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Abstract

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Major: Electrical Engineering

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Autonomous Vehicle Project

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The technological future containing autonomous robots that we once dreamed of has been realized. This work presents the electrical control and autonomous navigation system of a tracked vehicle. A team of three Electrical Engineering seniors have implemented the hardware and software required to produce a functional autonomous robot as a Senior Design project. The robot has many subsystems designed to autonomously navigate the obstacle courses at the 28th Annual Intelligent Ground Vehicle Competition (IGVC), representing the WIU School of Engineering. The completion of this project relied on strategic planning and was broken into multiple phases--research, design, and prototyping. The required functions of the robot were determined by following the established IGVC rules and guidelines. Extensive research has been done for the various hardware and software solutions that provide these functions. The design consists of three main components; a mobile base, power source, and a virtual driver. The chassis and mechanical hardware make up the mobile base, powered by batteries. The driver is made up of a computer, sensors, and software. The sensors provide sensory information in the form of measurements. The computer, as the driver's brain, handles sensor data, message passing, logical operations and hardware communication--all of which enables autonomous decision making while navigating the obstacle course. The preliminary results are presented and discussed, which met most of the project objectives. The future work is also presented so that the robot can be fine-tuned for the competition.