CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

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Project Number

38745

Project Title

Smart Burglar Alarm System Utilizing Open Source Hardware and Web Services

Abstract

Objectives/Goals

To construct a smart burglar alarm system that is capable of voice recognition using affordable open source electronic hardware, Arduino and Raspberry Pi, and publish the design to be used by the open source community.

Methods/Materials

My burglar alarm system, built on an Arduino controller board, incorporates a motion sensor which, when detecting motion, will set off an alarm consisting of a loud buzzer and a bright LED light. The alarm can be deactivated by two different ways: (1) entering a secret code through a keypad; or, (2) saying a secret phrase recognized by the Voice Recognition Module powered by the Raspberry Pi and Google Voice Kit. C and Python were used in programming.

Results

Making the system work reliably and integrating web service APIs were the most challenging parts. Each functionality such as motion detection, voice recognition, and alarm deactivation was first tested separately and then together in the final product. For each round of tests, I refined the code and improved the design until the alarm system became fully functional.

Conclusions/Discussion

My burglar alarm worked successfully according to my design goals of using open source hardware and low cost electronic components. My use of web service APIs helps add complex functionalities, such as voice recognition (I plan to add face recognition and text messaging in the next version). I published my design on Instructables.com for educational purposes. By combining different technologies and understanding the capabilities of each, I can create something more useful than what a single technology is capable of.

Summary Statement

I created a functional smart alarm system utilizing different open source hardware technologies and powerful web service APIs capable of providing sophisticated functionalities.

Help Received

I followed the Engineering Design Process introduced to me by my science teacher. My mom and dad helped me buy the components for the system. My thanks also go to my sister who helped proofread my notebook.