

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

Automatic Pet Feeder via IOT

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Abstract: IOT technology allows someone to control and monitor an object to the internet network. Pet feeder as a tool to pet the animals which is equipped with a communication network and can be controlled over the distance through a web server, it is different from the pet feeder tool in general, it works when the owner gives order through a web server. The design of the tool was divided into two parts, they were software and hardware, the software used IDE Arduino and ESP8266, servo motors, and buzzer. The system applied to the pet feeder worked well, the time to display the web server only takes for about four seconds, while to determine the availability of food in containers and tanks could be done by utilizing some software and the internet access even the controller was in the distant places.

KEYWORDS: Internet of things, Pet Feeder, Web Server.

I. INTRODUCTION

Nowadays most of us fascinated to have pets at their home. But these pets have to be taken care properly. Their feeding on time is an important task as they become part of our family. But in our busy schedule we fail to pay attention on our pet thus it doesn't get proper food on time. This paper addresses the above issue by introducing an Automatic Pet Feeding System to ensure feeding pet on frequent interval of time. Automatic Pet feeding System consists food storage, servo motor, dispenser, feeding bowl, etc. It also features ESP8266 to automatically control the operations as well providing food by issuing order through web server. It is also possible to make more hi-tech by adding cameras and audio box to check the activities of pet and talk to it.

Automatic pet feeding system features a machine which can feed pets (e. g, dogs) by getting order from the master via web server (Google assistant). By using this machine master don't have to stay with his pet every time to feed it and he gets liberty to do his work outside without caring about his pet. Dish for feeding pet could be filled in number of ways one is we can set time using ESP8266 which is displayed on LCD screen fitted on body of pet feeder. There are some pet feeders available in UK. They are either the type that rotate and unveil a meal, up to four times only, or the half descent machine with a hopper is hard to program, forgets everything if you remove the batteries, and frequently fails to even deliver any food. America has some good machines but they start at \$300 USD, and shipping would be painful to the India, so we decided to make one.

II. LITERATURE REVIEW

A. INTERNET OF THINGS (IoT)

Over the last few years in the world of wireless telecommunications there is a new technology called Internet of Things (IoT), which has received much attention in academia and industry. The method uses by Internet of Things is a wireless or automatic control without knowing about distance. The implementations of the Internet of Things are usually following the purpose of the developer in accordance with the application that is created, if a tool created to help monitoring a room then the implementation of the internet of things must follow the flow of programming diagram about the sensor in house, how far is the room can be controlled, and the speed of the internet network used.

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The development of networking technology and the internet such as IPv6, 4G, and WiMAX can optimize the implementation of the Internet of Things, and allows the distance that can be passed furthermore, so it is easier for user to control things.

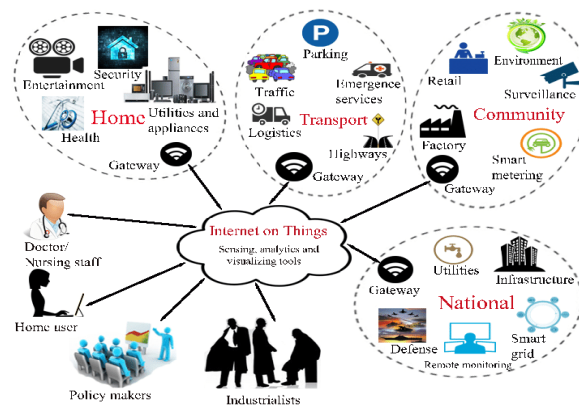


Fig 1: IOT Concept

Internet of things technologies assessed will be very helpful for people in the real world using the sophisticated technology of Internet. IOT aims to connect the real objects to internet, for example, production machinery, automobiles, electronic devices, wearable equipment, and includes any real objects that connect to local and global networks using sensors which is embedded within the object. It can be controlled and provide information to the user.

1. Pet Feeder

Pet Feeder is a tool to feed animals with the purpose to help owners to provide food for their pets. There are two methods of pet feeding, They are:

1.1 Manual Pet Feeder

Manual Pet Feeder is a feeding methodology which still takes human power to control the tool. Here are some examples of manual pet feeder applications:

- Human give the feed manually:
This method is a conventional method and it is still applied until today, where the pet owners provide the feed directly by hand and doesn't have the same dose
- Human give the feed using tools:
Using tools such as push button or lever enable to facilitate people to provide food to the animals because the owner simply pushing the lever, then the feed will be out from the container holding, in addition it provides efficiency for each feed out already have the same dose.

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Fig 2: Manual Pet Feeder

1.2. Automatic Pet Feeder

Automatic Pet Feeder is a feeder tool where the operation doesn't require the human power. There is some deficiency in it, the examples include:

➤ Timer Pet Feeder

This tool works automatically to provide feed. The way it works is user enters a time which is desired for feed and food valve will open according to the dose. It will occur continuously with a predetermined schedule.



Fig 3: Timer Pet Feeder

➤ Gravity Pet Feeder:

Similarly with the timer pet feeder, it does not require human power to operate, it works by utilizing the gravity.

2. WEB SERVER

Web server is a computer device including hardware and software, which provides users with access service via HTTP or HTTPS protocol. A computer equipped with web server will be accessible to other computers using web browser by writing the host name or the IP address and port used.

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III. METHODOLOGY

A. Designing state

This stage will discuss how the tools operate and the components that make up the system.

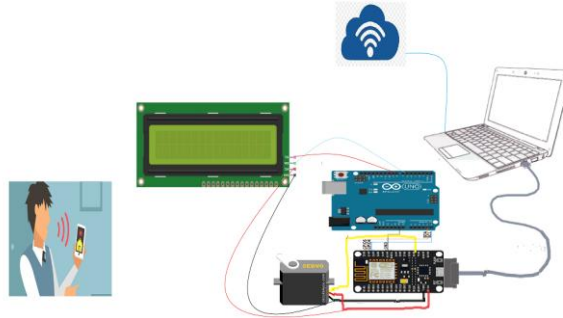


Fig 4: Block Diagram

Based on the block diagram above, the working principle of the tool will be explained.

The hardware kit consists of

- Arduino Uno
- ESP8266
- Servo motor
- LCD
- I²C Module

Arduino Uno:

Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to control the microcontroller. Simply connecting with computer with USB cable to feed the program and get started. We can also power it with a AC to DC adapter or battery to started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the ATmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards, EAGLE files.

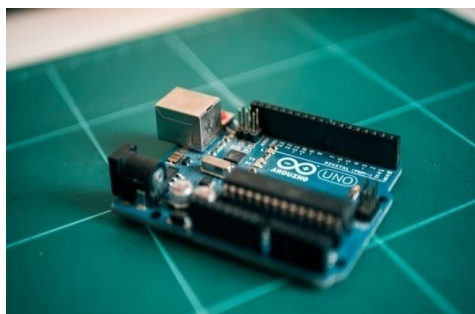


Fig 5: Arduino Uno

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ESP8266:

THE ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi ability as a Wi-Fi shield offers (and that's just out of the box). This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area.

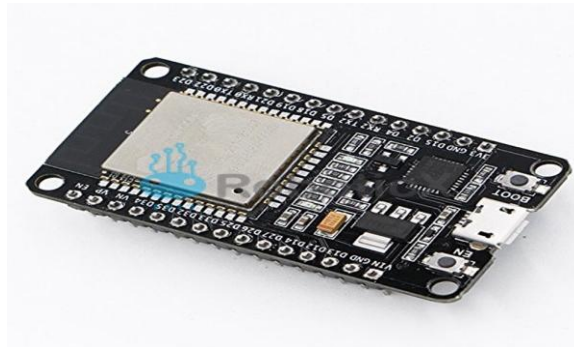


Fig 6: ESP8266

Servomotor:

Tiny and light weight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially since it will fit in small places. It comes with a 3 horns (arms) and hardware.



Fig 7: ServoMotor

LCD:

LCD- LIQUID CRYSTAL DISPLAY

We come across LCD displays everywhere around us. Computers, Calculators, television sets, mobile phones digital watches use some kind of display to display the time. An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16x2 LCD display is a very basic module commonly used in DIYs and circuits.

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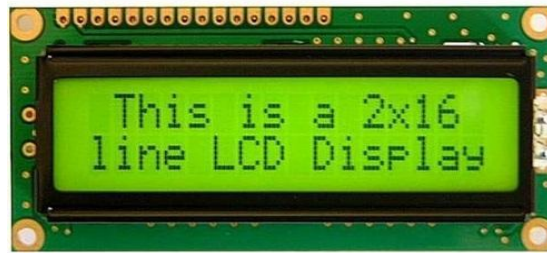


Fig 8: LCD Display

I²C Module:

I²C – Inter Integrated Circuit

A synchronous, multi master, multi slave, packet switched, single ended, serial computer bus. It has two wire interface, one wire for SDA (serial data) another SCL (serial clock). It connect up to 128 slave devices but in real time 112 devices are connected, 16 address are not defined it is the reserved address. It simplifies number of connections and provides a common way (protocol) of connecting different or same type of I/O devices using synchronous serial communication.



Fig 9: I²C Module

Working

There are many ways to implement a pet feeder, you can set to fill the bowl after each interval of time, or you can program to fill the bowl whenever it gets empty, or maybe you provide food by teaching the pet a set of orders.

In this specific project, we set the feeder to start beeping from time to time. Once the pet comes closer to the device, the PIR sensor recognizes it and the servo are triggered.

We can control the pet feeder by using our mobile phone, using a pre-defined dash board made with free board. We saw this as a great opportunity to introduce you to the option of connecting our project to the internet with ESP8266. The Wi-Fi module available on adaFruit.io.

IV. SUGGESTIONS

This study has some weaknesses which can be improved in the completion process by adding some new features such as watering trough, automatic cage cleaner, and animal health sensor. Moreover, a smarter Raspberry Pi

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microcontroller can be added so that a standby PC/Laptop is no longer needed to access a web server from a long distance if a public IP is not available.

ADVANTAGES

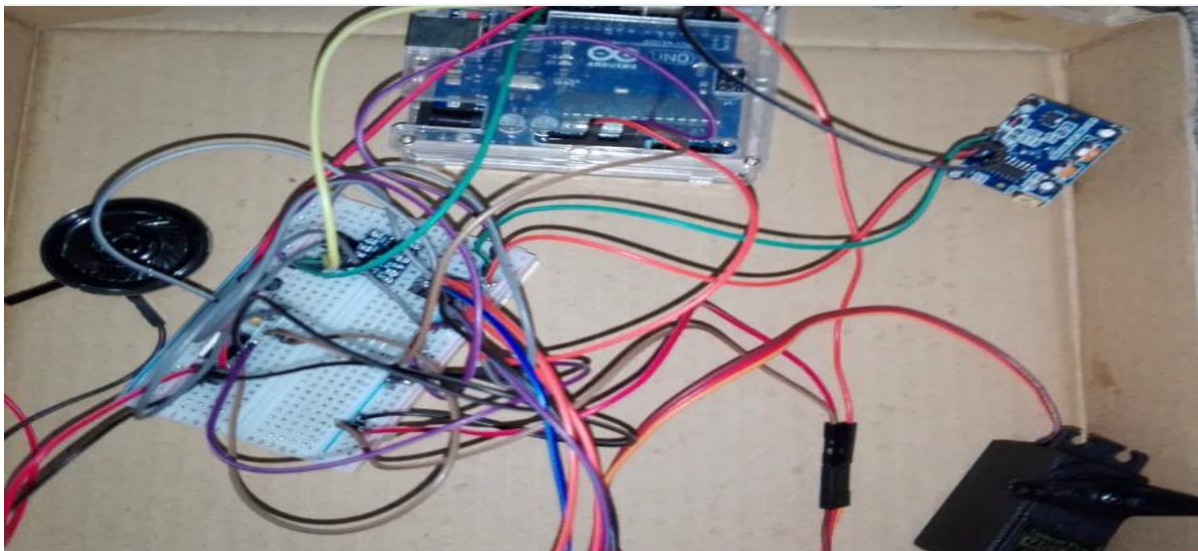
- ❖ No longer need to worry about their pets during business trips or vacations.
- ❖ No longer need to purchase multiple feeders for multiple pets.
- ❖ Seriously avoid the tension for the owners on pets.
- ❖ Keeps the environment very clean.
- ❖ Pets may become very advanced in the new era
- ❖ Pet is feed independently.

V. RESULT

The device we constructed here mainly ensures to feed the pet in a home or at any place without the presence of owner through electronic means and by the mechanical means. Makes the owner and pets very happy. Those people who really love and respect their pets can easily buy this product and ensures the pet is safe.

VI. CONCLUSION

IoT is a platform which can embed both software and hardware. It is obvious from that IoT is an efficient way to access data. Automatic Pet Feeding system was planned to ensure the time to time feeding of pet in absence of its master, so that master can do his other work/tasks without worrying about feeding. Automatic Pet Feeding system has attractive design and aesthetic model. Arduino and IoT add's automation in the system. The report showcased the basic design of the system to made. And also the ESP8266 circuit to control the functions of the system.



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