The Race of Doom

DESIGN DOCUMENT

Team #44
Client -- Timothy Bigelow (bigelow@iastate.edu)
Advisers -- Timothy Bigelow (bigelow@iastate.edu)
Team Members/Roles -- Zechariah Mundy, Vincent Quattrone, Simon Aguilar, Taylor Moore, Chris Agyare, Jaxon Dennis
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Executive Summary

Development Standards & Practices Used

IEEE 829	Software Test Documentation
IEEE 1028	Standard for Software Reviews and Audits
IEEE 1074	Software Development Life Cycle
IEEE 1547	Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
IEEE 2050	RTOS for embedded systems standard
IEEE C37.2040	Standard Cybersecurity Requirements for Substation Automation, Protection, and Control Systems
IEEE 260	Standard Letter Symbols for Units of Measurement

Summary of Requirements

- Design an autonomous vehicle capable of navigating a track while avoiding traps and competing with other vehicles.
- Ensure the vehicle can respond to remote control for speed adjustments.
- Implement onboard sensors for autonomous steering.
- Address potential hacking attempts on the control system that could lead to crashes.

Applicable Courses from Iowa State University Curriculum

CprE 288

EE 230

EE 201

CprE 437x

CprE 185

CprE 186

CprE 381

New Skills/Knowledge acquired that was not taught in courses

Professional Communication

Safety Training for Machine Shop

Woodworking

3D modeling

Money management

Table of Contents

1 Team

1.1 Team Members

1.1.1 Zechariah Mundy, Vincent Quattrone, Simon Aguilar, Taylor Moore, Chris Agyare, Jaxon Dennis

1.2 Required Skill Sets for Your Project

Professional Communication

Safety Training for Machine Shop

Woodworking

3D modeling

Money management

Wiring

Programing

1.3 Skill Sets covered by the Team

Taylor – I have experience with power tools, woodworking, metalworking, and welding, in addition to experience in project management.

Chris - I have experience with understanding circuit components and when to use them. In addition, I have the knowledge of programming Audinos for any device we need.

Jaxon - I have experience with Arduinos, circuit design, CNC machining, programming: C, and soldering.

Vince – I have experience in wireless cybersecurity systems such as RF and Bluetooth. Experience in cryptography, and network intrusion. I also have experience in the following languages: C/Embedded C, Java, Python, and C++.

Zech – I have experience with the programming languages: Java, C, Python, and Assembly. My skills also include my experience with soldering, power tools and modeling software. I'm also familiar with wireless communication technologies including both Wi-Fi and Bluetooth

Simon – I bring my knowledge of programming acquired at DMACC and ISU languages: C, C++, Java, Laber, HTML, MySQL, Swift, Mango DB, and JavaScript. Also, my skills in woodworking, soldering, and wiring.

1.4 Project Management Style Adopted by the team

Modified Agile

1.5 Initial Project Management Roles

a. Team organization: Taylor
b. Team Representative/client interaction: Taylor
c. Testing: Chris / Vince
d. Component Design: Zech/Jaxon