Autonomous Home System

By: Raunac Bhuiyan and Graham Jabeguero

Table of Contents

General Overview

- Purpose: A smart home device that is non-intrusive
- Target Audience: Homeowners

Figure 1: Project

Block Diagram

A smart home device with 9 features (i.e. 9 subsystems)

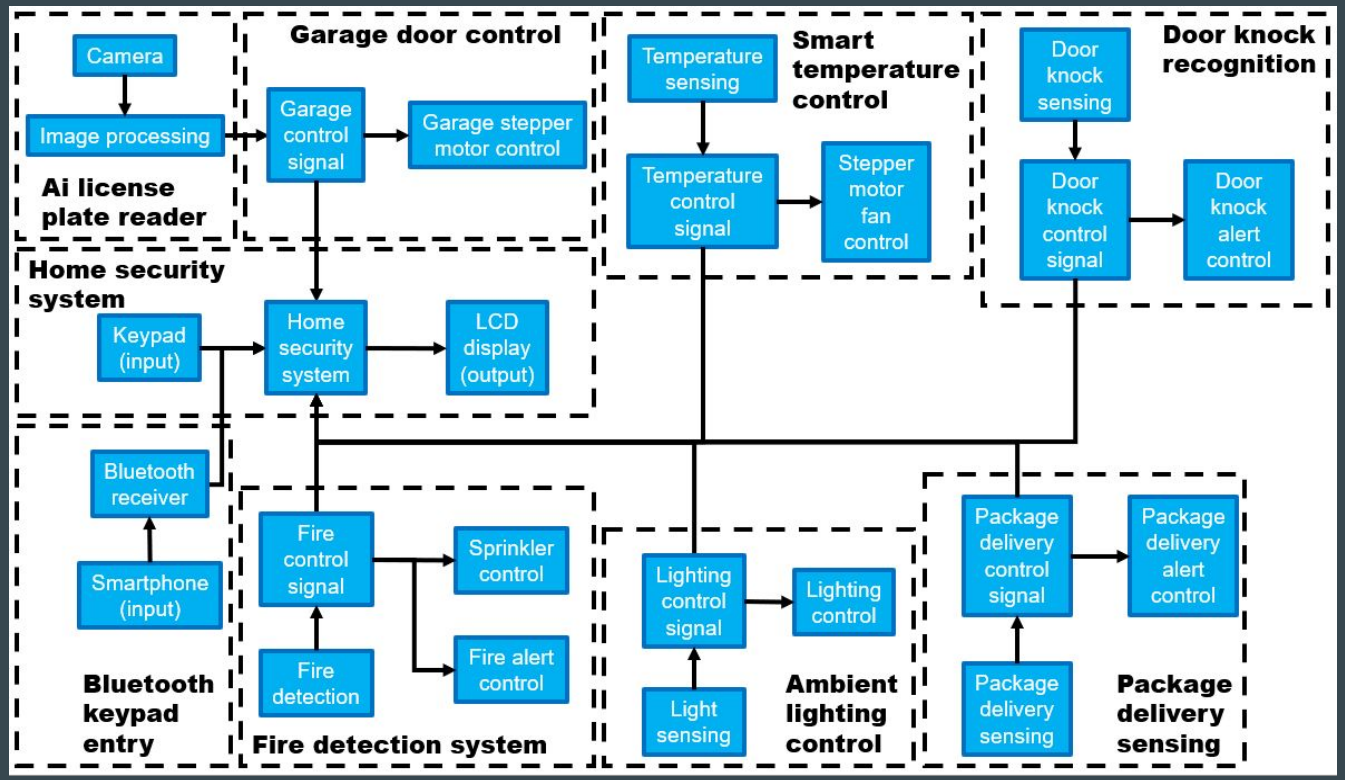


Figure 2: System

Development Cost vs Actual Cost

- Development Cost: $397
- Product Cost: $341

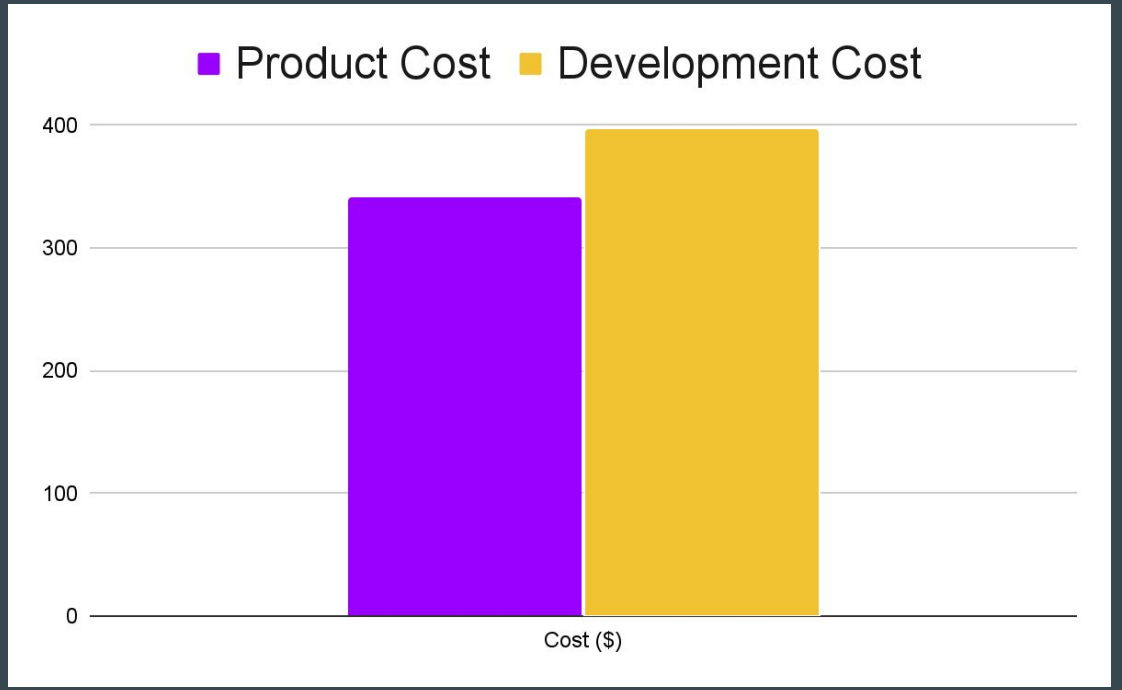
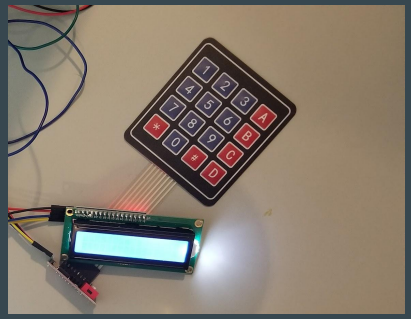
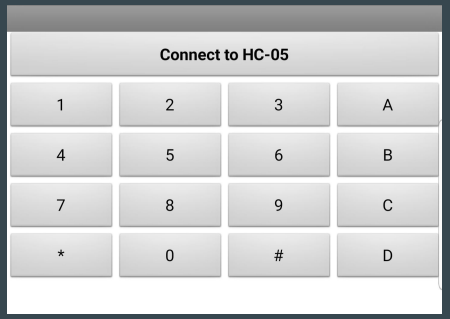


Figure 3: Costs

Industry Standards

1. I2C/Bluetooth Communication



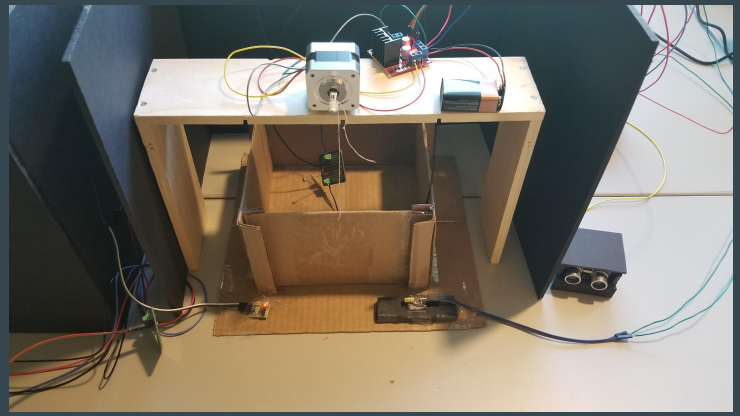


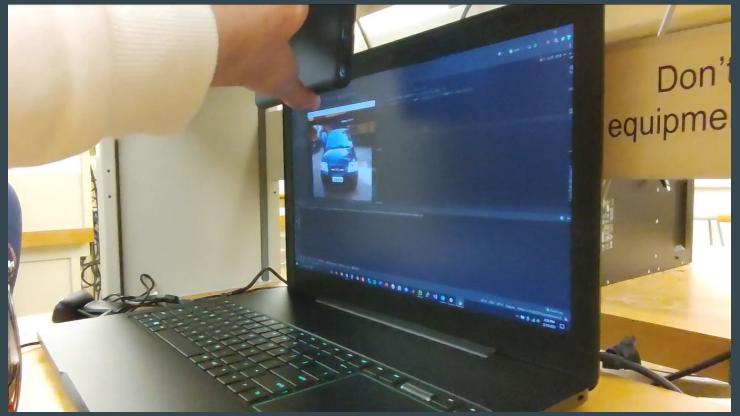
Note: Created with MIT App Inventor

2. Serial Communication via USB

AI License Plate Recognition + Garage Door System

- Python controls the sonar sensor and camera
  - Camera takes picture of car's license plate
  - The picture is processed and signal is sent to Arduino
- Arduino controls the garage door
  - After signal is received from Python, the garage door will open or remain closed





Technical Challenges

- Integration of every subsystem
  - Ex. Door Knock System interfered with the other systems, and etc...
  - Solution: Remove ‘while loops’ from code

- Transitioning hardware/parts from breadboard to PCBs
  - Solution: Soldering
  - Jumper wires to electrical wires

- Initial Plan: Using 4 microcontrollers
  - Arduino, Kinetis (K64F), Atmel, and Raspberry Pi
  - Solution: Only Arduino and a Laptop were used

Test Report

- Entire System: ~86.1% accuracy (after integration)
  - Fire Detection System: 85% accuracy
  - Ambient Light System: 80% accuracy
  - Keypad Entry System: 90% accuracy
  - Temperature Detection System: 90% accuracy
  - Home Security System: 80% accuracy
  - Package Delivery System: 95% accuracy
  - Door Knock System: 80% accuracy
  - AI License Plate System: 85% accuracy
  - Garage Door System: 90% accuracy

Conclusion

Project: Autonomous Home System

Purpose: Non-intrusive and effective smart home system

What our team learned:

- Budgeting
- Project Management
- Industry Standards

Acknowledgement

Professor: Roman Chomko

Teaching Assistant: Maliha Tasnim

Q&A