Automatic Cat Feeder And Location Tracker

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***Abstract*— Most of us are obsessed with cats at home, but it is important to take good care of those cat. The common issue faced by the owner of the cat is food. Some pet owners have quite a busy daily schedule at the workplace, leaving the cat alone for some activities or training and business matters for the whole day or days. Therefore, automatic cat feeder and location tracker is invented. The stand-alone modules Arduino UNO and Node MCU ESP8266, together with appropriate sensor types such as Ultrasonic Sensor, Servo Motor and GPS module tracking position, are one of a kind. This product is developed that can feed pets while owners are not available at homes. Through the use of mobile application, owner can click button to the system for the bowl to be refilled. Also, the system sends notification to the owner when there's critical level on food and water on the bowls. Lastly, it can help pet owner be aware by tracking the location of cat. The outcome of the project is a fully functioning prototype that can interact remotely via Mobile Application. This gives the individual less work, more leisure, and fewer worries as well.**

Keywords—Arduino Uno, Servo Motor, Node MCU, Ultrasonic Sensor, GSM Module

I. INTRODUCTION

Nowadays, people tend to be busier; and because of this, people tend to forget also some of their responsibilities which are the main cause of trouble. Automatic Cat Feeder and Location Tracker is an automatic cat dispenser that enables owner to feed their cat even without his presence and can track the location of cat by just tapping a button on the system application. This system uses the concept of Wireless Fidelity (Wi-Fi) through the owner smartphone to the system application the system application. This system uses the concept of Wireless Fidelity (Wi-Fi) through the owner smartphone to the feeder machine. The completed automatic cat feeder and location tracker machine is embedded with Wi-Fi module and GPS module to ensure any activities input by the app will be able to be executed. This helps the pet owner to ensure their beloved cats are being fed in good condition mostly when the cat owner is unable to feed their cat directly at home. It also can help pet owner be aware by tracking the location of cat. With this app, the cat owner need not to bother asking their family, friends, or neighbor for help.

II. LITERATURE REVIEW

In developing this project, some research has been done. This chapter will discuss the literature review related to the "Automatic Cat feeder And Location Tracker". Summarized information of the relevant studies was included to gain knowledge and ideas in completing this project. Besides that, the previous projects and studies are the main source for this project. By analyzing the previous research project did by other researchers; there is a possibility to define what features are lacking in their project. From the weaknesses, this project recommended some enhancement that could be done to improve the same previous project so that it makes the project more effective in solve the user's problem. The other source of literature reviewed are journals, articles, and information from the internet. Those sources will help to identify problems as well as giving ideas for analysis and decision making in this project.

A. Related Work

Pet Food Monitoring Using Raspberry Pi [1]– In this work, they are used the image to monitor the amount of the food in the bowl. The interaction between the system and the user only occur if there is no food in the bowl. If there is food in the bowl, the system will not interact with the user. The system will send a notification like "NOTICE: food bowl is empty" to the user through email and the notification also can be sent through message (Aguero, 2016).

Smart Pet care System Using Internet Of Things (IOT) [2] – In this project used Arduino as a platform and all of the devices are linked in a home network base on WIFI WLAN. The smart phone function is to monitor the status of smart pet care system and the user's smart phone have to control the setting. In addition, to make the smart pets feeder work, the users need to set the feeding time and the amount of food to feed their cat based on the weight of the amount of single meal.(Natarjan, 2016)

Programmable Pet Feeder Using Microcontroller [3] – According to this article, this project is develop a programmable pet feeder that depending on the rotational speed of a DC motor and give the pet owner the advantage of dispensing food. A stepper motor is used for speed control and a DC motor for food dispensing. The time schedule for each segment can be set by the pet owner using the LCD.

III. RESEARCH METHODOLOGY

To achieve the objectives of this project, a specific method is being used. In order to make sure the project is on the right

path, methodology plays an important role as a guide for the project to complete and working well as a plan. There's a special style of methodology that's used for various varieties of applications. It is important to choose the correct and suitable methodology for the development of an application thus it is necessary to understand the application functionality itself.

A. Development Process Model

The Prototyping Model has been chosen as a methodology for this project as this model is suitable for the development of an application. This Systems Development Methodology (SDM) is within which a paradigm output is created, tested and reworked. It is done until an appropriate paradigm is achieved to help develop the complete system or product. This Prototyping model works best in situations when not all the details or requirements are known well in advance.

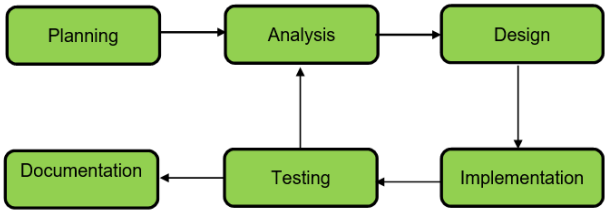

Figure 3.1 Prototype Model

B. Project Flow Chart

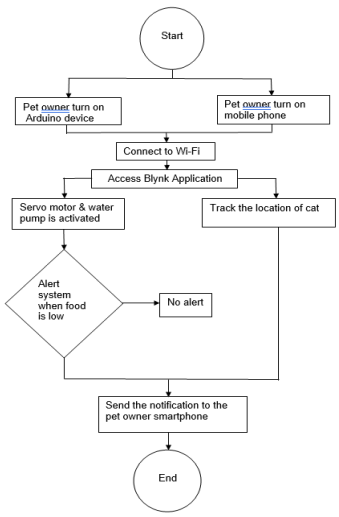

Figure 3.2 Flow Chart

Figure 3.2 is the flowchart for the project. First, the pet owner must turn on arduino device and mobile phone. After that, that device need connect to the Wi-Fi. Then, access the Blynk application for servo motor, water pump to be activated and track the location of cat. Lastly, It will alert the system when food is low by sending a notification to the pet owner smartphone.

C. Block Diagram

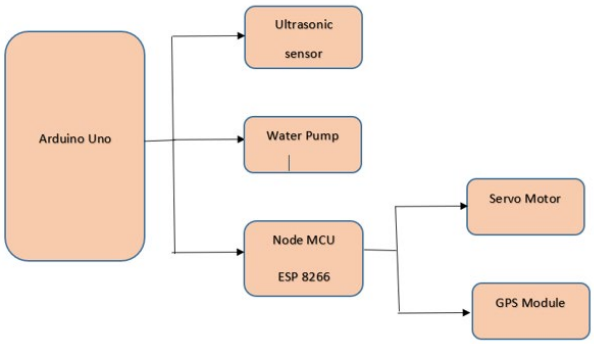

Figure 3.3 Block Diagram

Figure 3.3 is the block diagram for the project prototype. First, this project is use Arduino Uno to connect ultrasonic sensor that detect sensor of food level if low or not. Water pump used to dispense water. Node MCU ESP 8266 is used for Blynk Apps that need internet connection by connect servo motor to dispense food and GPS module is used for track the location of cat.

IV. Result and Discussion

This chapter discusses the testing method employed in the automatic cat feeder and location tracker. Various testing method relevant to the project has been discussed. Result analysis is the analysis that includes all the chosen guidelines considered appropriate to the prototype quality. Testing is vital since the main purpose is to identify software and hardware failures so the faults may be discovered and corrected.

1. Prototype Testing

Figure 4.1 Block Diagram

The system operates with a few sets of sensors used which are located near the position of the cat eating and drink. For the prototype unit, we use Node MCU ESP8266, ultrasonic sensor, servo motor, water pump. All sensors are connected to the system using Blynk Application. The machine starts to dispense after set schedule timer on Blynk. The sensor read the information wirelessly to the Arduino UNO to record the activity using Arduino IDE.

Figure 4.2 GPS Cat Tracking Collar

The GPS cat tracking collar are simply a tracking device that attached to cat by tracking the location of cat in real time. In order to transmit the GPS location from almost anywhere and anytime, the use of cellular data and towers are required.

2. Testing Results And Analysis

A. The connection to the Wi-fi

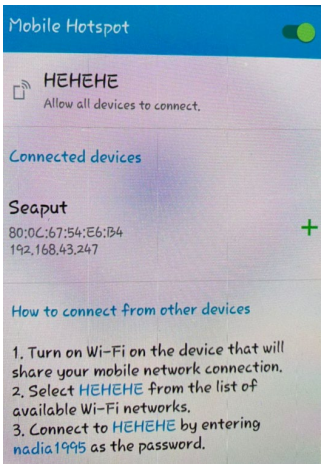

Figure 4.3 Configuration SSID and Password

Figure 4.3 shows the SSID for this network have be set "HEHEHE" and the password for this network "nadia1995".

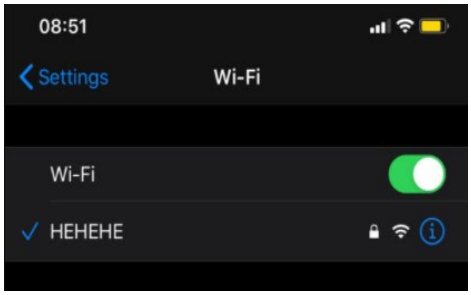

Figure 4.4 Successful Connected to the Wi-Fi

Figure 4.2 above shows the successful connection to the network.

B. Setting The Blynk App

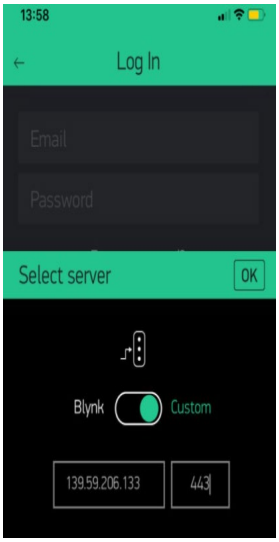

Figure 4.5 The Blynk App

The Figure 4.5 shows the Blynk App accessing the Blynk server for interfacing.

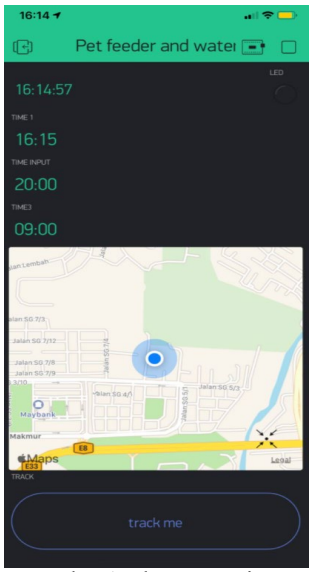

Figure 4.6 Pet Feeder And Water Dispenser in Blynk App

The Figure 4.6 shows that Pet Feeder and water dispenser have been created in Blynk App.

C. Push Notification

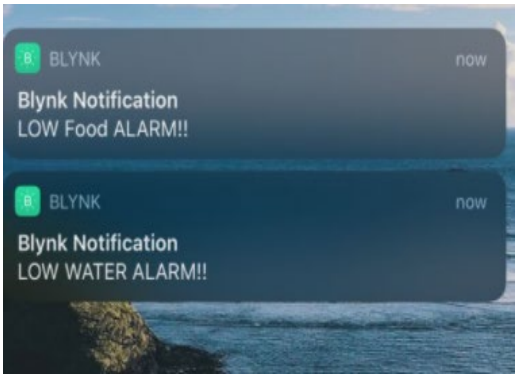

Figure 4.7 The alert notication on user's smart phone notification centre

Figure 4.10 shows the alert notification sends to the user whenever the minimum level of the food and water remained in the food storage.

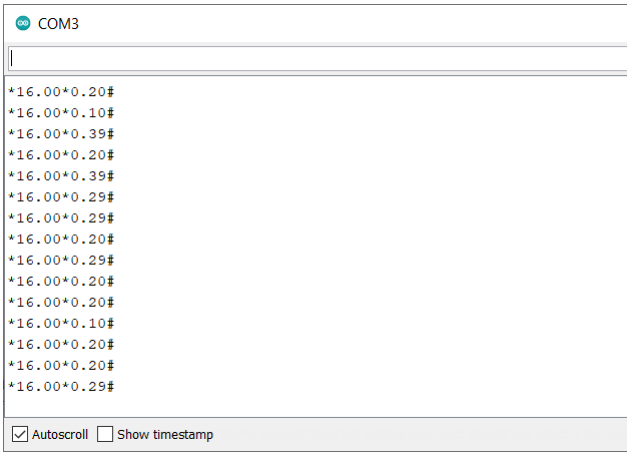

Figure 4.8 Food Dispensing Using Ultrasonic Sensor

Figure 4.8 show the reading data of food dispensing using ultrasonic sensor by using the serial monitor on Arduino IDE software. If the food level is more than 10, it will show that the food is low and will send alert notification of "Low Food" to user's smartphone.

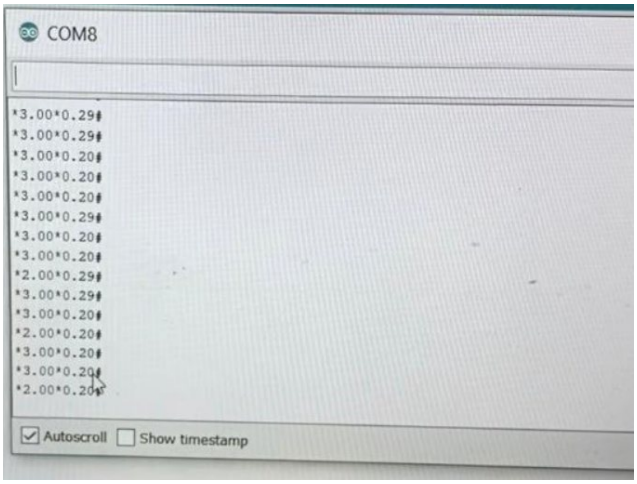

Figure 4.9 Water Dispensing Using Water Pump

Figure 4.9 show the reading data of water dispensing using water pump by using the serial monitor on Arduino IDE software. If the water level is less than 20, it will show that the water is low and will send alert notification of "Low Water" to user's smartphone.

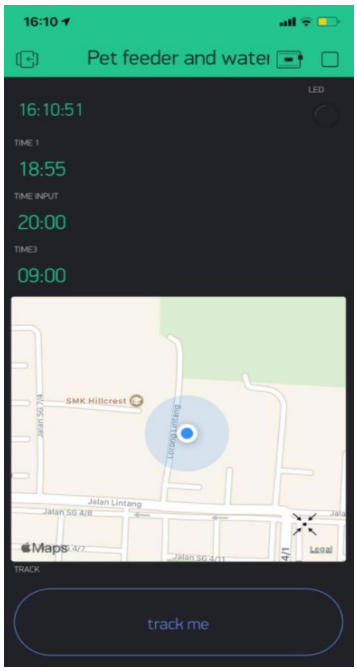

Figure 4.10 Location of Cat

Figure 4.10 show the location of cat by using Google Maps. It can track the location of cat as long GPS Module are connected to the WiFi.

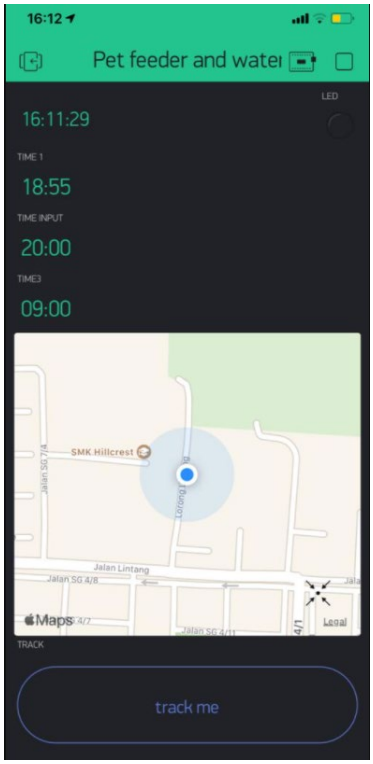

Figure 4.11 Location of Lost Cat

Figure 4.14 show the location of lost cat by using Google Maps. It shows that pet owners can track the location of their pets without having to worry about losing them.

V. CONCLUSION AND RECOMMENDATION

I. Conclusion

This project has presented the Automatic Cat Feeder and Location Tracker. To use the system, the cat owner at first must have a reliable internet connectivity to ensure the product to run smoothly. The system utilizes the principle of able to dispense the cat food and water after clicking a button on the Blynk application and send the signal to the servo moto to rotate food and water pump to dispense water.The machine-based pet food and water dispenser give the cat owners the power to control the feeding time of their pets on the desired time they want even wherever they are. It also notifies the user of low storage level of cat food and water to alert owner to refill. The system also focuses on helping the users, especially cat owners, to track their pet's location by providing a GPS module.

II. Recommendation

In order to improve the project functionality and implementation in the future, several suggestions are proposed. Firstly, the water pump used battery to dispense water. This battery need to be recharged and the power from battery is temporary. It is recommend used a power supply for the water pump instead of battery because the power supply provide power constantly.Next, the coverage of location cat is depend on internet connection. So if the cat walk far away, the coverage is lost to detect the location of cat. Hence, to solve the problem is by using sim card either pre-paid or pay monthly plan that can put on cat collar. Lastly, for this project prototype can add more features such as create another system that can monitor cat health. That system can help the pet owner to check cat daily health report and get instant notification of any critical changes.

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