Trinity College Fire-Fighting Robot Competition
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Abstract
The Trinity College Fire-Fighting Robot Competition requires robots to be autonomous with a goal of reducing the risk of lives when putting out fires. The competition tests each robot by requiring them to be adaptable to different maze layouts that are house replicas. The trials are started upon detection of a 3.8 kHz tone intended to resemble a fire alarm. The robot must then maneuver through the maze, searching for the flame, and extinguish it for a successful trial.

Problem Description
Robot must be able to accomplish the following:
- Recognize and start upon detection of a 3.8kHz +/- 13% start tone
- Autonomously navigate the maze within the allotted time limits while avoiding obstacles
- Locate a fire source within the maze and extinguish
- Function with battery power
- Adapt to different scenarios and maze orientations

Hardware and Software Flow Diagrams

Conclusion/Results
Aang the Firefighting Robot is able to accomplish the following:
- Start within a room and exit earning the arbitrary start multiplier
- Detect a 3.8 kHz tone using a 6th order elliptic bandpass filter
- Navigate the maze utilizing a right wall following algorithm
- Detect when a room has been found
- Recognize if a fire has been found within the room
- Hone in on fire location within room and extinguish

3-D Designed Components
UVTron Cover
Carrying Handle Cover
Robot Chassis
Line Sensor Holder