



T.O.G.A. Automatic Pet Feeder

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Summary

The goal of the TOGA Automatic Pet Feeder is to be controlled via web application, making it completely user-friendly and tailored to your pet. The pet owner has the ability to choose the feeding time, how often the food is dispensed and the portion size. When it is the chosen feeding time. The pet wears an RFID sensor to communicate with the feeder; when in range, the drawer will open, revealing the perfect portion size!

Team TOGA designed this product with the owners comfort in mind, knowing their pet will be fed whether they're at work or away without the need of being plugged into an AC outlet. With solar capabilities and rechargeability, you'll have the luxury of using the automatic dog feeder both indoors and outdoors.

Electrical Design

Control System: Raspberry Pi Model 3

Key Requirements

- Peripheral Interfacing
- Processing Speed



Power System: Solar Cell and Rechargeable Battery

Key Requirements

- Power Consumption



Mechanical Design

Drawer: Lead Screw

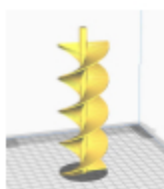
Key Requirements

- Strength

Dispensing System: Auger

Key Requirements

- Tight Tolerance



Build

For each element of this design, it is important that the product is reliable, durable, and accurate.

Electrical

- PCB was ordered so that the control modules could interface with the Raspberry Pi 3B efficiently.

Software

- Webpage was built using HTML and JSON
- Control modules programmed using Python

Mechanical

- Structure made of wood
- 3D printers were used to create the load cells base and plates, auger, and funnel.



Bill of Materials

Item Description	Vendor	Part No.	Quantity	Price Per Unit	Price
Raspberry Pi 3b	SFA	N/A	1	\$35.00	\$35.00
Nema 17 Stepper Motor	SFA	N/A	2	\$10.99	\$21.98
RFID Mifare RC522 RF IC Sensor Module	Amazon	MF522-AN & MFRC522	1	\$9.99	\$9.99
Sparkfun HX711 Sensor Module/Load Cell 5kg & 20kg	Amazon	HX711	2	\$9.50	\$19.00
A4988 Stepper Driver	SFA	A4988	2	\$7.99	\$15.98
12V 9Ah Lead Acid Battery	Amazon	ML9-12	1	\$22.99	\$22.99
Raspberry Pi Buck Converter(micro USB connector)	Amazon	B09DGR24W	1	\$11.99	\$11.99
Newpowa 12V 5W Solar Panel	Amazon	NPA55-12i	1	\$19.99	\$19.99
Renogy 10A 12V/24V PWM Charge Controller	Amazon	B07NPDWZJT	1	\$16.99	\$16.99
Pet food Container	Amazon	300666	1	\$35.00	\$35.00
Plywood Siding 4'x8'	Lowes	N/A	2	\$42.25	\$84.50
Filament	Amazon	N/A	1	\$25.00	\$25.00
Battery Terminal Wires	Amazon	B07M5M8ZCG	1	\$7.99	\$7.99
2"x4"x8" (frame)	Lowes	N/A	4	\$5.00	\$20.00
Wood Screws	Lowes	N/A	1	\$10.00	\$10.00
Gaskets	Amazon	MAG2503	1	\$16.00	\$16.00
Hinges	Lowes	N/A	2	\$5.00	\$10.00
2 Spools 24 gauge wire	Amazon	B089756MPQ	1	\$8.99	\$8.99
Drawer Slides	Lowes	N/A	2	\$14.00	\$28.00
Drive Belt	Amazon	2604736001	1	\$10.00	\$10.00
100 uF Capacitor(Motor Driver)	SFA	N/A	1	\$0.99	\$0.99
1" x 6" x 8" (wooden planks)	Lowes	N/A	3	\$9.00	\$27.00
Drive Belt	Amazon	B07P54DWRF	1	\$14.99	\$14.99
Limit Switches	Amazon	B09212SL3Q	1	\$11.99	\$11.99
90 degree Male Headers	Amazon	B01463DQ65	1	\$7.49	\$7.49
Connector 3 Pin Male Adapter	Amazon	B0B8F8VWZT	1	\$6.90	\$6.90
PCB Standoffs	Amazon	B0756CW6Y2	1	\$9.99	\$9.99
40 Pin Female Header	Adafruit	4079	4	\$1.95	\$7.80
2 Pin Screw Terminal 3.5mm	Amazon	B01C3DGIBQ	1	\$9.99	\$9.99
PCB Female Headers	Amazon	B01IPABJZY	1	\$9.99	\$9.99
Total:					\$536.52

Software Design

T.O.G.A. Feeder Program Flowchart

This is the flowchart for how the feeder's program will operate.

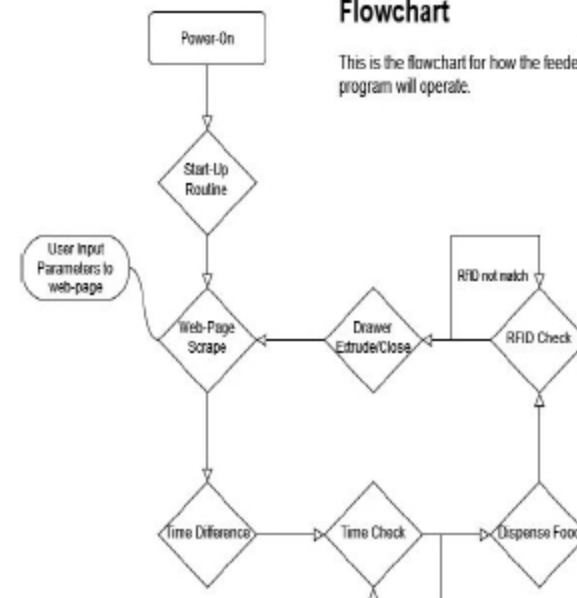


Figure 4. TOGA Feeder Program Flowchart



TOGA PETFEEDER

Cup Conversion

Note: Enter the weight of 1 cup of kibble in pounds before scheduling a feed

Meal Time:

Cup Amount

Note: Enter the amount of cups you'd like to feed your pet at each scheduled time

Note: Schedule will repeat for 7-days

Automatic Feed

Note: Press the feed button to automatically dispense 1 cup of kibble

Note: Clicking Submit or Feed updates the file at <https://engineering.sfasu.edu/teams/settings.txt>

History

Date and Time Amount

2023/04/19 10:15 1

PM

2023/04/19 03:37 1

PM

2023/04/19 03:37 1

PM

2023/04/19 03:37 1

PM

2023/04/19 03:35 1

PM

2023/04/19 03:34 1

PM

Remaining Food: lbs

Figure 5. TOGA Feeder Webpage