IoT smart automatic pet feeder

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ABSTRACT – This paper presents Smart Automatic Pet (SAP) Feeder that can feed pets upon command. The device can be used to feed the pet with customize portions of pet food. The portion of pet food can be adjusted according to the need of pets when the pet's owner is not around. NodeMCU, YwRobot Breadboard Power Supply, servo motor, PIR sensor and LED (8 mm) are hardware used in this project. All the hardware link with Blynk app which is a custom-built software as the Internet of Things (IoT) platform. Thus, users can control the SAP Feeder through their smartphone.

1. INTRODUCTION

Pets can be very physically and emotionally beneficial to their owners. Living with and caring for them can also be a great experience and very entertaining. However, for busy owners who need to work from morning till night, they may face difficulties to feed their pet on time as well as elderly people who always forget to feed their pets on time [1].

Most of the pet feeders on the showcase are designed to supply regular feedings to pets even when the owner is not at home. The most common type is based on the idea as a gravity feeder and there are some pet feeders that work by providing specifically sized portions at pre-set times [2]. Therefore, an automation device for feeding pets is proposed in this paper. This device can prevent pets starving when the pet's owner is not around. It also intended both for the vacationing owner and the busy owner who simply does not have time to be home to feed their pets frequently.

This paper presents a Smart Automatic Pet (SAP) Feeder. Figure 1 shows the illusion of the proposed SAP Feeder circuit. The NodeMCU is used as the main controller of the SAP Feeder system. The system can detect the presence of pet near to the SAP Feeder by PIR sensor. This project is mainly concentrate on application of the IoT by using the Blynk app [3] in order to control the operation of SAP Feeder.

2. METHODOLOGY

The schematic diagram of the SAP Feeder is illustrated in Figure 2. The SAP Feeder is built with NodeMCU as the core component. It is used to control all the components of the circuit in this project. The set of coding is uploaded to NodeMCU via Arduino Software (IDE). Besides that, there are three visual push buttons for controlling the rotation of servo motor and LED. The status of servo motor will be displayed on the visual LCD of the Blynk app. With the combination of these hardware and software, the SAP Feeder can be fully controlled by the user via the Blynk app through Wi-Fi.

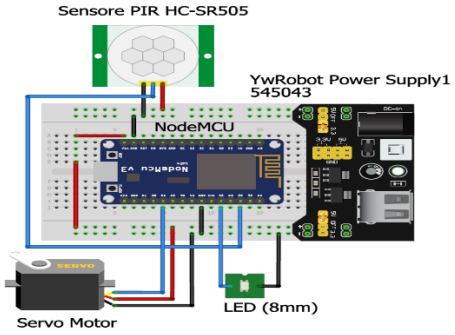

Figure 1 The illusion of the SAP feeder circuit.

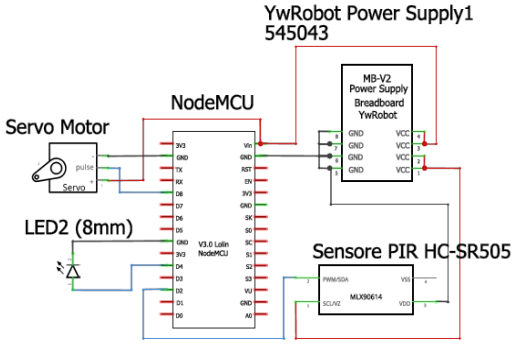

Figure 2 The schematic diagram of the SAP feeder.

Based on Figure 3, the flow chart shows the operation of SAP Feeder. Firstly, the NodeMCU need to connect with Blynk app. Then user may give commands using the visual button in the Blynk app inside their smartphone to start feeding pet or to turn on LED light bulb. Besides, user can receive a notification displayed in the Blynk app when pet is passing by the SAP Feeder as the result of using PIR sensor that detects motion.

3. RESULTS AND DISCUSSION

The front view of SAP Feeder is shown as Figure 4. The control circuit of SAP feeder is fix in the transparent container. The orange cap is the hole where to refill pet food. The funnel located on the right side of the transparent container is used to refill the pet food. From Table 1, the important components of SAP Feeder are servo motor and the visual LCD.

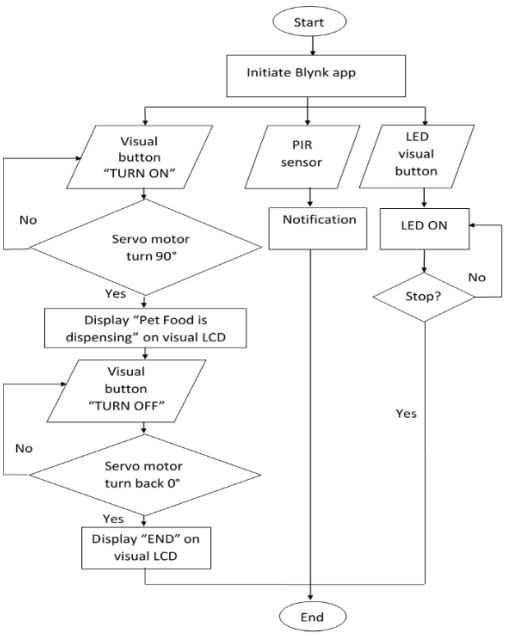

Figure 3 The flowchart for the operation of SAP Feeder.

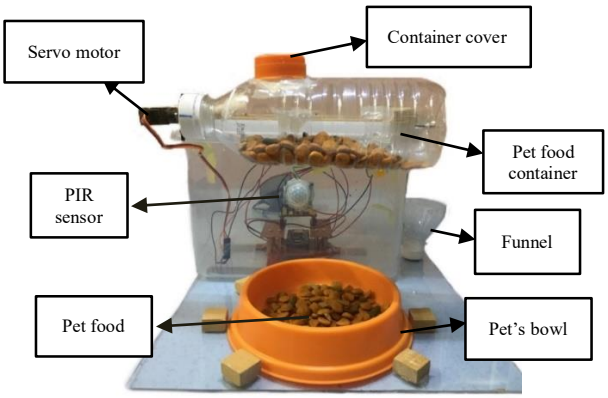

Figure 4 Front view of SAP feeder

Table 1 Description of the components used for SAP feeder.

Component	Control	Input / Output	Action
PIR Sensor	Input	Automatic	Notification pop up when cat passing by.
Servo motor	Output	By visual button "TURN ON" and TURN OF "	Turn 90º to dispend pet food Turn back to 0º to stop dispend pet food.
Visual LCD	Output	By servo motor	Show the status of the servo motor
LED	Output	By visual button "LED"	LED turn on or off

Without servo motor, pet food will be stuck in the bottle and without visual LCD user won't know the status of servo motor. When pressing the visual button "TURN ON", the pet food container will turn to 90º and the pet food will be drop from the pet food container to the pet's bowl as shown in Figure 5. When the PIR sensor sensed the pets, the PIR sensor will receive high signal and Blynk app will display "Pet detected". Hence, the words 'Pet detected' will be pop up on the background of the Blynk app as depicted in Figure 6. Then the visual LCD of Blynk app shows "Pet food is dispensing" as illustrated in Figure 7(a). When pressing the visual button "TURN OFF", the servo motor is turn to 0º, the bottle will turn back to the original position and stop dispensing pet food to the pet's bowl and the visual LCD will show "End" as shown in Figure 7(b).

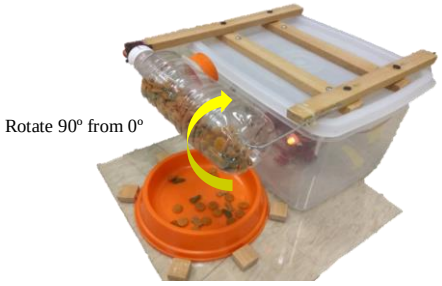

Figure 5 Pet food container is turn to 90º.

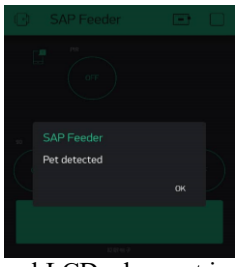

Figure 6 The visual LCD when pet is detected by PIR.

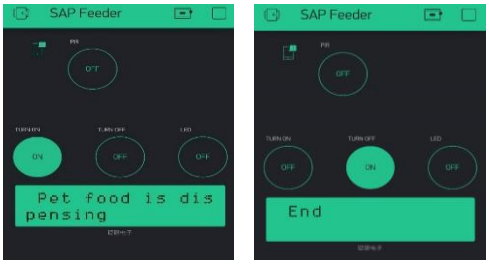

Figure 7 The visual LCD (a) when dispense pet food. (b) when the pet food container turning back.

4. CONCLUSIONS

Smart Automatic Pet (SAP) Feeder can be used to feed the pets when receiving command using IoT platform which is the Blink app. This device is suitable for most of the pets such as bunny, cat, dog and reptile.

REFERENCES

[1] Parr, J. M., & Remillard, R. L. (2014). Handling Alternative Dietary Requests from Pet Owners, Veterinary Clinics of North America: Small Animal Practice, 44(4), 667- 688.

[2] Vania, Karyono K., & I. Nugroho H. T. (2016). Smart Dog Feeder Design Using Wireless Communication, MQTT and Android Client, *2016 International Conference on Computer, Control, Informatics and its Applications*, 191 – 196.

[3] Doshi, H. S., Shah, M. S., & Shaikh, U. S. A. (2017). Internet of Things (IoT): Integration of Blynk for Domestic Usability, Vishwakarma Journal of Engineering Research, 1(4), 149 - 157.