

Automated Pet Feeder

A smart solution to automate and regulate
the feeding of common household pets

CMPE 495 Independent Risk Investigation

Microcontroller Options

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Contents

Overview	3
Risk specification	3
Risk investigation	4
Risk mitigation design	5
Parts List	5
Testing strategy	5
Uncertainties	5
Appendices	5

Overview

Like any embedded system a microcontroller that is cost effective and provides adequate hardware for the requirements of the system is needed. These requirements being to operate the mechanical communication aspects of the feeder. It must have available documentation and easy to use toolchains, with useful SDKs, for efficient development.

Risk specification

Marketing requirements relevant for microcontrollers:

1. Supplementary and Master Feeders should operate unattended
2. Supplementary and Master Feeders should be able to connect to a wireless network
3. Master Feeder should be able to broadcast localized network for managing Supplementary Feeders
4. Master Feeder should be able to store feeding schedules and the amount of food eaten by owners pets

The relevant specifications can be found in [Table 1](#).

Table 1: Engineering Specifications

Marketing Requirement(s)	Engineering Requirement	Justification
1,2,3,4	A. Supplementary Feeders need to be able to transmit and receive data to and from master feeder on a private localized network.	Allow for automation of supplementary feeders, without interfering with owners network if any, and to reduce cost for owners of multiple pets.
2,3	B. Supplementary and Master Feeders need wireless peripherals or to be able to integrate with a wireless module.	Needed to permit network communication between Master and Supplementary feeders.
2,3,4	C. User needs to be able to communicate with Master Feeder via its localized network or the User's personal network.	Needed to allow for user to configure eating times and food portions in pet profiles
1	D. Supplementary and Master Feeders should be able to measure food dispensed and detect pets	Needed to adequately feed pet/s when it is their feeding time.

Risk investigation

Table 2: Decision Matrix: Master Feeder

Criteria	Weight	Raspberry Pi 3 B	Bananna Pi Zero	Raspberry Pi Zero W	Beaglebone Black
Price	3	0	0	1	-1
Compact Size	1	1	0	1	0
Wireless Built-in	3	1	0	1	1
Development Resources	2	0	1	1	0
	total	5	4	9	0

Table 3: Decision Matrix: Supplementary Feeder

Criteria	Weight	KL64	Teensy	ESP8266
Price	3	0	1	1
Compact Size	1	0	1	1
Wireless Built-in	3	0	0	1
Development Resources	2	1	1	1
	total	2	6	9

Risk mitigation design

Parts List

Table 4: Parts List

Part	Description	Cost	Actually Paid	Availability
Raspberry Pi Zero W	A tiny Raspberry Pi with built in Wireless and Bluetooth	\$10.00	\$0 (owned)	Cana Kit Link 3-5 business days
Micro SD Card	SD card for OS and data storage of Raspberry Pi	\$7.80	\$0 (owned)	Amazon Link 2 day shipping (Prime)
ESP8266(Feather)	Adafruit dev board variant of the ESP8266	\$17.12	\$0 (owned)	Amazon Link 2 day shipping (Prime)

Testing strategy

Uncertainties

Appendices