INTELLIGENT GROUND VEHICLE

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Goals and Objectives

Design an autonomous ground vehicle that can compete in the Auto-Nav challenge of the IGV competition

Objective:
• Demonstrate functionality by reading average velocity of 1-5 mph
• Obstacle avoidance with the use of IR sensors and cameras for line tracking
• Capable of carrying a 20 lb. payload

Requirements
• Must be a ground vehicle
• Between 3 and 7 feet long
• Between 2 and 4 feet wide
• Less than 6 feet tall
• Vehicle must propel itself with no remote fuel storage
• Must maintain an average speed of 1 mph for 44 ft.
• Must be hardware governed to have a max speed of 5 mph
• Mechanical E-stop, that shuts down the hardware of the robot.
• Must have a wireless E-stop, effective from 100 ft away.
• Must have a easily seen indicator light to show when it’s powered on.

Timeline

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Wiring Diagram

Progress and challenges

• Due to the size of the team, a collective effort was taken to design or redesign every system of the ground vehicle.
• Began by completing Python tutorials. Tested individual components from last year’s team.
• Chassis, control arms and wheel hubs were redesigned using 1” x 1” 6061 Aluminum square tubing. Keeping the expenses under budget.
• Ready to test motors to demonstrate movement capability and functional code.

Future works

• Register for competition and prepare required reports
• Implement all design changes and manufacture redesigned components
• Connect camera to Jetson Nano to begin route tracking
• Add video recognition software to detect lines
• Establish electronic componentry location and mounting
• Integrate ESC and ultrasonic sensors into one control system and begin testing IGV