



Automatic Pet Food Dispenser

Group 25

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Senior Design 1 - EEL4719 - SPRING 2021

Due: January 29, 2021

Project Description

We are all familiar with feeding our pets or, at least, have a friend that does. We have noticed that, sometimes, pet owners are out of their house and need to go home whenever they have to, or forgot to, feed their pet. This can be an inconvenience at times when we do not want to leave where we currently are (ex: date, out with friends, etc). Our solution to this problem is an automatic food dispenser, with many helpful features, that makes life, for the average pet owner, easier.

The goal of this project is to provide the end user with automatic/manual control of when, and how much, food is dispensed for their pet. This can be achieved through various methods and features that are built into the design. The design will be easy to use and can be used remotely, or physically, at the dispenser through buttons and/or a menu.

Although there might be few similar designs out there, our design will be unique in many ways. Our design will provide the pet owner with peace of mind wherever they may be. With a few clicks from a mobile phone, they should be able to feed their pet and not worry about rushing to get home from work or a trip in order to feed their pet. Our design will also allow the pet owner to control the amount of food dispensed to the pet. The owner will be able to provide a specific portion of food to the pet; the owner

can decide if the pet should get a certain amount of portions for a meal or just one portion for a snack.

Furthermore, our design comes with a schedule that can be programmed by the owner to dispense at certain times. Through this option, the owner can decide when their pet should be fed while they can also control the pet's diet.

Project Requirements

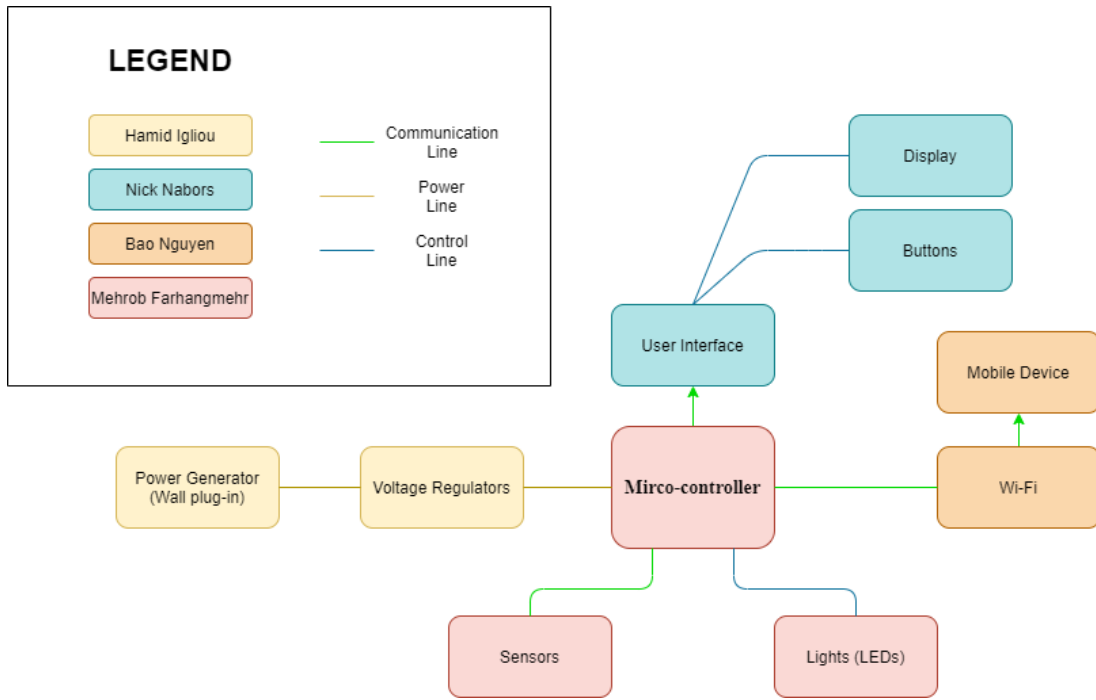
In order to build such a project we will need multiple hardware parts that will be controlled by a software program. The first requirement for this project would be the availability of internet and a mobile phone. Both will establish a connection between the pet feeder and the owner's mobile device through the web. We will also design a software interface through which the owner can control the feeder. We will also need to establish a wireless connection between the feeder and the owner's router such as a bluetooth that will enable wireless communication between the feeder and the mobile device. These devices will be connected to a programmable controller that will receive commands from the owner's mobile device and send signals to the hardware in order to execute these commands. This controller will most likely be embedded in the pet feeder and connected to a PCB that will control the hardware.

When it comes to hardware, we will design a PCB that connects all the pet feeder hardware elements. This will include a power supply that will power all the elements of the feeder; this will be accomplished with a step down transformer. Once the owner plugs the feeder into an outlet, the step down transformer will convert the supplied power into a lower voltage that will provide adequate power to all the components inside the feeder. We are unable to provide power specifications at this time such as the voltage rating or whether we are using AC or DC voltage since we are at an early stage of the project. These specifications will be determined later on when other critical parts of the feeder are specified.

Another hardware component that would be very critical to the functionality of the feeder is a mechanical motor. The motor will receive a voltage signal from the PCB to open and close a gate through which the food portions will be dispensed. The PCB will in turn be controlled by the programmable controller. The motor should be able to rotate back and forth in order to accomplish its purpose, which is to swing the gate back and forth. It should also have a quick response capability in order to dispense the right amount of food and not exceed what the amount that the owner specified.

Portion Control	<p>ADULT DOG SIZE DRY FOOD FEEDING AMOUNT (CUPS)</p> <table border="1" data-bbox="597 281 1398 621"> <tr> <td>3-12 lbs.</td> <td>1/3 to 1 cup</td> </tr> <tr> <td>13-20 lbs.</td> <td>1 to 1 1/3 cups</td> </tr> <tr> <td>21-35 lbs.</td> <td>1 1/3 to 2 cups</td> </tr> <tr> <td>26-50 lbs.</td> <td>2 to 2 2/3 cups</td> </tr> <tr> <td>51-75 lbs.</td> <td>2 2/3 to 3 1/3 cups</td> </tr> <tr> <td>76-100 lbs.</td> <td>3 1/3 to 4 1/4 cups</td> </tr> <tr> <td>Over 100 lbs.</td> <td>4 1/4 cups plus 1/4 cup for each 10 lbs. of body weight over 100 lbs.</td> </tr> </table>	3-12 lbs.	1/3 to 1 cup	13-20 lbs.	1 to 1 1/3 cups	21-35 lbs.	1 1/3 to 2 cups	26-50 lbs.	2 to 2 2/3 cups	51-75 lbs.	2 2/3 to 3 1/3 cups	76-100 lbs.	3 1/3 to 4 1/4 cups	Over 100 lbs.	4 1/4 cups plus 1/4 cup for each 10 lbs. of body weight over 100 lbs.
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Wireless control	Wifi														
Dimensions	2 feet in height, 2 foot in width														
Power consumption	5V - 12V, 1W-3W (estimated)														
Low food reminder	When the food is 1/4 full send reminder														
Manual dispensing	Drops food within 1 minute of command														
Scale	5% error														
Setting Timer	Dispenses with 30 seconds of set time														
LEDs	Green good on food, Red no food, Yellow low food???														
Weight	2-3 lbs without food														
Container size	Should hold 4 lbs of food														

Block Diagram



Project Budget and Financing

Component	Price (Estimated)
Power Supply / Regulation	\$15-\$20
MCU	\$10
Sensors (scale, level, etc)	\$10
WiFi (on device)	\$15-\$20
LCD	\$10-\$50
Buttons / Control	\$1-\$10
PCB	\$5-\$10
Mobile App (Android, Apple, Web Interface)	Free
Motors	\$15
Housing (plastics, rubber feet)	\$10
Pet Food	\$50

Project Milestones (Initial)

Senior Design 1 Milestones (Tentative)	
Week number (Date range of Week)	Milestones
Week 1 (1/11/21 – 1/17/21)	Create Group
Week 2 (1/18/21 – 1/24/21)	Think of Design Idea/Problem
Week 3 (1/25/21 – 1/31/21)	Plan Idea/ Finish Divide and Conquer 1.0
Week 4 (2/1/21 – 2/7/21)	Research
Week 5 (2/8/21 – 2/14/21)	Research, Finish Divide and Conquer 2.0
Week 6 (2/15/21 – 2/21/21)	R&D
Week 7 (2/22/21 – 2/28/21)	R&D
Week 8 (3/1/21 – 3/7/21)	R&D
Week 9 (3/8/21 – 3/14/21)	R&D
Week 10 (3/15/21 – 3/21/21)	R&D
Week 11 (3/22/21 – 3/28/21)	R&D
Week 12 (3/29/21 – 4/4/21)	60 page Draft Senior Design I Documentation
Week 13 (4/5/21 – 4/11/21)	R&D
Week 14 (4/12/21 – 4/18/21)	100 page report submission_updated
Week 15 (4/19/21 – 4/25/21)	R&D
Week 16 (4/26/21 – 5/2/21)	Final Document Due

Senior Design 2 Milestones (Tentative)

Week number (Date range of Week)	Milestones
Week 1 (5/17/21 – 5/23/21)	Acquiring Materials
Week 2 (5/24/21 – 5/30/21)	Acquiring Materials
Week 3 (5/31/21 – 6/6/21)	Build Prototype
Week 4 (6/7/21 – 6/13/21)	Build Prototype
Week 5 (6/14/21 – 6/20/21)	Test
Week 6 (6/21/21 – 6/27/21)	Build Prototype
Week 7 (6/28/21 – 7/4/21)	Build Prototype
Week 8 (7/5/21 – 7/11/21)	Test
Week 9 (7/12/21 – 7/18/21)	Build Prototype
Week 10 (7/19/21 – 7/25/21)	Build Prototype
Week 11 (7/26/21 – 8/1/21)	Test
Week 12 (8/2/21 – 8/8/21)	Finalize Prototype
Week 13 (8/9/21 – 8/15/21)	Prepare Final Reports
Week 14 (8/16/21 – 8/22/21)	Prepare Final Reports