CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)	Project Number
Rashi Ranjan	35756

Project Title

Infant Car Alert System

Abstract

Objectives/Goals

Since 1990, over 747 children (on average 31 per year) have died from heat stroke when left alone in a vehicle. This is an alarming situation, so I decided to solve this problem, by designing a low-cost programmable device called iCAS. The objective of this device is to save infants when left in the car by tracking their presence and alerting via text message and alarm once the temperature exceeds the limit.

Methods/Materials

I used an Arduino development board attached with four sensors and a switch. When the baby is placed in the car seat, iCAS is activated due to a switch. The temperature sensor senses the ambient temperature inside the car and my code checks if it is above the threshold (82 degrees Fahrenheit) set. When the temperature is out of range, the Doppler sensor, which uses microwave frequency signals to detect a moving object, checks if a living body is in the car seat. If conditions are not met, the program goes back to checking for the temperature. As soon as both conditions are met, the alarm is sounded and a text message is sent, utilizing the GSM Cellular Shield, to all emergency contacts.

Results

My device was tested in a hot car with a model baby. (I shook my hand to activate the Doppler Sensor.) My computer was connected to the device to capture the output of all the sensors. All 5 trials showed that as soon as the temperature was out of range and motion was detected, the text message was sent and the alarm sounded. An external thermometer was also placed in the car to make sure the sensor was reliably sensing the ambient temperature.

Conclusions/Discussion

My final solution satisfies all the objectives. iCAS is $48, a price that fits the budget of an average parent and a price any parent should be willing to pay for the safety of their child. The device is small and can be attached to any car seat without expert help. As of now, phone numbers must be hardcoded in the sketch, but in the future, I will make it easy for users to update the phone number using a website or app.

Summary Statement

The Infant Car Alert System is an inexpensive, programmable, reliable device to prevent child deaths due to heat stroke in vehicles.

Help Received

Father helped in making GSM Shield send text message; Teacher provided mentoring and guidance