

AE298: Undergraduate Research Mentoring

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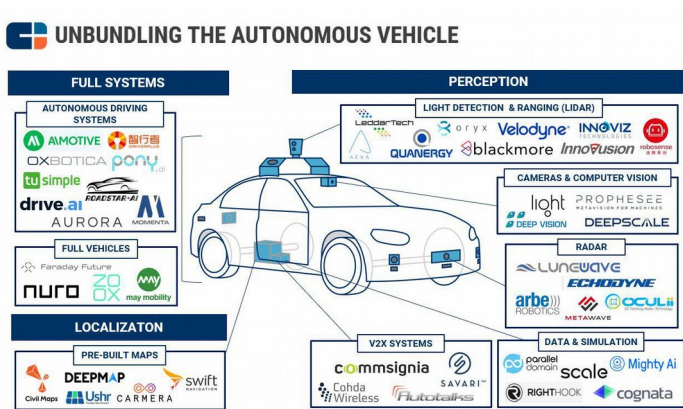
Project Summary:

We are working on the John Deere R-Gator Vehicle which was recently donated by the Deere & Company. For this research project, we would like to upgrade and turn it into full-fledged modern autonomous off-road vehicle. Currently, the autonomy systems on the vehicle are more than 10 years old and cannot handle the modern control and machine learning algorithms. By participating our research, you will be able to find opportunity to familiarize yourself with autonomous vehicle.

Opportunities For Students

Student 1: Autonomous Vehicles System Analysis

Autonomous vehicles are highly complicated systems composed of many subsystems, such as perception systems, localization systems, control systems, high-level control systems, mapping systems, etc. This opportunity is about system engineering research and autonomous vehicle technology. You will learn to analyze alternatives for the subsystems and create a high-level system block diagram, as shown in the following picture on the left, for the R-GATOR shown on the right. You will do the same thing for R-Gator platform.



Expectations and Requirements:

- 1) 2/3 hours commitment every week.
- 2) Interest in Technology, such as computers, cameras, etc.

Student 2: Concept Remote Control Software Development Using Open Source Libraries

You will develop a remote controller(joystick) using open-source libraries on the web. This will be a concept development based on Raspberry Pi or Arduino. Your code will be used as a starting point for the ultimate software stack for R-GATOR's remote control system. You will gain insight into MQTT Communication protocol, Raspberry Pi, and Pi Shields.

Expectations and Requirements:

- 1) 2/3 hours commitment every week.
- 2) Working knowledge of Python Programming Language
- 3) Interest in Autonomous Vehicle Technology.

Some Photos of Our Platform:

Currently, our vehicle is located at the UIUC Research Park IRL Facility.

