Automated Kitty Litter Box

"make your life convenient and neat"

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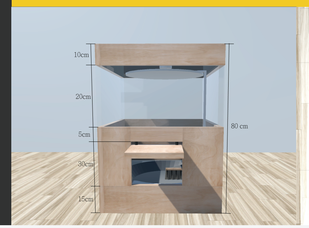
INTRODUCTION

Caneat Inc. is denoted to developing the most reliable automatic litter box in the current market. The automatic kitty litter box we are designing can scoop the waste intelligently the certain time, that can be set by the user, after a cat has used the litter box. The waste will be stored in the receptacle with a weight sensor monitoring if it has to be replaced simultaneously. The following list point shows the main functions of Caneat.

- Detection of cat entry / exit the litter box
- Activating scooping system after 10 mins
- Removing waste to garbage bag
- Activating waste collecting system
- Checking the waste exceed the limit or not
- Sending notification to user while waste is over limit



MARKET

According to GfK (Growth from Knowledge) survey, 61% of Canadians own at least a pet. 35% of Canadians have a cat (compared to 23% internationally), which is slightly greater than the dog ownership. In total, around 8.8 million of cats are breeded in Canadian families. Industry analysts forecast the global automatic self-cleaning cat litter box market to grow at a CAGR (Compound Annual Growth Rate) of 7.3% during the period 2018-2022.

LitterMaid LM680C is the cheapest automated litter box available on Amazon. It can automatically scoops waste 10 minutes after the cat uses the little box controlled by an adjustable program. After each cleaning cycle, the sleeping time of the automated progress is subjected to be adjusted.

The top rated automatic litter box is **Litter-Robot III Open Air Automatic Self-Cleaning Litter Box**, which is the most expensive one. The cleaning cycle will be activated 7 minutes after the cat used the litter box. Compared to two litter boxes introduced above, the cleaning mechanism of Litter-Robot III is totally different and less time-consuming.

SYSTEM OVERVIEW

Cat Detection - Photoelectric Sensor

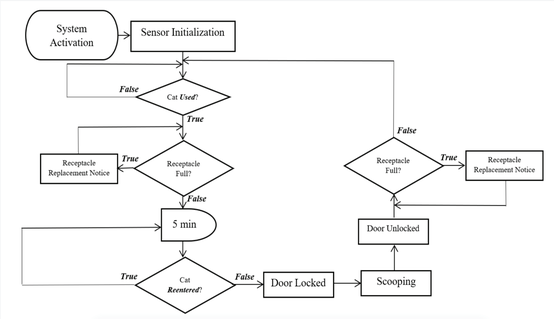
- Detecting an object by using a light transmitter and a photoelectric receiver [1]
- The cat passing between the sensor and reflector will block a perceivable percentage of emitted light
- Adjusting the sensitivity of receiver, photoelectric sensor can be succeeded to detect if the cat is coming though in the dark environment
- The litter box can be decided to be vacant when there are 2 voltage drop in 2 mins
- Photoelectric sensor is easy to interface with a microcontroller

User Interface

- On / Off Switch : Power
- Emergency Stop Button : Turn Caneat immediately
- Time Selection Button : Select time to initialize the scooping system after cat leave the litter box
- Onboard LED Light
  - Activated scooping cycle
  - Mission complete
  - Error occur
- System Progress Report : LCD board display current progree with 4 LED blue light

Scooping System Procedure

- Initialize Photoelectric Sensor and Load Cell
- Ignore the signal generated by sensors until the cat is no longer in the litter box, in case there are multiple cats sharing the same litter box
- Recall the condition of the receptacle to prevent it to be overweight
- Detecting if the cat re-enters the box in next 5mins
- Activate the scooping cycle if the litter box remains vacant
- Notify the breeder(s) that the receptacle has to be replaced (User Interface)



FUTURE PLAN

In order to provide a more efficient communication between breeders and cats, we will try to public a mobile app. The app helps to send feedbacks and collect more data about their cats.

- Mobile application will be developed as a detection of the condition of Caneat and a reminder when the receptacle needs to be replaced
- Customers can customize the exterior materials of Caneat
- Adding kittly litter refill system to avoid the litter is lower the standard level

CONCLUSION

Caneat is a robust, compact, and powerful system for cleaning the cat litter box. By using photoelectric sensor, the device will detect whether a cat has used the litter box or not. At the same time, the detecting behavior initialize the mechanism operation to clean the litter box. The system design consist of 3 major sections, which are mechanism, software and firmware.

Reference

[1] Panasonic Corporation. "Basics of Photoelectric Sensors." Internet: https://www.panasonic-electric-works.com/pew/it/downloads/ti_construction_working_principle_en.pdf July, 2014 [July. 23, 2018]

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