Trinity College Fire Fighting Robot Contest
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Abstract
The goal of this robotics project was to design and develop a robot that could be used to lower the number of injuries and deaths from house fires. To accomplish this goal, the robot competed on a track designed to imitate the layout of a home. The robot began the competition at the sound of a simulated fire alarm and then autonomously navigated through the home to extinguish the flame and return to its starting position. The 2016 Trinity College Fire Fighting Home Robot Competition was April 1-3 in Hartford, Connecticut. The robot competed in the Senior Division.

Problem Statement
The robot needed to meet several goals including:
• Start at a 3.8KHz signal and only a 3.8KHz signal
• Autonomously navigate the course at a competitive speed
• Avoid hitting walls, dogs, furniture, and the candle
• Identify a heat source and reliably navigate to the heat source
• Extinguish the flame using a versa valve and CO₂ canisters

Results
The robot was able to navigate to all four rooms of the house regardless of setup. The robot was able to find, navigate to, and extinguish the candle in a reliable manner. The robot met all competition requirements to have passed tech inspection.

Acknowledgements
Thank you to Mark Randall, Christina Howe, Jeff Cron, AFB, and The University of Evansville for their funding, guidance, and support.

Design Process
Choose and Implement Hardware for Robot Navigation
Write and Implement Navigation Software
Choose and Implement Fire Detection Capabilities
Add Fire Suppression Capabilities

The Robot: Florian

Software Outline
Start
Detect three and other PWM
Initiate Sensors and Motors
Begin Driving on Fire Alarm
Check Rooms for Fire
Is there a fire?

Yes

Return Home

No

Indicate location of Fire - Put Out

End