

Automatic Pet Feeder

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Abstract: *Pets need special treatment and special care. Due to busy life style ,this task is not as simple as it used to be. The goal of this project is to design and implement a smart pet feeder The automated pet feeding system not only addresses a practical need but also enhances the bond between pet and owner by reducing a stress associated with pet care. This project presents a comprehensive solution by automating the feeding process through three methods remote feeding via a mobile, scheduled feeding and voice activated feeding. The system is built using an Arduino as the core controller, a Bluetooth module for wireless communication, a 4 channel relay module to manage multiple devices, and a sound detection sensor to recognize the dog bark .The mobile apps allows owner to remotely dispense food providing real time control when they are away from home . Additionally the scheduled feeding function enables owners to set specific times for the system to automatically release the food , ensuring the dog is fed at regular intervals . If the dog is hungry and barks near the feeding station , the sound detection sensor triggers the system to dispense food.*

Keywords: Arduino Uno , Bluetooth module, Sound detection sensor, IC 555 timer

I. INTRODUCTION

In today's fast-paced world, many people struggle to balance their busy schedules with the responsibilities of pet ownership, particularly when it comes to feeding their dogs. Dogs require consistent care and attention, especially regarding their dietary needs, to maintain good health and well-being. However, managing a regular feeding routine becomes challenging for dog owners who work long hours, travel frequently, or have other personal commitments. Missing a meal or feeding a dog at irregular intervals can lead to health issues like obesity, malnutrition, and anxiety. This problem creates stress for both the pet and the owner, as ensuring that a dog is well-fed and healthy is a major concern for any responsible dog owner.

Traditional solutions, such as hiring pet sitters or asking friends or neighbor for help, can be unreliable, expensive, or inconvenient. While some owners opt for kennel boarding, this can cause anxiety and discomfort for dogs due to unfamiliar environments. Additionally, relying on others for daily feeding doesn't provide the flexibility or assurance that the dog is being cared for properly. As a result, many dog owners are in need of a convenient, reliable, and flexible system that guarantees their pets are fed on time, regardless of their personal availability.

To address this growing issue, the Automated Dog Feeding System offers a comprehensive solution that allows owners to feed their dogs easily and reliably, whether they are home or away. The system is designed to feed dogs through three different methods:

Mobile Command – Owners can use a Bluetooth-enabled mobile app to control the food dispenser remotely, allowing them to feed their dogs from anywhere within range.

Scheduled Feeding – The system allows users to set specific feeding times, ensuring dogs are fed at regular intervals without the need for manual intervention.

E-bark Detection – A sound detection sensor is installed to recognize the dog's bark. When the dog barks near the feeding station, the system dispenses food automatically, ensuring the dog gets fed even if no one is around.

This project integrates several key technologies, including an Arduino Uno microcontroller, Bluetooth module, sound detection sensor, and relay modules, all of which work together to provide a seamless, automated feeding experience. It offers a user-friendly solution that enhances convenience, reliability, and peace of mind for dog owners.

By automating the feeding process, this system not only addresses the practical issue of ensuring consistent feeding schedules but also improves the emotional well-being of both pets and their owners. Owners can go about their daily activities or travel without the constant worry of whether their dogs are being fed on time. The Automated Dog Feeding System simplifies the responsibilities of dog ownership, making it easier to provide proper care for pets and ultimately improving their quality of life

II. LITERATURE SURVEY

Literature Survey for Automated Pet Feeding System. The increasing integration of technology into pet care has paved the way for innovations like automatic pet feeders, providing both convenience and reliability for pet owners. Our project, which aims to automate dog feeding through multiple methods such as mobile control, scheduled feeding, and voice recognition, builds upon prior research in various technological domains. Below are the key studies and literature that provide a foundation for this project.

Smart dog feeder design using wireless communication: All information will be sent in JSON format and will be processed by Smart Dog Feeder, Android and server. The result of experiment is Smart Dog Feeder can receive messages from server and do feeding at the right time. Next development can be done by adding other devices in Appliance Hub system. [1] (2016)

Design and Implementation of an Automated Pet Feeding System using IoT: The use of sound detection technology to interact with pets has been explored in various studies. Research by Zhang et al. (2021) focuses on the effectiveness of sound sensors in recognizing specific commands or sounds made by pets, such as barking. These sensors have been found to be reliable in triggering automated actions, making them ideal for projects involving pet interaction. In our case, the use of a sound detection sensor allows the system to respond to a dog's bark, ensuring feeding when the dog is hungry.[2](2021)

Pet food auto feeder by using Arduino: In this project, Arduino is used as the microcontroller to control the mechanism and to operate the system with a given of set time. Finite element analysis is used to analyze the maximum stress that the designed mechanism can withstand. Furthermore prototype testing on the mechanism with experimental and theoretical was conducted, the result of the analysis is analyzed. The analysis is providing the path to make sure the final concept of the pet feeder is reached.[3](2019)

In this project Arduino used as a microcontroller to control the mechanism to operate the system with a given of set time. Our project which aim to automate dog feeding through multiple method such as mobile control , scheduling , voice recognition , builds upon prior research in various technological domains .

III. METHOD

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 seeking permission to feed the pet, the user can also deny the same and postpone the time .The system is built using an Arduino Uno as the core controller, a Bluetooth module for wireless communication, a 4-channel relay module to manage multiple devices, and a sound detection sensor to recognize the dog's bark. The mobile app allows owners to remotely dispense food, providing real-time control when they are away from home. Additionally, the scheduled feeding function enables owners to set specific times for the system to automatically release food, ensuring the dog is fed at regular intervals. If the dog is hungry and barks near the feeding station, the sound detection sensor triggers the system to dispense food.

Programming for Automatic Pet Feeder

```
char data = 0;
unsigned long previousMillis = 0; // Stores the last time Relay 4 was toggled
const long interval = 15000; // Interval for Relay 4 in milliseconds (15 seconds)
const int relay4OnTime = 2000; // Relay 4 on time in milliseconds (2 seconds)
void setup()
{
```

```
Serial.begin(9600);
pinMode(8, OUTPUT);
pinMode(9, OUTPUT);
pinMode(10, OUTPUT);
pinMode(11, OUTPUT);
digitalWrite(8, LOW); // Ensure relays are off initially
digitalWrite(9, LOW); // Ensure relays are off initially
digitalWrite(10, LOW); // Ensure relays are off initially
digitalWrite(11, LOW); // Ensure relays are off initially
}
```

```
void loop()
{
  unsigned long currentMillis = millis();
```

```
  // Check for Bluetooth data
  if(Serial.available() > 0)
  {
    data = Serial.read();
    Serial.print(data);
    Serial.print("\n");
```

```
  // Control Relay 1
  if(data == 'a')
    digitalWrite(8, LOW);
  else if(data == 'b')
    digitalWrite(8, HIGH);
```

```
  // Control Relay 2
  if(data == 'c')
    digitalWrite(9, LOW);
  else if(data == 'd')
    digitalWrite(9, HIGH);
```

```
  // Control Relay 3
  if(data == 'e')
    digitalWrite(10, LOW);
  else if(data == 'f')
    digitalWrite(10, HIGH);
```

```
  // Control Relay 4 manually if required
  if(data == 'g')
    digitalWrite(11, LOW);
  else if(data == 'h')
    digitalWrite(11, HIGH);
}
```

```
  // Automatic control for Relay 4
  if (currentMillis - previousMillis >= interval) {
```

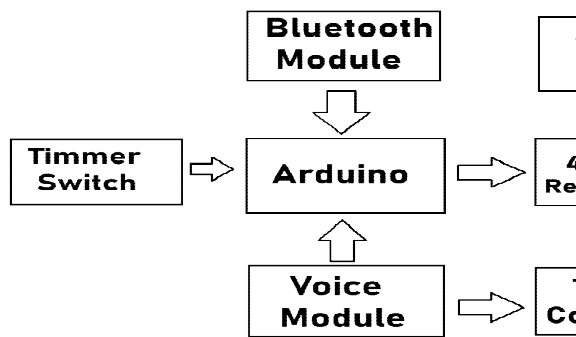
```

// Time to toggle Relay 4
digitalWrite(11, LOW); // Turn on Relay 4
delay(relay4OnTime); // Keep Relay 4 on for 2 seconds
digitalWrite(11, HIGH); // Turn off Relay 4

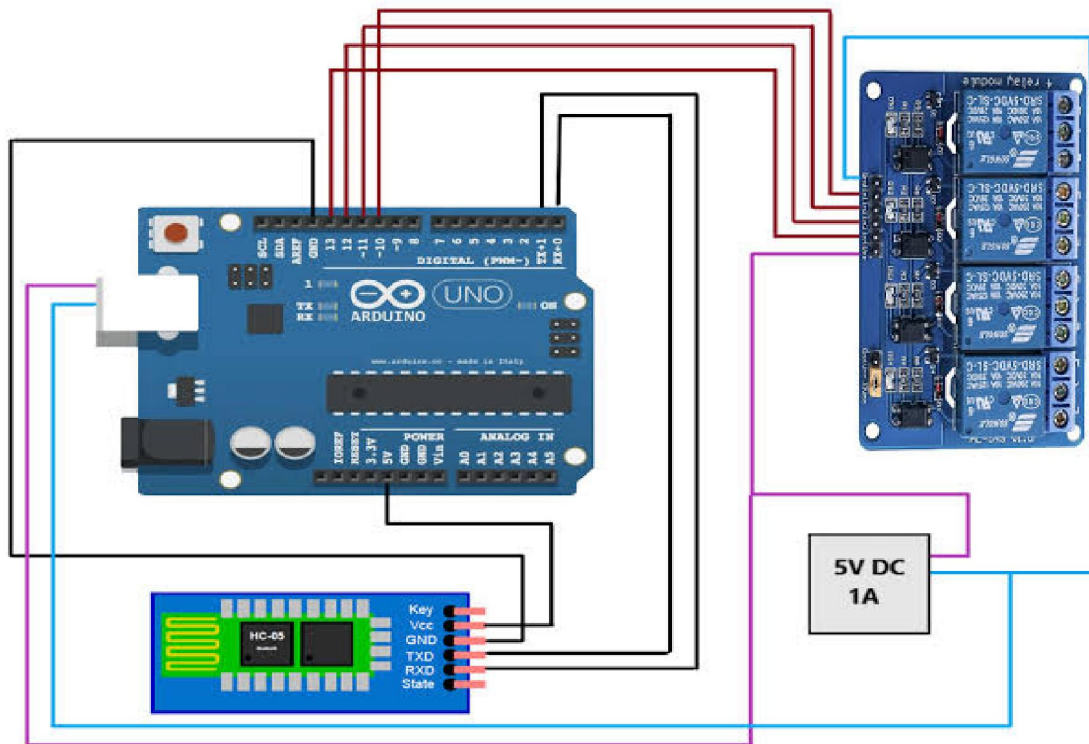
// Update the last toggle time
previousMillis = currentMillis;
}
}

```

Block diagram

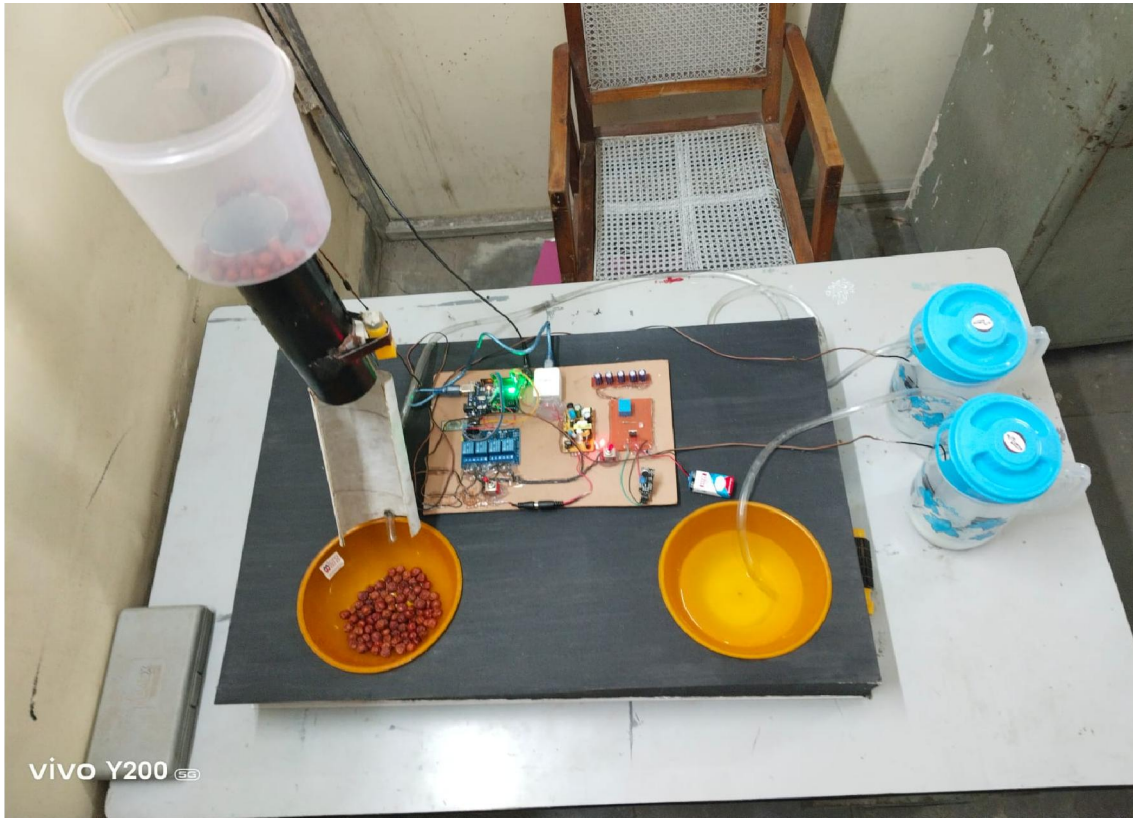


Schematic diagram



IV. RESULTS

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 like wise center 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.



V. CONCLUSION

Auto pet feeder is the solution for those who love to keep pet in house but because of busy schedule they may not be able to provide food to their beloved pets at fixed time. This prototype can be used to release food by inputting the chosen time and weight. The time and weight both are adjustable and can be given many at once. When the time and weight are selected through keyboard, the stored food will automatically come through the pipe at that assigned time and will be collected in the bowl.

The load cell under the bowl will operate the preferred amount of the food. This project is completely made with wastage material, so it's also eco-friendly and handy. Thus, the proposed prototype is expected to have immense opportunity to serve the said purpose in present society, because in this pandemic situation lockdown is happening at any time, so many people can be stuck outside and not be able to come back home so that they can treat their pets and since we are putting attention to build this project at reduced cost, so that the affordability of the consumer shall be very high in the market.

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