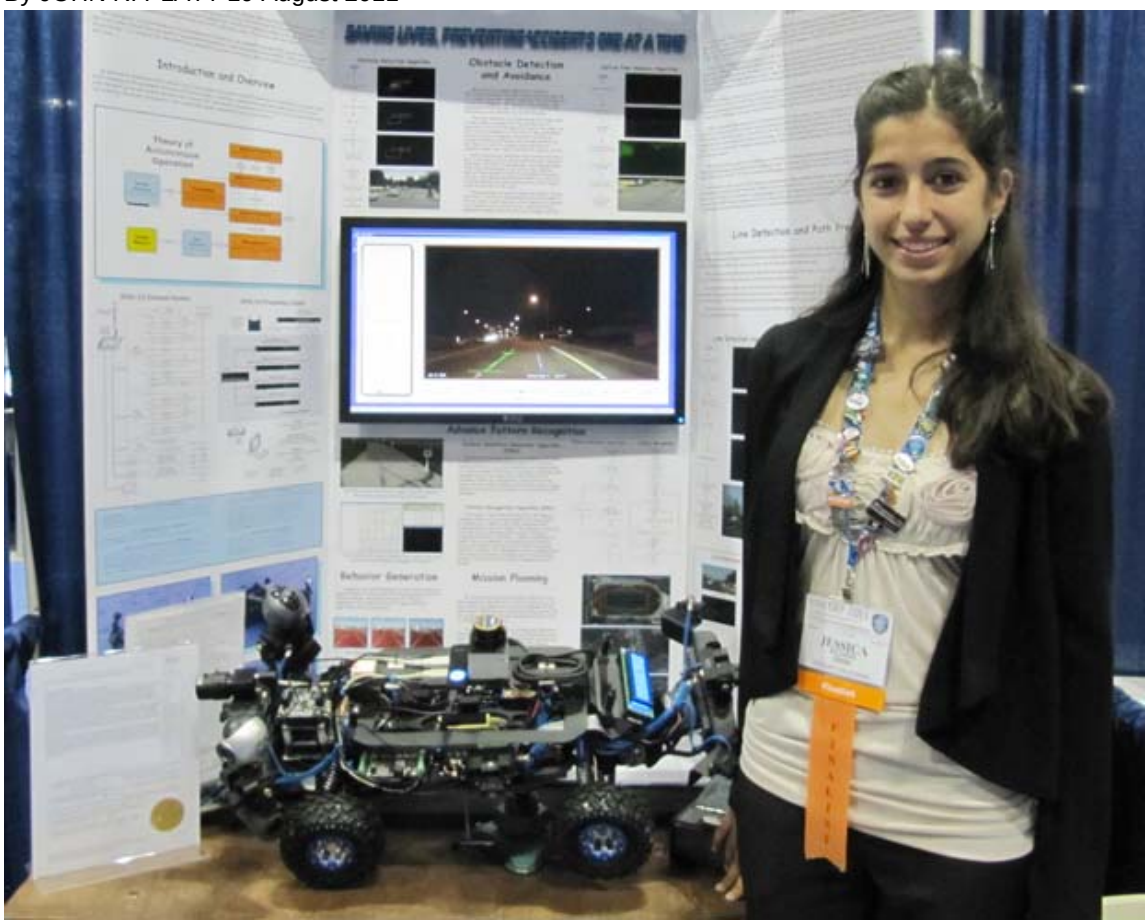

PHOTO: Lynn Bowlby/IEEE

If you think the roads are crowded now, imagine what they'll be like in 2030. Earth's population is expected to top 9 billion people by then, with twice as many cars on the roads around the world as there are now. We likely to have many more accidents and fatalities to go with all that traffic.

Concerned about such issues, high school student Jessica Richeri, 17, looked for a solution in the form of a smarter transportation system. After three years of work—yes, she began at age 14—and 20 000 lines of code, she developed an autonomous vehicle able to recognize and avoid obstacles and, hopefully, prevent accidents. Unlike previous robotic vehicles, Richeri's can adapt to its environment without first knowing the details of the landscape on which it is traveling.

Richeri's project, "Autonomous Robotic Vehicle: Saving Lives, Preventing Accidents One at a Time," earned her the 2011 IEEE Presidents' Scholarship. She received the recognition at the Intel International Science and Engineering Fair in May in Los Angeles.

Richeri has since graduated from Centennial High School in Corona, Calif., and is enrolled in the electrical engineering program at Carnegie Mellon University, in Pittsburgh—which she starts in September.

Administered by IEEE Educational Activities, the US $10 000 scholarship from the IEEE Foundation is awarded annually to a high school student who creates a project that demonstrates understanding of an IEEE area of interest. The amount is payable over four years of undergraduate study, and the scholarship includes complimentary IEEE student and society memberships during the four years. The winner also receives a certificate and a plaque.

Meanwhile, Richeri came in third in the Intel fair's electrical engineering category. That means she also received an $8000 scholarship from the U.S. Office of Naval Research and a $1000 award from the IEEE Computer Society.

SEVERAL STARTS

The base of her vehicle is a large, off-the-shelf, radio-controlled toy car, to which she added an array of infrared sensors and a light detection and ranging (LIDAR) optical sensor, as well as a camera with a variable-focus lens. She added four HP DL360 servers, which help control the image processing and the vehicle's steering angle and speed. The onboard hardware was connected to a tablet computer.

Richeri created software modules to handle pattern recognition and obstacle detection and avoidance. She also installed Google Earth, a 3D mapping program that provides geographic models of streets and landscapes around the world, so the vehicle could map out its own route when given beginning and ending GPS coordinates. All data was transmitted from the HP DL360 servers to the vehicle wirelessly.

In demonstrations during the Intel fair, Richeri's vehicle avoided obstacles placed on a closed track. When lanes were blocked, the vehicle navigated around the obstructions. When all lanes were blocked, the vehicle stopped. When it could proceed, the vehicle completed the course, ending at a predetermined GPS position.

The total cost of her vehicle, including its added electronics, was $4000.