GNG 2101

Design Project User and Product Manual

Accessible Fuzzy Friends Dispenser

Submitted by:

Accessible Fuzzy Friends Dispenser – Group 4.2

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Table 1. Acronyms

Acronym	Definition
CAD	Computer-Aided Design
BOM	Bill of Materials

Table 2. Glossary

Term	Acronym	Definition
N/A		

1 Introduction

This User and Product Manual (UPM) provides the information necessary for differently abled people to effectively use the Accessible Treat Dispenser and for prototype documentation.

Our client has tasked us with the creation of a treat dispenser for her dog. "Why not buy one from the store?", you might ask. That's because the treat dispenser we're designing is not ordinary, as it is tailored to the unfortunate disabilities that the client suffers from.

This document contains all the deliverables we worked on since the start of the project (in order). You will find content that varies from paperwork, such as client needs ranking and problem statement, to logistics, such as a detailed BOM and designs.

Most importantly, you will find full documentation of the various prototypes, as well as the final product.

2 Overview

The problem is that the client struggles to comfortably activate her treat dispenser via button. This is an important problem because the client feels affected by her lack of interaction with her dog, compared to people who build relationships with them with ease.

The users of our product can range from people who would like to interact with their dogs from anywhere (having remote activation) to users who have limited mobility.

Our product is designed to allow those who struggle activating smaller or tougher buttons a sleek comfortable holder that can be secured in various ways to each individual users' needs. It also provides a protective cover that is resilient to dog bites as well as an adjustable strap/securing mechanism that is compatible with many different shapes and sizes of chairs etc.

The major function of our product is to dispense treats wirelessly with a button that can be pressed by the head. By attaching the remote to the headrest, the user can dispense treats to their dogs with a short head movement. Also, the treat dispenser can be placed on the side of a wheelchair for efficient transportation.

Explain the architecture/construction of the system in non-technical terms (metal frame, microcontroller, web-based, etc.), the user access mode (unfold frame, GUI, button, etc.) and any special conditions.
A block diagram is a useful thing to include here too.

Figure 1. Final Product

2.1 Conventions

N/A

2.2 Cautions & Warnings

The remote is made of PLA materials, which had a melting point of 180-200C. Ensure that the remote is not exposed to these temperatures to avoid melting the plastic. It also contains electronic components; hence you should avoid dropping or throwing the remote to prevent damage. Handle the remote appropriately to ensure longevity. Store the treat dispenser and the remote in a cool dry place.

3 Getting started

Start by placing the required batteries into the remote and dispenser. The remote requires 3 AAA batteries whereas the treat dispenser requires 4 C batteries. The battery compartment of the remote is located underneath the remote and the battery compartment of the treat dispenser is located under the treat dispenser. After inserting the batteries, insert the remote into the remote holder and use the remote holder straps to attach it to the headrest in an appropriate position. If needed, use the claw found on top of the treat dispenser to attach/place the product anywhere else than on a flat surface.

To fill the treat dispenser with treats, open it by turning the lid in a clockwise direction. To turn on the treat dispenser, use the on/off switch located on each the remote and the dispenser itself. Pressing the main circular button found on the remote will dispense one treat. Turn off the treat dispenser using the switches.

3.1 Configuration Considerations

The product comes with a treat dispenser, a claw, a remote, and a remote holder/strap. The remote will dispense one treat at a time (one each time it's pressed). The remote holder/strap serves for positioning the remote onto more comfortable and easily accessible spots for pressing (i.e., the headrest of a wheelchair). Finally, the claw is located on top of the dispenser, and is used if needed to place the dispenser anywhere that does not have a flat surface (which makes it hard for it to stand on its own).

3.2   User Access Considerations

The product can be used by people that suffer from a disability that hardens their usage of a normal treat dispenser, as well as by any pet owning customer that would like to have an easy-to-use treat dispenser.

3.3   Accessing/setting up the System

Start by placing the required batteries into the remote and dispenser. The remote requires 3 AAA batteries whereas the treat dispenser requires 4 C batteries. The battery compartment of the remote is located underneath the remote and the battery compartment of the treat dispenser is located under the treat dispenser. After inserting the batteries, insert the remote into the remote holder and use the remote holder straps to attach it to the headrest in an appropriate position. If needed, use the claw found on top of the treat dispenser to attach/place the product anywhere else than on a flat surface.

To fill the treat dispenser with treats, open it by turning the lid in a clockwise direction. To turn on the treat dispenser, use the on/off switch located on each the remote and the dispenser itself. Pressing the main circular button found on the remote will dispense one treat. Turn off the treat dispenser using the switches.

3.4   System Organization & Navigation

The product comes with a treat dispenser, a claw, a remote, and a remote holder/strap.

The remote will dispense one treat at a time (one each time it's pressed). The remote holder/strap serves for positioning the remote onto more comfortable and easily accessible spots for pressing (i.e., the headrest of a wheelchair).

Finally, the claw is located on top of the dispenser, and is used if needed to place the dispenser anywhere that does not have a flat surface (which makes it hard for it to stand on its own).

3.5 Exiting the System

In order to put away the system, the user needs to make sure the remote and the dispenser have been turned off using the corresponding switches. Also, make sure the remote and the claw have been put somewhere safely to avoid any unfortunate breaking.
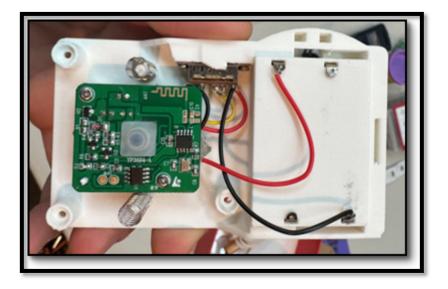
4 Using the System

The following sub-sections provide detailed, step-by-step instructions on how to use the various functions or features of the Treat Dispenser

4.1 Remote

Figure 2. Remote

Figure 3. Inside of Remote (Circuiting)

The main function of the product is the remote that, once pressed, dispenses treats from the dispenser. As seen, the straps used can be adapted for any sized object you would like to attach the remote to. On the left can be seen the on/off switch, and the big black button on the front face of the remote is the dispensing system activator. It is assumed that the user can press /switch the various features of the remote, or has the help needed to (helper, or accessibility products)

4.1.1   <Given Sub-Function/Sub-Feature>

Figure 4. The Claw

Figure 5. CAD Representation of the Claw

An other important part of the product is the claw. This one has been added in order to improve transportability: you can attach the treat dispenser to any non-flat surface, which makes portability easier.

5 Troubleshooting & Support

The following sub-sections provide detailed, step-by-step instructions on how to solve any problems you might encounter with the Treat Dispenser.

5.1 Error Messages or Behaviors

If the treat dispenser is not dropping treats, make sure both the remote and the dispenser are not turned off. If the problem keeps happening, take out and put back in the batteries found in both parts of the product.

5.2 Special Considerations

N/A

5.3 Maintenance

To avoid failure, try turning off the remote and the dispenser when not in use for a long period of time. Also, make sure the dog is not biting the product.

5.4 Support

In case of emergency, do not hesitate to contact our customer service, or send us an email. The number and email address can both be found on our website.

6 Product Documentation

The product consists of three modules: the dispenser, the button, and the dispenser mounting.

After much consideration, the mounting was solved by a strong 3D printed hook which was designed in concert with laces to hang the dispenser onto anything… including the client's wheelchair.

The button, on the other hand, took more time and effort as it contained many moving parts

We designed it on SolidWorks, using the existing remote button that the second-hand dispenser (that we bought in early stages of development) came with as inspiration. The original button was designed for the dog to press and was quite large and bulky. It also made loud sounds whenever it was pressed.

In our work, we redesigned the button to do a few things:

- Make it attachable to the headrest
- Remove the sound features
- And make it thin enough to be located near her head

And with those goals we went ahead and designed the button.
With a few iterations to settle tolerances and proper 3D print orientation, we settled on the following design.

Also, with adjustable Velcro straps, it can be attached to almost anything needed. The button was also carefully designed to have a proper sensitivity for the client's head to press.

The hook can hang anywhere, and it keeps the dispenser suspended securely.
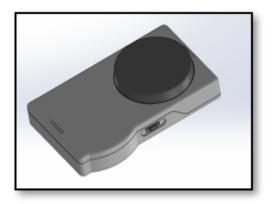
Figure 6. CAD Representation of the Remote

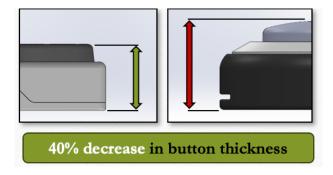Figure 7. Thickness Difference between Prototype 2 and Final Product

40% decrease in button thickness

Figure 8. Inside of Remote
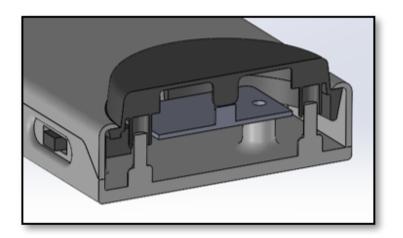

Figure 9. Exploded View of Remote

Figure 10. The Claw in Action

6.1 Other Considerations

6.1.1 BOM (Bill of Materials)

Table 4. BOM

BOM						
Item name	**Description**	**Units of measure**	**Quantity**	**Unit cost**	**Extended cost**	
Second-Hand Treat Dispenser	Used Treat Dispenser bought off Facebook Marketplace	Metres	1	$30	$30	
AAA Battery	AAA Battery used for remote button of Treat Dispenser (Found at home)	mAh	3	$0	$0	
C Type Battery	C Type Battery used for the dispenser	mAh	2 packs	$4.88	$9.76	
Velcro Straps	Velcro Straps used to keep the button inside the holder (Found at home)	per unit	2 packs	$9.59	19.18$	https://www.amazon.ca/Doryum-0-47inch-Fastening-Management-Organizer/dp/B09P8KJMV9/ref=sr_1_5?c

6.1.2 Equipment list

Table 5. Equipment List

List of Equipment				
Item name	**Description**	**Type**	**Prototype #**	**Source**
SolidWorks	CAD for designing our concept	Online Software	1, 2, 3	https://www.solidworks.com
3D Printer	To construct the frame	Hardware	2, 3	MakerLab / Sammy's own 3D Printer
Laser Cutter	To shape the frame	Hardware	1	MakerLab
makeabox.io	Box generation	Website	1	https://makeabox.io
bambu studio	Slicer for 3D files	Software	1	https://bambulab.com/en-ca
Soldering Machine	Used to link cables together	Hardware	3	MakerLab

6.1.3 Instructions

N/A

6.2 Testing & Validation

N/A

7 Conclusions and Recommendations for Future Work

We learned that it's important to be pessimistic in your time estimates, and always assume you are under a strict time constraint to avoid falling behind in the design process. We realised that during the brainstorming phase, we had a lot of great ideas (which were interesting to conceptualize), although it's important to constantly be building towards functionality as well as testing core needs and functions throughout the process, to ensure you aren't designing something that isn't feasible.

Our main idea was to redesign an entirely new treat dispenser, from scratch, that would also have the additional accessibility features required by the client. Fortunately, a PM (during the review lecture) pointed out that this would be a waste of time, and that we should work on making the product accessible.

APPENDICES

8 APPENDIX I: Design Files

All files have been uploaded to Makerepo website.

Table 3. Referenced Documents

Document Name	Document Location and/or URL	Issuance Date
N/A		

9   APPENDIX II: Other Appendices

N/A