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Project Title

A Novel Approach to Detecting Fires

Abstract

Objectives

Fires are one of the deadliest natural disasters. Employing an efficient fire detection system can help save lives and property. This experiment is testing the efficacy of a fire detection system which employs an Arduino and a temperature sensor. The question is that can this Arduino-based fire detection system decrease the response time to fires. The hypothesis is that this fire detection system will decrease the response time to fires.

Methods

To conduct the experiment, first the Arduino 1.8.8 software, the Dallas Temperature and OneWire files were downloaded to the Arduino library. The code was created in the software editor and was uploaded to the Arduino IDE. The Arduino was then wired to the temperature sensor. The temperature was monitored on the serial monitor in the Arduino software. The temperature sensor was dipped in water heated to 130 degrees. The time taken by the sensor to heat from room temperature to 120 degrees was recorded. The experiment was repeated two more times. The data was analyzed. The control was the response time to major US fires.

Results

In this experiment, it was observed that the response time was much less using the fire detection system employing Arduino and temperature sensors compared to the control major US fires (The Camp Fire, the Woolsey Fire, and the Hart Lake Fire). With this detection system, the average time was 150 times less than the detection time for the Camp Fire, about 14 times less than the detection time for the Woolsey Fire, and about 164 times less than the detection time for the Hart Lake Fire. This shows that this Arduino-based fire detection system drastically reduced the response times.

Conclusions

In conclusion, the hypothesis was supported. This technology is viable for use in the future in the firefighting industry. In future, a system can be designed to link all these units and spread them in wilderness and connect to the monitors in fire stations or police stations. A fire detection system using drones and a color sensor, or a carbon dioxide sensor can be designed as well. Docking points for these drones and charging them using solar panels can further help. Finally, a system design that alerts when the temperature is above a baseline in an area can help locate areas that are at risk of a fire.

Summary Statement

I created and tested an Arduino-based fire detection system employing a temperature sensor.