IOT BASED PET FEEDING SYSTEM

Project report submitted in partial fulfillment of the requirement for the degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

By

AYUSH KUMAR JAISWAL (171002)
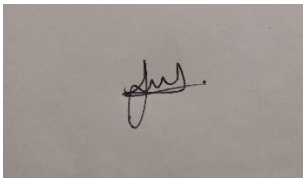
UNDER THE GUIDANCE OF

Dr. ALOK KUMAR

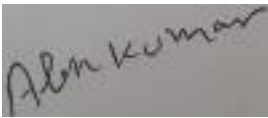**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT**

May 2021

DECLARATION

I hereby declare that the work reported in the B.Tech project Report entitled "**IOT based PET FEEDING SYSTEM**" submitted at **Jaypee University of Information Technology, Waknaghat, India** is an authentic report of my work carried out under the supervision of **Dr. Alok Kumar**. I have not submitted this work elsewhere for any other degree or diploma.

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This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

Dr. Alok Kumar

Date: 21/05/2021

Head of the Department/Project Coordinator

ACKNOWLEDGEMENT

I would like to express the deepest appreciateion to my instructor and mentor, Dr. Alok Kumar, who generously donated his time and vast expertise to help me complete this project on the topic "IOT based PET FEEDING SYSTEM," which also assisted me in conducting significant research and introducing me to many new concepts. I owe him a debt of gratitude.

Second, I wanted to express my gratitude to my lab assistants, who assisted me greatly in finishing this research within the time constraints.

Ayush Kumar Jaiswal (171002)

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ABSTRACT

The aim of the IOT Based Pet Feeding System is to provide a viable and technically found solution to the problem of pet feeding when the owner is not at home. The project provides this option with minimal manpower and effort, through which the owner would be able to serve food to the pet even if he is sitting in any corner of the world. It uses the technology of Internet of Things to connect the entire system to the smartphones, wirelessly. The project uses minimal parts to serve the purpose, that are cheap and are also long lasting. Most importantly, it creates a two-way communication system between the owner and the pet which is a unique feature of the project that is not yet explored in any other similar projects. This system includes an additional IR sensor which can detect any type of motion and it will message to Arduino and the Arduino will further send a notification to the owner who can decide whether to give food to the pet or not, the owner also has the option to manually postpone or prepone the timings of giving food to the pet.

CHAPTER 1

INTRODUCTION

1.1 Introduction:

In both the global economy and everyday life, automation is becoming increasingly necessary. Manual systems are being replaced by automatic systems. According to the findings, automatic feeding control will aid in the treatment of a variety of issues that pets experience as a result of irregular feeding patterns. Automation significantly reduces the need for human sensory and mental requirements, while mechanization provided human operators with machines to assist users with muscular requirements of work. One of the newest inventions for feeding pets is the automatic pet feeder. It will help pet owners look after their animals when they are away from home. Pets can also be fed if their owners the are not at home. The automatic pet feeder is intended to assist pet owners with animal care. An automatic pet feeder is one of the pet feeders that will be operated by a wireless remote control. The wireless reemote control will run the automateed pet feeder, which will automatically dispense predetermined amounts of food at the times set by the user. The project's aim is to assist pet owners in feeding their pets on time, even though they are not at home. Aside from that, it may also assist the owner in understanding their pet's diet. It is important for the owner to consider the pet's diet in order to ensure that the pet is safe. This machine makes it easier for pet owners to feed their pets. The computer feeds the pet and sends the feeding information to the owner in one direction, and it feeds the pet and sends the feeding information to the owner in the other. The computer will stop responding for a period of time after feeding thepet to ensure that it does not overeat. When the number of people who own pets grows each year, so does the market for higher-quality pet care items have been increased. This has moved the Internet of Things (IoT) technology forward in this area. With Arduino Uno boards and WiFi module, the three subsystems are linked to the local network. Furthermore, the information gathered by each sensor is processed and displayed on a smartphone app.

1.2 Motivation

As pet owners, users should be aware that their pets need careful dietary management as well. Life's obligations can also hinder pet owners from adequately caring for their animals. If the customer is unexpectedly away from home or simply wants to focus on something else, they can be assured that their beloved pet will be cared for and fed on time, every time. The aim of this project is to make pet ownership easier for owners by providing an automatic pet feeder. Furthermore, we discovered a market gap while searching for a comprehensive framework for tracking and controlling these three devices. Some pet care apps, such as Petsafe, only have a food feeder app rather than adding water dispensers and litter boxes to create an ecosystem.

The feeding and defecation roles of pet care systems were included in the above study. However, when it comes to a more in-depth health study, the data obtained by these three programmers is inadequate. As a result, the current research aims to combine three basic pet care subsystems while still keeping a more detailed record of a pet's health status. As a result, pet owners can use a mobile application to get a rundown of their pet's basic condition at any time and from any place.

Then there are illnesses that pets suffer from as a result of irrational feeding habits, suchas obesity and overeating.

Labrador Retriever: Obesity

Any dog can become overweight, but labs are especially prone to it. And just like with people, obesity is linked to health problems in dogs. Labs need vigorous daily exercise. If your lab is constantly begging for more food, try giving them raw carrots, green beans, or apples to snack on. Since prevention is easier than weight loss, it's best to consult with your vet on a diet plan that's right for your pet.

Fig 1.1: Dog description

CHAPTER 2

LITERATURE SURVEY

Introduction

One of the issues with a dog's upkeep is daily feeding. Because of their jobs, owners sometimes neglect to feed their pets. The Smart Dog Feeder is the solution to these issues. This system will feed the dog on a daily basis without interfering with the owner's job. On their Android smartphone, owners can monitor anything they want to monitor like pet feeding and all. Smart Dog Feeder can provide RFID authentication, set feeding time and portion per serving via Android smartphone, send feeding report (compeleted or incomplete), and send dog arrival when feeding time arrives.[1] All feeding time, component, stock, and waiting   to time settings will be rendered on Android, which requires Jelly Bean of the version, SDK 18, and the Appliance Hub application to function. The MQTT protocol is the used by the Smart Dog Feeder to obtain stock information, feed schedules, wait time, and the owner's name from the server of system.[2] Smart Dog Feeder, Android, and the server will process all information sent in JSON format. Smart Dog Feeder will save the schedule and trigger the RTCalarm, which will sound when it is time to feed the dog. The RFID tag attached to the dog's collar is checked during the authentication process. Food will be served and weighed by the load cell of the depending on the user's preferences. The experiment includes punctuality, portion accuracy, setting delivery, and system notification. As a result of the experiment, Smart Dog Feeder will receive messages from the server and feed at the appropriate time. More devices may be added to the Appliance Hub in the future.[3]

Over time, an increasing number of households started to have pets. As more pet owners struggled to find time to feed their animals, pet feeders were created. Pet feeders are daily food dispensers that have been pre-programmed.[4] They are primarily timed, dispensing a certain amount of food at a specific time of day. A microcontroller is used to power the pet feeder, which is a programmable device. Users will be able to choose the food that will be served at their preferred time. [5]

One of the pet feeders that will be operated by a wireless infrared remote control is an automatic pet feeder. The automated pet feeder is operated by a wireless infrared remote control and will automatically dispense preset quantities of food at the times the user specifies. [6] As pet owners, users should be aware that their pets need careful dietary management as well. Life's obligations can also hinder pet owners from adequately caring for their animals. If users are away from home unexpectedly or just want one less choreeo to worry about, they can rest assured that their beloved pet will be cared for and fed on time, every time.[7] Pet ownership should be pleasure, not taxing, and the aim of this prroject is to maker pet ownership easier for owners by providing an automatic pet feeder. The aim of the project is to help the pet owners feed their pets on time, even when they aree not at home. [8] Apart from that, it could heelp the owner understand their pet's diet. To ensure that the pet is healthy, the owner must consider the pet's diet. This machine makes it easier for pet owners to feed their animals.The computer feeds the pet and sends the feeding information to the owner in one direction, and it feeds the pet and sends the feeding information to the owner in the other. The computer will remain quiet for a while after feeding the pet to ensurethat it does not overheat.[9]

In 2017 a paper was published that had the same function as ours in terms of feeding the pet. However, the developer attempted to add a new feature into this system, which was a pet collarthat was used to monitor the location of the pet. The biggest drawback is that it was made for petswho spend most of their time at home, so using a tracker makes no sense[10] This device was developed as an alternative to manual feeding in the form of an automated feeding system. The key flaw we discovered with this system was that it relied on a web application to track and feed pets automatically. Since using a web application is not a viable choice, our device includes an Android application that can be accessed from anywhere. The paper "Automatic Pet Feeder Using Arduino via IOT" was published in the International Journal of Innovative Research in Science

and Technology (IJIRSET) on March 3rd, 2018. As the name implies, this was a system created to automatically feed pets as an alternative to manual feeding. But the biggest drawback was that it was built on Arduino, which isn't necessarily a bad thing, but we prefer the Raspberry Pi. "The Study and Application of the Internet of Things in Pet Systems," a paper that was published online in January 2013 (http://www.scirp.org/journal/ait) and included Chinese students. The smart pet door was the first gadget in the pet monitor scheme, and it can assist the pet owner in controlling their pet's behaviour. The smart pet feeder is the other unit. The pet owner could arrange the pet eating bowl time remotely with the aid of the device. They also included a pet door as a drawback, which might not be the best option, but our system has a camera as a backup.[11]

CHAPTER 3

METHODOLOGY

The IoT based pet feeder system adopts a dynamic control methodology. According to the proposed plan, initially, the user will first fix the time to feed the pet as per the pet's need. At the fixed time, the user will receive an alert on the smartphone via UI platform seeking permission to feed the pet, the user can also deny the same and postpone the time.

If the user gives the permission, then he would be asked for the number of doses to be given, followed by which it would send a signal to the Wi-Fi Module.

After receiving the signal from the user, the PIR sensor upon detecting the pet would send a signal to Arduino, which would permit the motor to dispense the food.

3.1 Existing System

Programmable Pet Feeder and Smart Pet Care System are two examples of previous research on automatic feeders. They aren't specifically for feeding dogs, but rather for pets in general. A microchip PIC18F4520 microcontroller feeds the Programmable Pet Feeder automatically. The speed and positioning are regulated by a stepper motor, and the food is dispensed by a DC motor. Turn-Table is the name of the food dispenser, which is divided into four parts and can dispense various types of food. When feeding time arrives and the food is ready to be served, the buzzer rings. Users can utilize the LCD to program each section's schedule and input their chosen time.

An automatic feeding, an automatic faeces pad, a camera with Raspberry Pi, and a smartphone app make up the Smart Pet Care System. At the 2016, International Conference on Computer, Control, Informatics, and its Applications, the automatic feeder has three layers that dispense and distribute the food. The feeding mechanism is regulated by Arduino, and the serving size is determined by a weight sensor. The automatic feeder and pooping pad are both monitored using a Raspberry Pi camera. The Raspberry Pi serves as a server as well. In the app, the user can choose the serving size and the schedule for three times. The application, unfortunately, is only available in Korean.

The Programmable Pet Feeder only has four dispensers, so it can only feed four pets at a time, and the user must set the times.

The device can be set up using a smartphone, but to user would not be able to see the feeding history. It comes with a camera, so the user must watch it to see what their pet is up. The plate that feeds the pet is depicted in the diagram below. The issue is that it can only serve four items at a time, and if it becomes caught in between or has difficulty rotating, the food willnot be served.


Fig 3.1: Turntable

One of the newest inventions for feeding pets is the automatic pet feeder. It will assist pet owners in caring for their pets when they are away from home. And if the owners are not present, their pets may be fed. Automated pet feeders are designed to assist pet owners in caring for their animals.An automatic pet feeder is one of the pet feeders that will be controlled by a wireless the infrared remote control. The machine driven pet feeder will automatically dispense the to quantity of food at the exact times the user specifies using a wireless infrared remote control. Users should keep in mind that their pets, too, need to be careful of the dietary management of the pet. Life's responsibilities can also make it difficult for pet owners to provide proper care for their animals. If users are away from home unexpectedly or just want one less chore to worry about, they can rest assured that their beloved pet will be cared for and fed on time, every time.

An Arduino Uno board, as well as an ESP8266 ESP-01 Wi-Fi module, which has an integrated TCP/IP protocol stack and can link the Arduino board to a Wi-Fi network, monitor each subsystem in this pet care device. All of the systems are also connected to the Blynk smartphone framework, which acts as a control, tracking, and statistical display platform. The Arduino board is supported by Blynk, an iOS and Android platform that supports a variety of board modules. As a consequence, it is used as a GUI and to communicate with the Arduino mainboard. Sensors on each that have to subsystem device send data over the Internet to a home gateway, which is then forwarded to the Blyynk server, and finally to the Blynk app on the smartphone. The actuator, on the other hand, receives the commands that the Blynk app originally sent.

The current system's block diagram is shown below. Since they used a Microcontroller instead of an Arduino UNO, their system became quite complex. Since they are using a microcontroller, they must use a power supply to provide power to it. Then they used a Turntable and Tray, which allowed them to dispense a specific form of food all at once. All of this makes their circuit very complex and difficult to use by ordinary people.
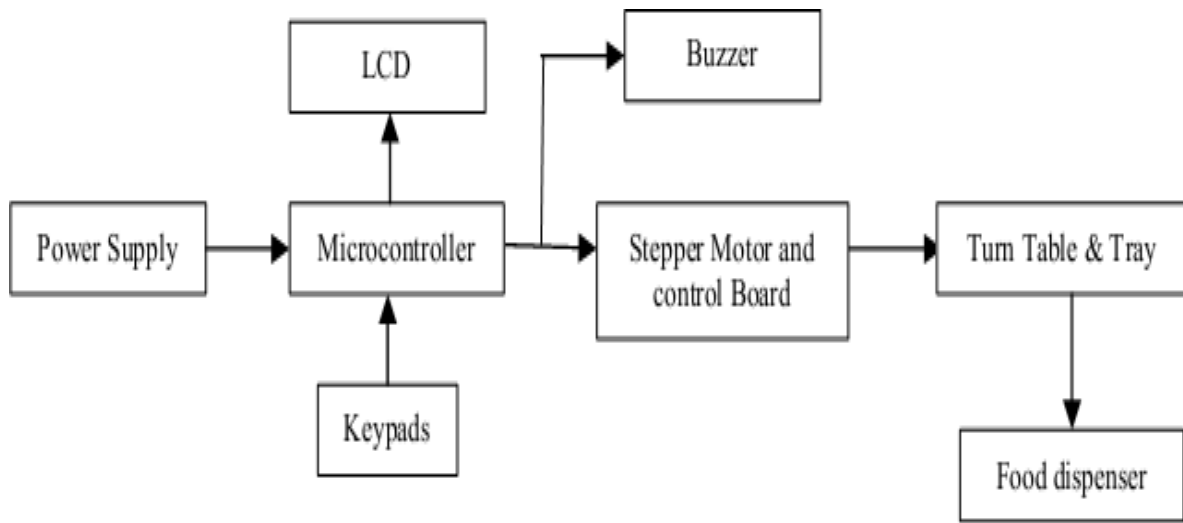
Fig 3.2 Block Diagram of Existing System

3.2 Proposed System

In today's world, people get quite busy in their office work or their office work make them forget everything. Due to this, the people who own pets forget about them and even forget to feed them. Because these pets get the disease or become unhealthy because of food not be given at the proper time. There are also times when the owner wants to go somewhere for some days but can't go because of the problem of who will serve food to the pet. To solve this problem many projects have been made. Even their automatic pet feeder system on amazon, which anyone can buy but it's quite expensive and many can't afford it. Another fault in the projects that have been made on this topic is that either the project is dependent on the owner or the pet. It means that when the food should be given is either totally based on the owner or the pet. There is no 2-way communication.

But our model cover's all the problems above mentioned and solves it. Our model is quite inexpensive. It can be brought by anyone. Our project is not dependent on anyone because it follows the 2-way communication due to some set of conditions.

We would be making our project using IoT. We would be using Arduino UNO. Many systems used Microcontrollers instead in Arduino UNO which made them more complex and costly. So, to tackle this we used Arduino UNO.

3.3 The Architecture of Proposed Work

But all the problems described above are our model cover and solve it. Our model is fairly cheap. It can be delivered by anyone. Our project is not dependent on anyone because, due to some set of circumstances, it follows 2-way communication. Using IoT, we'd be making our project. We'd use Arduino UNO. In Arduino UNO, many systems used microcontrollers instead which made them more complicated and expensive. So we used Arduino UNO to fix this.

So our proposed system is like this. First, we will fix time after every how many hours the food should be given to the pet. This will be based on the pet's diet. After fixing that whenever the pet comes in front of the system then the PIR sensor will detect it. If the time has come to feed the pet then the alert will be sent to the owner's phone via SMS or the notification will be popped via the UI that we have created on the owner's phone. Then it's up to the owner whether he/she wants to give the food to the pet or not. Now if the pet is hungry and he wants the food then if the pet stands in front of the system for more than a certain time, an alert will be sent to the owner that the pet is hungry and he wants food. Then from that Dashboard, the owner can select how many doses of food he wants to give. Each dose contains the same amount of food. If let owner select 2 doses then, the bottle will rotate 2 times with the help of the Servo Motor, and 2 doses will be given. Whenever the food is being dispersed then the buzzer will begin to beep. But now, the thing that we have covered in this project that no one has covered till now is that if by chance the owner forgets to give food to the pet or he doesn't receive the notification on his phone, then the food will automatically be given to the pet. Due to this, the pet will not be hungry and the owner will be satisfied that if he is not able to give food via UI then also food will be given. Here we have to set the time or duration after which the food is automatically given.

So, the main components that would be used by us in this project will be:

1) PIR Sensor

2) Arduino UNO

3) WiFi Module

4) Speaker or Beeper

5) Servo Motor

Our system will always be online via a WiFi module. The WiFi module will always be connected to the home local internet or WiFi due to which it will always be online. Due to this only we can control all the functions of our system via Dashboard.
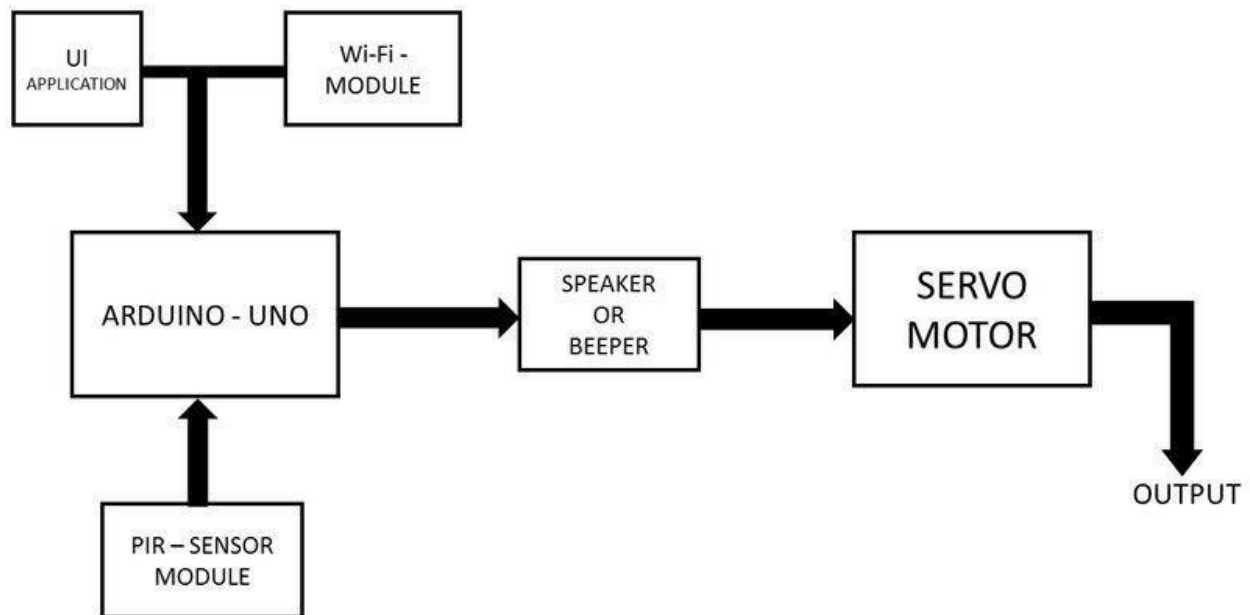
Fig 3.3: Proposed System Block Diagram

3.3.1 Circuit Diagram of Proposed Work

Fig 3.4 shows the circuit diagram of the proposed Pet Feeding System. The main components in the circuit diagram are Arduino UNO, PIR Sensor, Speaker, Servo Motor, and ESP8266 WiFi Module.

Ground terminals of all the sensors are connected with the GND terminal of the Arduino as you can see in Figure 3.4. As seen in the block diagram, the sensors' Vcc terminal is attached to the Arduino's +3.3V terminal.

The PIR Sensor has 3 Pins:

1) Vcc - Power Supply Pin
2) GND - Ground Pin
3) I/P - Input

So, the PIR Sensor pins are connected to Arduino in the following way:

1) The Vcc of the PIR Sensor already connected to the +3.3V terminal pin of the Arduino UNO.

2) The GND of the PIR Sensor is also already connected to the GND pin of the Arduino UNO.

3) The I/P of the PIR Sensor is connected to the PIN 3 of Arduino UNO Digital Pin

The next main sensor used is Speaker. The Speaker has 2 Pins.

1) I/P - Input Pin
2) GND - Ground Pin

So, the Speaker pins are connected to the Arduino in the following way:

1) The I/P of the speaker is connected to the Arduino UNO Digital Pin PIN 4.
2) The GND of the Speaker is already connected to the GND of the Arduino UNO.

The sensor used is the Servo Motor. Servo Motor has 3 pins.

1) Signal Pin - Input Pin

2) Vcc - Power Supply Pin

3) GND - Ground Pin

So, the Servo Motor pins are connected to the Arduino in the following way:

1) The Signal Pin is wired to the Arduino UNO Digital pin PIN 12.

2) Vcc is already wired to the Arduino UNO's +3.3V.

3) The GND pin is already attached to the Arduino UNO's GND.

And the last sensor used is the ESP8266 WiFi Module. There are 8 pins in the ESP8266 WiFi Module.

1) GND - Ground Pin

2) TX - General purpose IO and Serial TXd

3) CH_EN - Chip Enable Pin

4) GPIO 2 - General purpose Input/output pin

5) GPIO 0 - General purpose Input/output pin

6) RESET - Reset Pin

7) Vcc - Power Supply Pin

8) RX - General purpose IO and Serial RDX

So, the ESP8266 WiFi Module pins are connected to Arduino in the following way:

1) 1) The Arduino UNO's GND pin is already attached to the ground.

2) 2) TX is wired to the Arduino UNO Digital pin PIN 1.

3) 3) The Arduino UNO's +3.3V power supply is wired to CH EN.

4) 4) GPIO-2 and GPIO-0 are not wired to any of the Arduino UNO's pins.

5) 5) The Arduino UNO's RESET pin is attached to the GND pin.

6) 6) The Arduino UNO's Vcc is already wired to +3.3V.

7) RX is connected to the PIN 0 of the Arduino UNO.
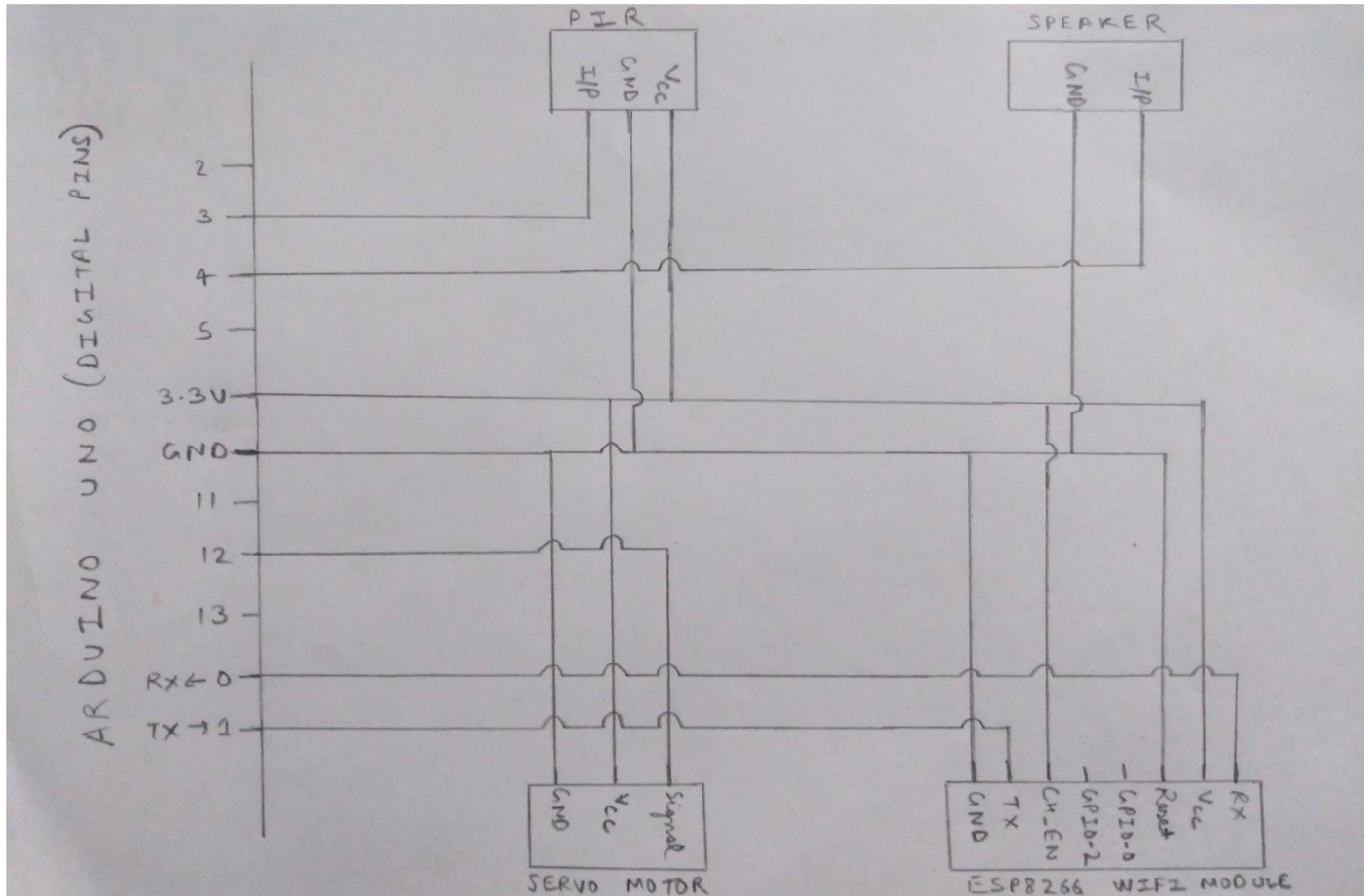
Fig 3.4: Circuit Diagram of Proposed System

(a) ARDUINO UNO

Arduino UNO is an open source microcontroller to based on the ATMega328P microcontroller built by Arduino.cc. The board has several digital and analogue input/output pins that can be used to attach to a var ety of sensors and expansions. It has 14 optical input/output pins and 6 analogue input/output pins. We can connect the Arduino with Type B USB cable to any laptop or computer and can code on it with the help of Arduino IDE which is the interface for coding on Arduino. Arduino is powered by a USB cable but it can also be powered using an external 9V battery. It accepts a voltage between 7V to 20V. It's working and how to

use it is available on the website and anyone can read and refer to that. The layout is also available on the website with different updates.

Arduino UNO has various input and output pins out of which 14 of them are digital pins and 6 are analog pins. Did pins have external inputs Arduino UNO is different from all other boards and theydon't use the USB-to-Serial driver chip. Digital pins also do Pulse Width Modulation.
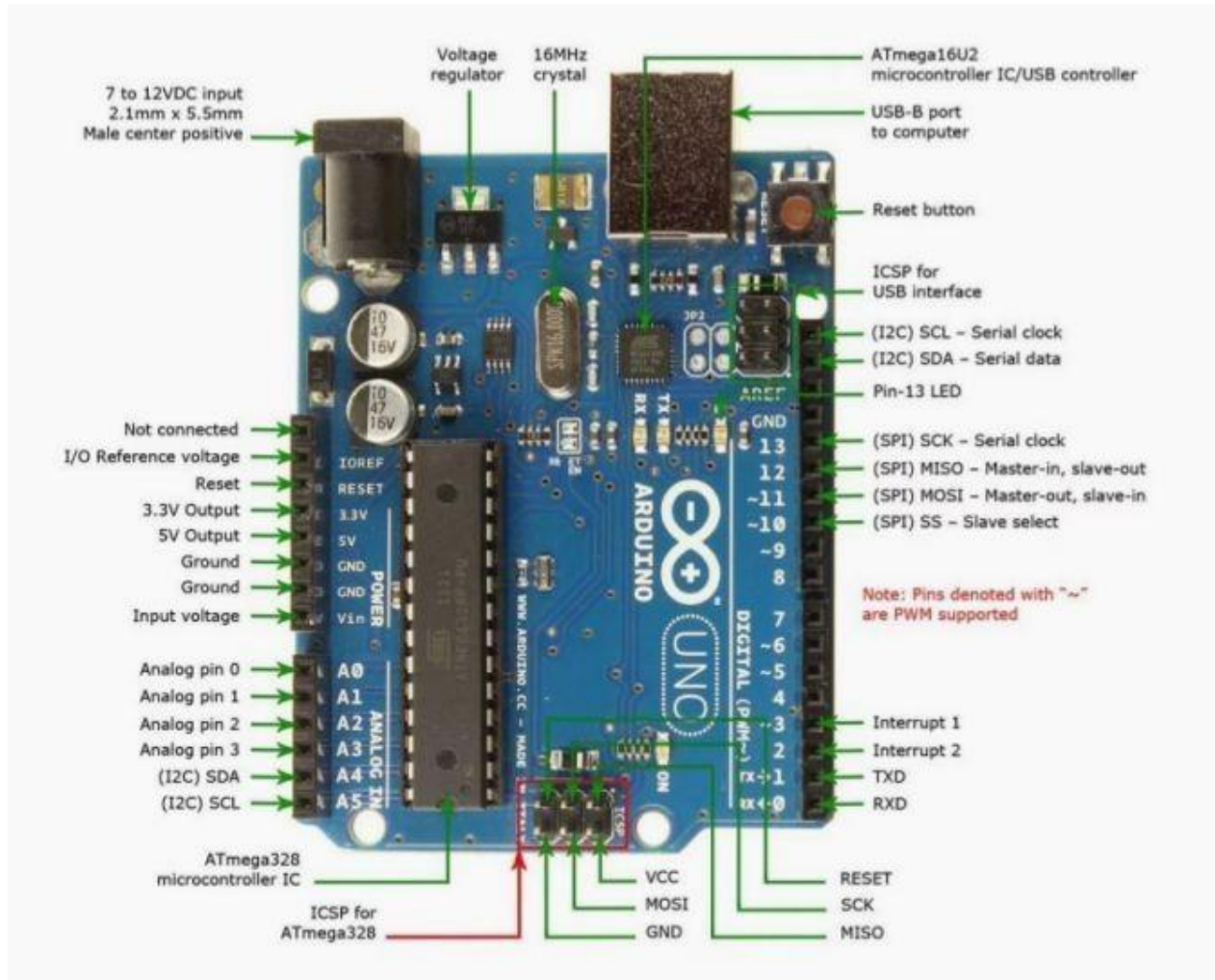
Fig 3.5: Arduino UNO
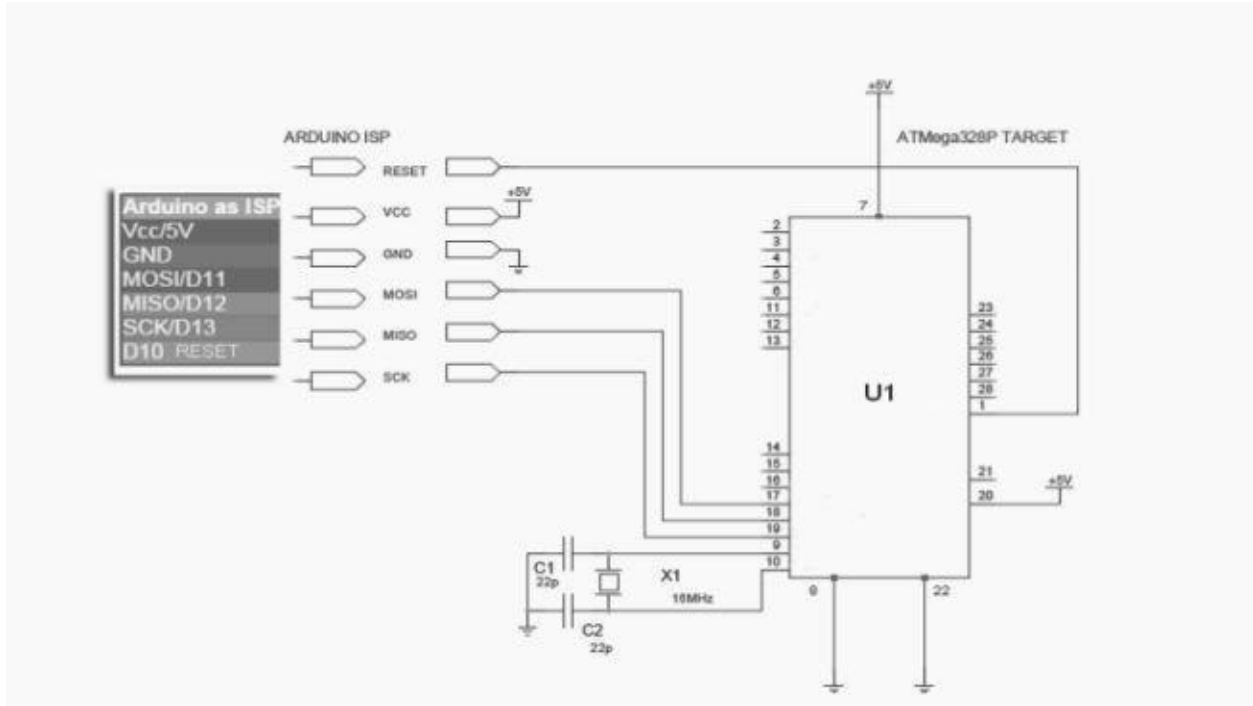
Fig 3.6: Circuit Diagram of ATMega 328P

The microchip ATMega328P comes that with 32KB flash memories. lt combines it with the read – while - write capabilities. lt is Power 8-bit AVR RISC-based microcontroller. lt also has 32 general purpose working registers. lt has I KB of Electrically Erasable Program le Read-Only Memory. lt also has a watchdog timer with an internal oscillator. lt works within the range of 1.8V to 5.5V.

When these instructions are executed in a single clock cycle, throughputs of the about 1 MIPS per MHz are achieved. It strikes a balance between power consumption and processing speed.

(b) PIR SENSOR

PIR sensor is some like the IR sensor. The full form of the PIR Sensor is a Passive Infrared Sensor. lt also detects the motion of things and tells whether there is something or not. It's a sense of

whether there is a person in its sensing range or not. They are very cheap and easy to use. lt use low power This the reason why they are commonly seen in home appliances like the remote or Tv's etc.

In the below diagram you can see that there is a metal can with a rectangular crystal in the center. This part is the pyroelectric sensor which is the PIR sensor. This also detects the infrared waves in the surrounding. As every human being senses some type of radiation, so they detect that. The hotter is the object, the more it emits radiation. So whenever they sense some sort of radiation then they send a signal that there is something in their surrounding.

The passive infrared sensor does not emit any energy into the environment. To sound an alarm, it absorbs infrared radiation from the human body. Every object that has to a temperature emits infrared rays to the outside world. The human body's surface temperatbure ranges from 36 to 27 degrees Celsius, with the majority of its radiant energy disstributed in the wavelength range of 8 to 12 microns. The (infrared probes) and alarm control parts of passive infrared alarms are separated. Pyroelectric detectors are the most popular infrared detectors. It's a sensor that converts infrared radiation from humans into electricity. If human infrared radiation is irradiated directly on the detector, it can, of course, induce a temperature change, resulting in the output of a signal. However, the detection distance would not increase as a result of all of this. An optical device to absorb infrared radiation must be added to extend the detection distance of the detector. Infrared radiation is usually focused using a plastic optical reflection device or a plastic Fresnel lens.

The ranges of PIR Sensor are:

1) Indoor passive infrared: detection distances vary from 25 cm to 20 m.
2) Outdoor passive infrared: detection distances range from 25 cm to 20 m.
3) Indoor curtain-type detectors have a detection range of 25 cm to 20 m.
4) The detection distance for outdoor passive infrared ranges from 1 meter to 150 meters.
5) Detector for outdoor passive infrared curtains with a range of 10 to 150 meters.
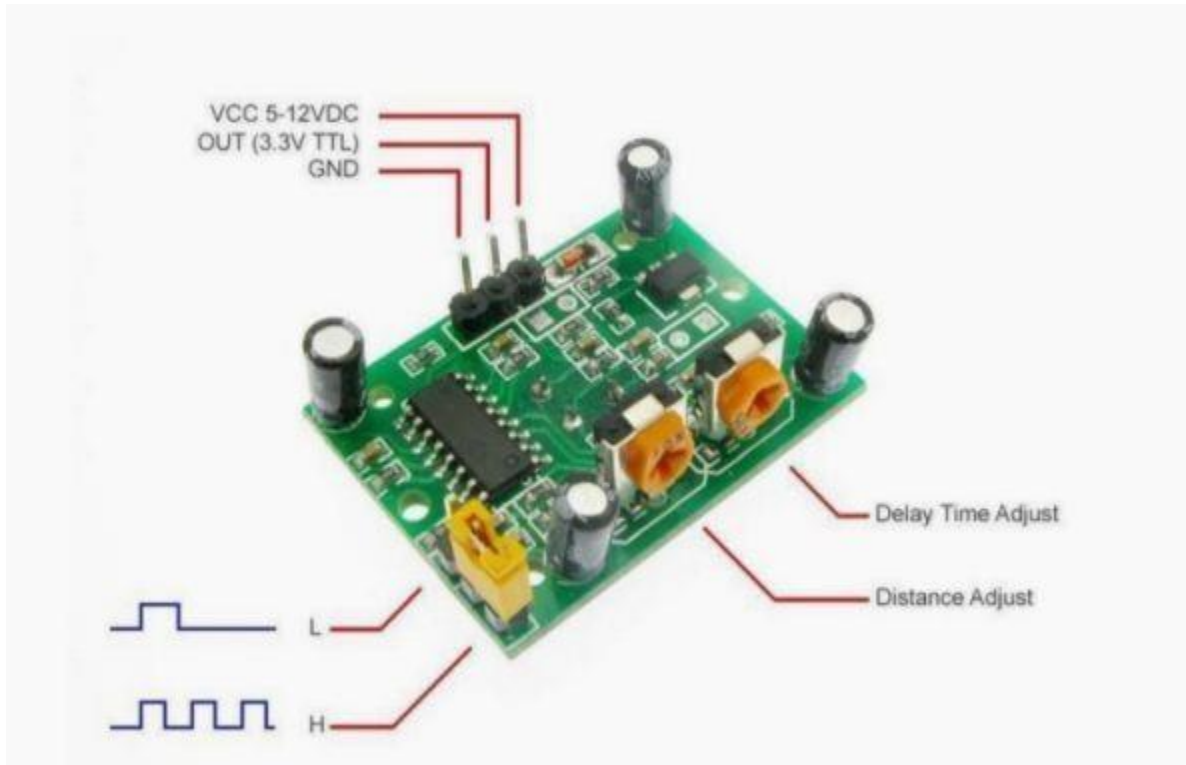
Fig 3.7: PIR Sensor
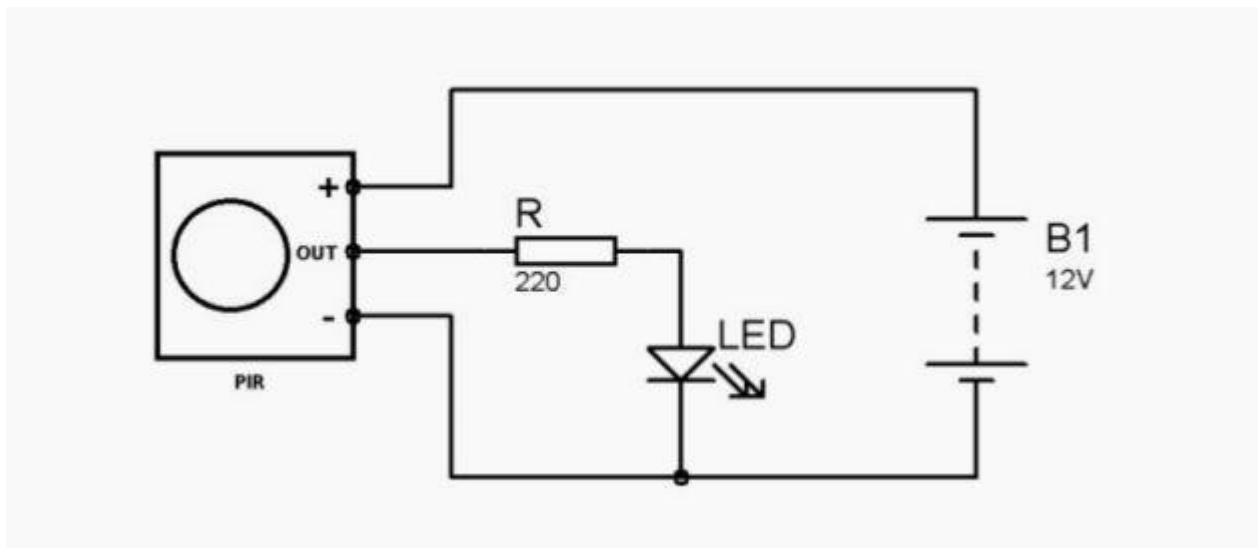
Fig 3.8: Circuit Diagram of PIR Sensor

(c) EP8266 WIFI MODULE

The Espressif system developed the ESP8266, a Wi-Fi-enabled system on chip (SoC) module. It's mostly used to build embedded IoT (Internet of Things) applications.

ESP8266 comes with capabilities of

- Wi-Fi (802.11 b/g/n, supporting WPA/WPA2), 2.4 GHz

- Input/output device that can be used for a variety of purposes (16 GPIO)

- The serial communication protocol Inter-Integrated Circuit (I2C)

- Analog-to-digital conversion is a term that refers to the conversion of analogue signals into digital signals (10-bit ADC)

- Serial Peripheral Interface (SPI) is a serial communication protocol that was developed by Intel.

- UART (on dedicated pins, plus GPIO2 can be used to allow a transmit-only UART), and pulse-width modulation (PWM).

On a 32-bit RISC CPU based on the Tensilica Xtensa L106 (or overclocked to 160 MHz), it runs at 80 MHz. A 64-kilobyte boot ROM, a 64-kilobyte instruction RAM, and a 96-kilobyte data RAM all included. External flash memory can be accessed using SPI.

To communicate with the ESP8266 wifi board, the microcontroller that must use the series of AT commands. The microcontroller is connected to the ESP8266-01 module via UART at a specific Baud rate.

This chip is used by a variety of third-party manufacturers to create various modules. As a result, the module includes a variety of pin availability options, such as,
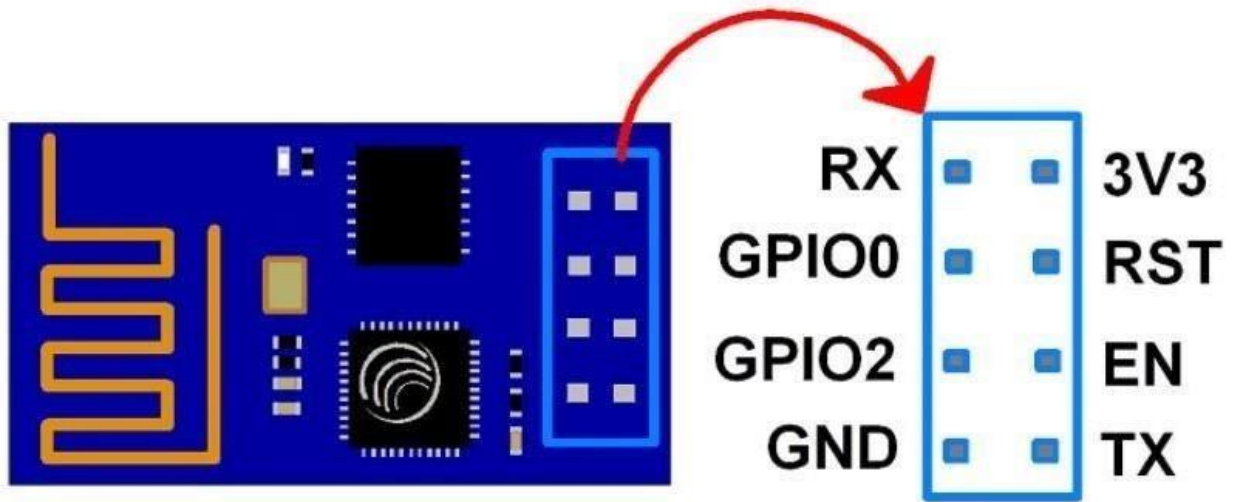
- The ESP-01 has 8 pins (2 GPIO pins) for the PCB trace antenna.

- The ESP-02 has an 8-pin U-FL antenna connector (3 GPIO pins).

- The ESP-03 has 14 pins (7 GPIO pins) and a ceramic antenna.

- The ESP-04 has 14 pins (7 GPIO pins) and no ant.
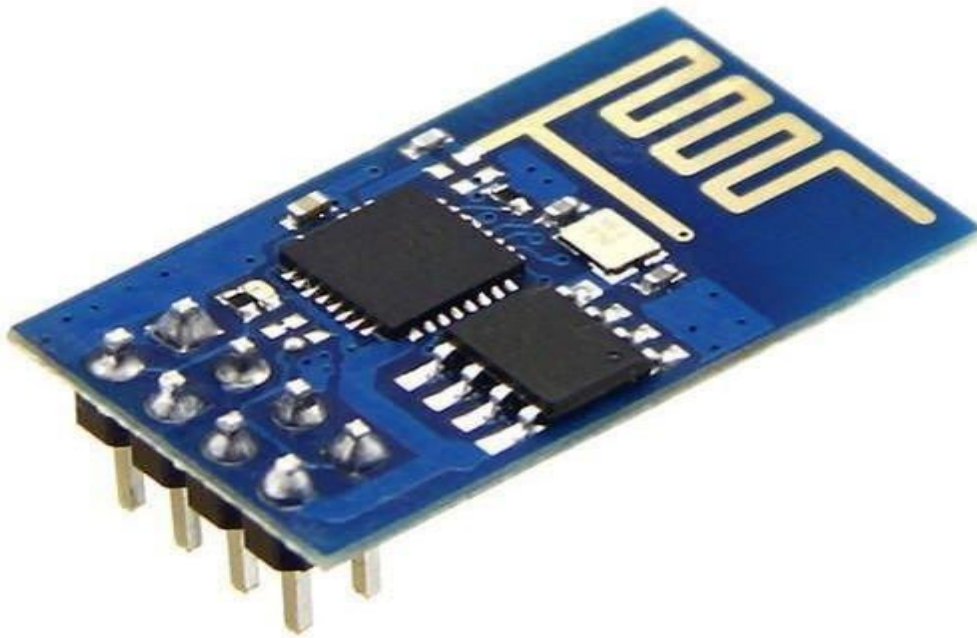
Fig 3.9: ESP8266 Module

The below figure shows ESP-01 module pins.

Fig 3.10: Pin Diagram of the ESP8266 WiFi Module

3V3: - 3.3 V Power Pin.

GND: - Ground Pin.

RST: - Active Low Reset Pin.

EN: - Active High Enable Pin.

TX: - Serial Transmit Pin of UART.

RX: - Serial Receive Pin of UART.

GPIO0 & GPIO2: - I/O Pins for General Purpose. These pins decide the mode (boot or normal) in which the module starts up. It also decides whether or not the TX/RX pins are used for serial I/O or module programming.

Connect GPIO0 to ground and GPIO2 to VCC or leave it open to program the module using UART. Leave both pins open to use UART for standard Serial I/O. (neither VCC nor Ground).

(d) SERVO MOTOR

A servo motor is a motor that rotates with a high degree of precision. Servo motors typically the have a control circuit that provides feedback on the current position of that motor shaft, allowing them to rotate with great precision. When you need too rotate an object at a certain angle or size, you'll need a servo motor. It is made up of nothing more than a simple motor and a servo that do mechanism. A DC servo motor runs on a DC power supply, while an AC servo motor runs on an AC power supply. This tutorial will only cover the operation of a DC servo motor. In addition to these major classifications, there are several other types of servo motors based on gear to do the it operating characteristics. A servo motor's gear configuration allows us to fit a high torque of the servo motor into a small, lightweight package. They're used in a variety of applications, including toy vehicles, RC helicopters and aircraft, robotics, and so on, because of these characteristics.

It is divided into three sections:

1. A computer that can be regulated
2. Sensor of output
3. A method of feedback

The feedback mechanism produces the third signal by comparing the reference input signal to the reference output signal. This third signal is that is used to monitor the system as an input signal. This signal is present as long as the feedback signal is provided or there is a difference between the reference input signal and the reference output signal. As a result, the primary goal of the servo mechanism is to keep a system's performance constant in the face of noise.

The length of the applied pulse to a servo motor's Control PIN, which works on the PWM (Pulse width modulation) principle, controls the angle of rotation. A servo motor consists of a DC motor and gears operated by a variable resistor (potentiometer). Gears convert the DC motor's high-speed power into torque.

WORK = FORCE X DISTANCE, where the force in a DC motor is low of the and the distance of (speed) is high, and the force in a servo is high and the distance is low. To measure the angle and stop the DC motor at the appropriate angle, and the potentiometer is attached to the Servo output shaft.

Fig 3.11: Servo Motor
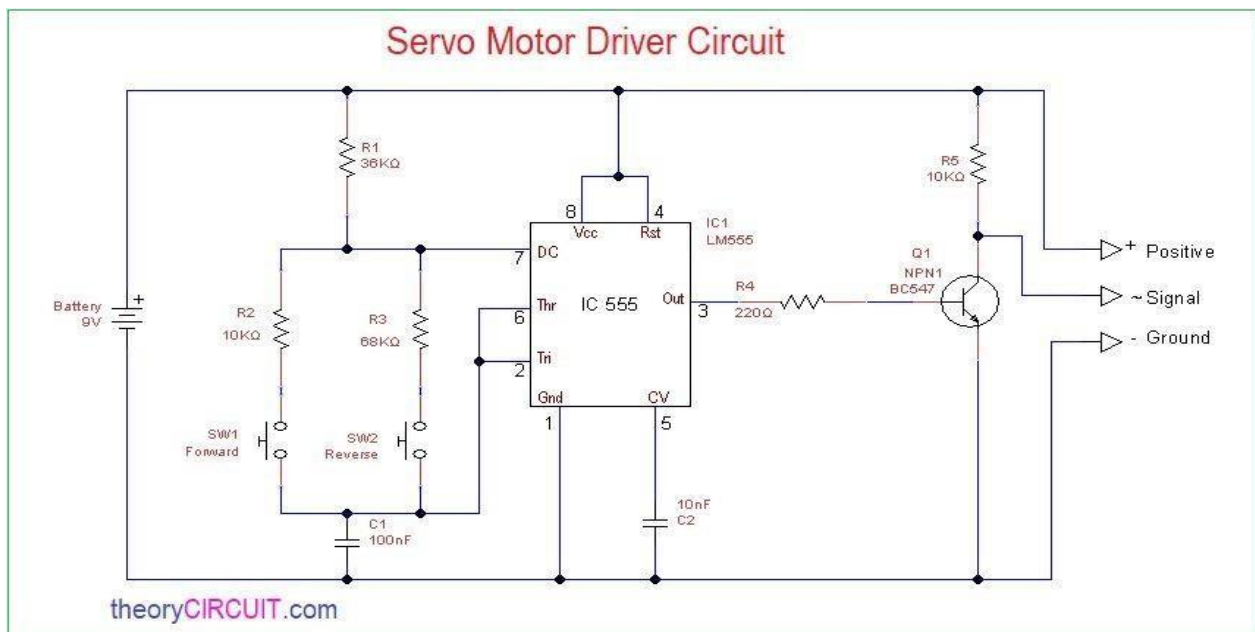
Fig 3.12: Circuit Diagram of Servo Motor

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CHAPTER 4

4.1 CONCLUSION

In today's reality, everything is changing into a smart framework and automation. Individuals need that the thing they purchased ought to be cost-productive and shouldn't make any kind of contamination. Our undertaking SMART PET FEEDING SYSTEM likewise centers around that. It is very cost-proficient and doesn't make any kind of contamination. There are many projects like these in the market but the problems also stick to them. The problems people face are that the system is quite complex to use or it's quite costly. But our project solves these things. It is quite cheap as compared to other systems and quite easy to use. Any non-tech person can understand how to use it as it is user-friendly. We have comprised code on Arduino utilizing Arduino IDE. This framework essentially will diminish some expense and energy and will be easy to use and won't bring on any kind of contamination.

4.2 FUTURE WORK

In the future, we would be working to make this system even more efficient and would try to implement it in a better way and would try to reduce the price of it. Apart from that, we have given a lot of thought to also provide a statistical report through the system itself, through which the owner would be able to track the amount of food and water consumption, along with an increase or decrease in the diet. All of this would be provided on a weekly or monthly basis so that the owner can track all of this information and thereafter, make relevant changes in the feeding pattern of the pet.

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