DoggyGo

Team 07
DoggyGo Inc.
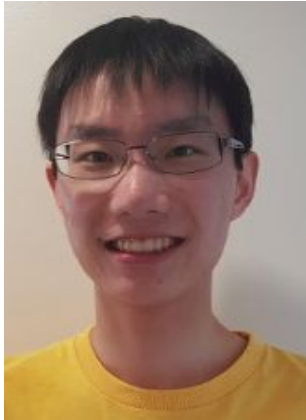
Team Members

Danfeng Sheng
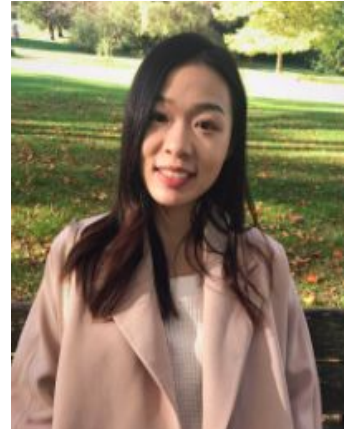**CEO**

Curtis Cheung
CTO

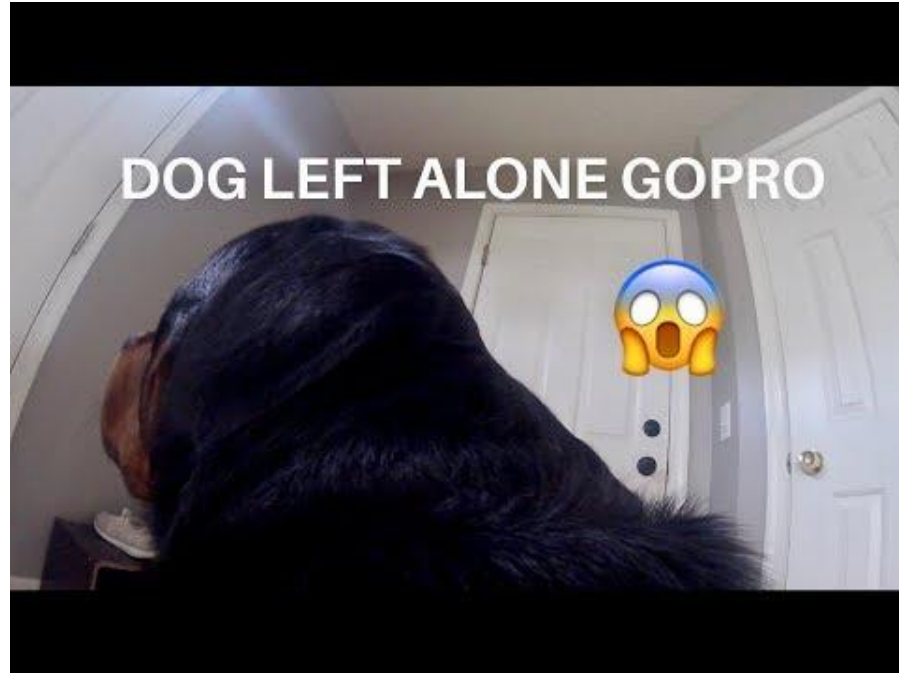**Junchen Wang**
CCO

Manci Song
CFO

Hongbin Lin
COO

Background

DOG LEFT ALONE GOPRO

Motivation

Pets lonely at home:

- Pets keepers are guilty and nervous
- Pets are boring and sad

Our expectation:

- Cut the boring time of pets at home lonely
- Provide another way of entertainment: interaction with pets

Market

- Dog Population 2018 in Canada: **$8.2 million**
- **41%** Canadian households have at least one dog
- Canadian pet industry is worth about **$7 billion**
- US pet industry is worth about **$70 billion**

What are dogs' favorites?

- **Treats**
- **Chew toy**
- **Throw-and-Fetch**

Competition

PetSafe Automatic Ball Launcher

- Nine distance setting and Six angle(vertical) setting
- Front-motion sensor
- Two-second motion detection delay and audible tone alert
- Carry handle
- **Canadian $200**

**iFetch/iFetch Too Interactive Ball launcher**

- iFetch and iFetch Too
- Three preset launching distance and one random distance
- Rechargeable battery
- iFetch: **Canadian $190**
  iFetch Too: **Canadian $350**

What's in the box?

Ideal Customer

king for?

- People who have one or more than one dogs
- People wish dogs enjoy time home alone
- People allow dogs play fetch indoors
- People wish to play throw-and-fetch with dogs
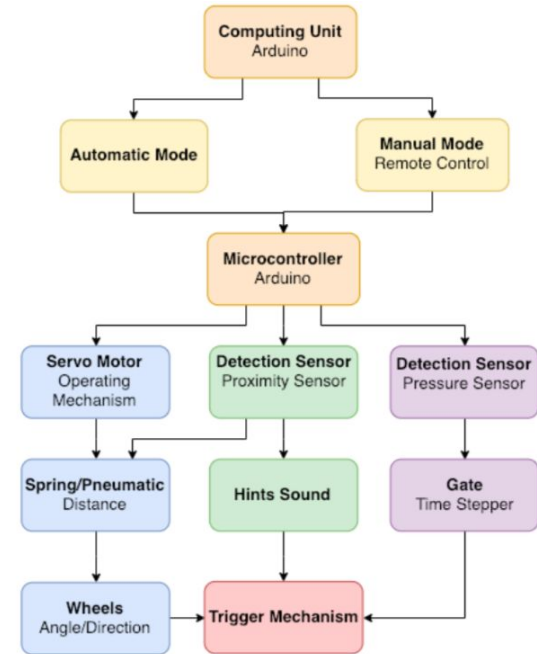- People enjoy playing with dogs outdoors

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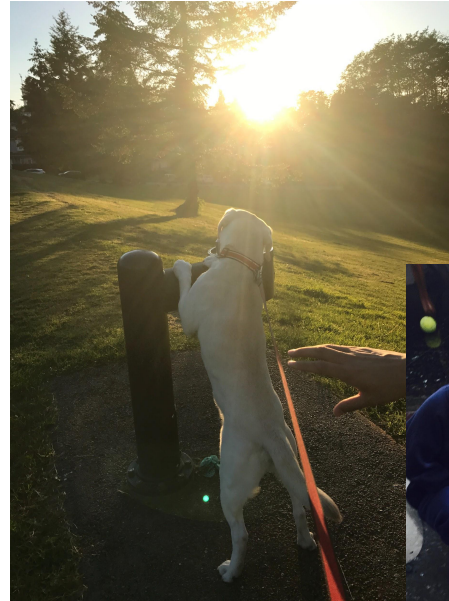
Main Features

- Two Modes
  - **Automatic**
    - Ability to launch ball at distances of 3m, 6m, 9m
    - Dispense treats when ball is returned to launcher
    - Object Detection around launch path for safety
  - **Manual**
    - Same features as Automatic, but allows users to control horizontal/vertical rotation
    - Dispense treats manually

Materials

- Wood (PoC)
- Arduino Uno
    - Ultrasonic Sensor (HC-SR04)
    - L9110S Motor Driver
    - 2 x 5V DC Relay
    - 1 x Buzzer with LED
    - B10K Potentiometer
- Universal Power Supply (3-12V)
- LM7805 Voltage Regulator
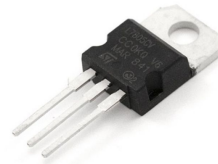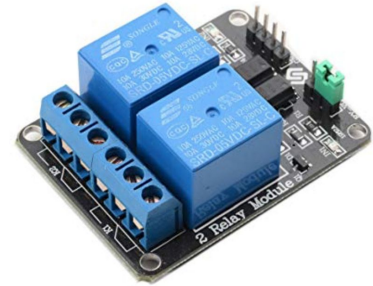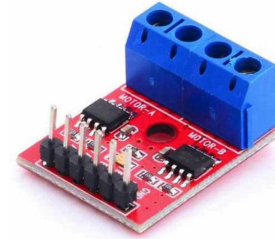
Materials (Continued)

Motor Selection

- 12V Gear Motor
    - For horizontal rotation
        - Rotates launcher base
    - For Treat Dispenser
- SG-5010 Servo Motor
    - For accurate amounts of vertical rotation
- 2 x 3-9V DC Motor
    - One broke during PoC development
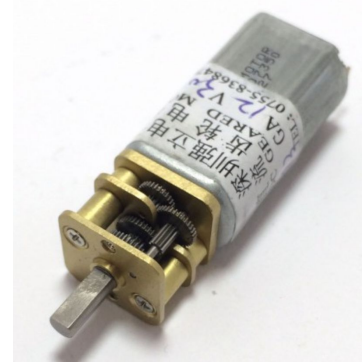
Cradle-to-Cradle

- All parts will be easily recyclable

- Plastics
    - Returned to plastic recycling depots

- Electrical Components
    - Provided to electronics return depot (ie. FreeGeek)

Costs

Name	Quantity	Estimated Price (CAD/Unit)	Subtotal (CAD)
Wheel	2	2.5	5
Arduino Uno	1	15	15
Ultrasonic Sensor	2	3	6
L9110S Motor Driver	2	10	20
Micro Switch	3	1	3
Buzzer	1	5	5
Motor	5	5	25
Shell and Chassis (3D print)	1	50	50
Battery / Power Supply	1	12	12
Treats	1	5	5
Basic Components (screws, nuts, etc.)	30	0.3	10
Ball	3	2	6
Remote Controller	1	8	8
Gear	4	1	4
Shipping	1	10	10
Total (before tax)			169
Total (After 12% tax)			189.28

Schedule

		Name	Duration	Start	Finish
1		Documentation and Presentations	25days	03/18/2019	04/19/2019
2		Project Proposal Draft	4days	03/18/2019	03/21/2019
3		Project Proposal Finalization	6days	03/20/2019	03/27/2019
4		ENSC440 Project Plan	4days	03/27/2019	04/01/2019
5		Poster Design	8days	04/01/2019	04/10/2019
6		Presentation&Demo	7days	04/10/2019	04/18/2019
7		Journal	25days	03/15/2019	04/18/2019

		Name	Duration	Start	Finish
1		Proof of Concept	25days	03/18/2019	04/19/2019
2		Research Components	3days	03/18/2019	03/20/2019
3		Purchase Components	2days	03/21/2019	03/22/2019
4		Build the Launcher System	6days	03/22/2019	03/29/2019
5		Build on Detection System	6days	03/29/2019	04/05/2019
6		Build on Treat System	6days	04/05/2019	04/12/2019

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Risk Analysis

Safety Risks:

- Humid Environment
- Sharp Edge/Corner
- Damage from outside

Business Risks:

- Market Competition
- Economic Risk
- Labour Cost

Safety Risk Management

- **Humid Environment:** Enclose the project with waterproof materials

- **Sharp Edge/Corner:** Make sharp edges and corners to be smooth

- **Damage from outside:** Using PBT Material

Business Risk Management

- **Market Competition:**   Keep our features and innovations

- **Economic Risk:**   Own great understanding about the market and to plan for any economic crisis

- **Labour Cost:**   Make the producing procedure to be as automatic as possible

Engineering Standards (UI General)

1. IEEE 1621-2004

IEEE Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments

2. IEEE 1012-2012

IEEE Standard for System and Software Verification and Validation

3. ISO 9241-161-2016

Ergonomics of human-system interaction – Part 161: Guidance on visual user-interface elements

Engineering Standards (Specific Design)

- The drive motor shell comply the safety standards listed in CAN/CSA-C22.2, No.100-14

- The rechargeable power sources utilized in the operation of DoggyGo shall conform to the general standards stated by ANSI C 18.2M

- During operation DoggyGO's components shall not surpass temperature values cited in NFPA (Fire) 70 standards

- The ultrasonic detectors shall comply with the safety standards list in CAN/CSA-C22.2 No.61010-1-12

- The launcher build shall obey the rules given in CAN/ISO 8124-1:2018

- The development process of DoggyGo shall conform to CAN/CSA-ISO/TR14062-03 regarding consideration of environmental aspects during design and implementation

Self-Reflection

Two parts for our team's self-reflection:

- The things we learned during the process in ENSC 405W

- The changes we will do in our next development process in ENSC 440

Self-Reflection-Learned

The things we learned:

- Draw proof of concept model before building
    - Know what we need to focus during the building
    - Avoid messy work during the building
- Time management
    - Save time cost
- Teamwork is important in succeeding
    - Assigning task for every person

Self-Reflection-Changes

Changes we will do in our next development process in 440:

- Change the development materials
  - Wood to PLA / ABS (3D printer)
- Have a parts list finalized before buying extra parts
  - Everything we need should be prepared (save time)
  - Match the parameters of relative parts
- Have more group meetings
  - Share recent ideas and work

Plans for ENSC 440

- Sensors
  - Calibrate sensor distance
- Portable power
  - Rechargeable Battery (9V)
- Product Shell
  - 3D printer to construct our shell
- Arduino Code add more features
  - Error / exception handling
- Ball Feed System
  - Belt to feed ball into launcher

Conclusion

Current Progress:

Launcher Design
Detectors Combination
Buzzing/Speaker

Base Rotation Design
Treat Dispenser Design

Technical:

Arduino
Shop Class Skills
Engineering Sketching

Soft skill:

Group Management
Time Management
Members Corporation

Special Thanks

Lee's Electronic Components

For providing advice and supplies required for project at a reduced price

Reference

https://www.dailymail.co.uk/sciencetech/article-4432134/What-happens-dog-leave-alone.html [Pic @ Motivation]

http://www.honolulumagazine.com/Honolulu-Magazine/August-2012/Stylish-Pet-Store-Opens-on-Kapahulu/ [Pic @ Market]

https://www.thespec.com/news-story/6802056-hamilton-business-canadians-spend-billions-on-spoiled-pets/ [@ Market]

https://petgearguide.com/best-dog-ball-launchers-throwers/ [@ Competition]

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Materials:

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https://www.amazon.com/SunFounder-Channel-Optocoupler-Expansion-Raspberry/dp/B00E0NTPP4

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Motors:

https://leeselectronic.com/en/product/41500.html

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