Automatic Pet Feeder Using Assistant

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Abstract: *Nowadays most of us fascinated to have pets at their home. But these pets have to betaken 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 properfood on time. This paper addresses the above issue by introducing an Automatic Pet Feeding System to ensure feeding pet on frequent interval of time. In our project we used two methods to feed the Pet, one is by Camera and another by using Google Assistant. When the DC servo motor runs, the motor rotates the propeller which is in the feeding device, which drops downpet food through the pipe into perforated feeding bowl. The water pump will be kept in a tankcontaining water. When the water pump runs, the water is pumped into the water bowl of pet. The user in order to feed their pet have to give a command on their Smart Phones such as"Okay Google", "Feed my Pet", with the help of this command the machine will do its following work. The user can also specify the time to feed their pet on schedule using GoogleAssistant*

Keywords: Pet

I. INTRODUCTION

Automatic pet feeder is one of the new technologies for feeding pet. It will help pet owner to take care of their pet while they are not at home. Even the owners are not at home, they still can feed their pet. Automatic pet feeder is built to help pet owner taking care of theirpet. IoT pet feeder is one of the pet feeders that will be controlled by a mobile application through internet. The automatic pet feeder will automatically dispense predetermined amount of food and water to the bowls. As pet lovers, user should understand those pets also need a proper diet management. Whether user away from home unexpectedly or simply would like one less chore to worry about, user can feel secure that the beloved pet will be cared for and fed on time every time. The Automatic pet feeder will solve two problems which pet owners face i.e., making sure that each pet has access to a healthy amount of food throughout the day,regardless of the owner's schedule. Making sure that each pet eats only its own food thoughthere are a variety of products on the market which solve the first problem, there are none which address the second.
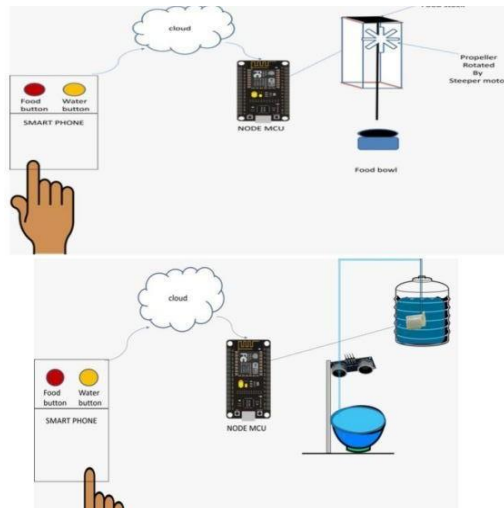

Fig 1. Working Model of Food & Water Bowl

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The automatic pet feeder will give pet owners a solution to both problems, thereby improving the lives of both pets and owners by allowing the owner to reliably provide food to a pet at the time the owner wishes and keep the pet from reaching the food stored for later feedings. Many animal feed systems can be designed to function as an automatic device thatallow the user to feed whenever he wishes from anywhere through internet. The purpose of having sensors in a system like this is to automate the feed process completely with lesshuman interference.

II. LITARATURE SURVEY

An automatic pet feeder using Google Assistant and IoT technology is an innovative solution that combines the convenience of voice control with the power of smart devices. This project aims to make feeding our furry friends easier and more convenient, even when we're not at home. By leveraging Google Assistant's voice recognition capabilities and the connectivity of IoT, pet owners can automate and customize their pet's feeding schedule.To begin our literature review, let's explore the design and implementation of automatic pet feeders. Research has shown that these feeders typically consist of a combination of hardware components, such as sensors, actuators, and a microcontroller. The microcontroller is the brain of the system, responsible for processing commands and controlling the feeding mechanism. Sensors are used to detect the presence of the pet and the amount of food remaining, while actuators are responsible for dispensing the food.When it comes to the integration of Google Assistant, studies have demonstrated the use of voice commands to control the feeding process. Pet owners can simply say something like, "Hey Google, feed my pet," and the automatic pet feeder will dispense the appropriate amount of food at the scheduled time.

III. INTERNET OF THINGS

The Internet of Things (IoT) refers to the interconnection of everyday objects, devices,machines to the internet, allowing them to collect, exchange, and share data. This interconnected network enables devices to communicate and collaborate seamlessly, leadingto increased efficiency, automation, and convenience in various industries and sectors. IoT devices can include everything from household appliances like smart thermostats and refrigerators to industrial machinery, vehicles, and wearable devices. These devices are equipped with sensors, actuators, and software that enable them to gather and transmit data, often in real-time. This data can then be analysed and used to make informed decisions, improve processes, and enhance user experiences.

The IoT has numerous applications, such as smart cities, where sensors monitor traffic, energy usage, and waste management to improve urban planning and sustainability. In healthcare, IoT devices can track patients' vital signs remotely and alert healthcare providersof any abnormalities.

Despite its many benefits, the IoT also raises concerns about privacy, security, and data breaches, as the sheer number of connected devices increases the potential attack surface for hackers. As the IoT continues to evolve, it has the potential to revolutionize how we interactwith technology and the world around [6].

IV. EXISTING SYSTEM

- **Hardware Setup:** Get a pet feeder mechanism or build one yourself using a motorized mechanism. You'll need a microcontroller like Arduino or Raspberry Pi to control the feedermechanism. Connect a Wi-Fi module (like ESP8266 or ESP32) to the microcontroller for internet connectivity.
- **Software Setup:** Set up your microcontroller with the necessary firmware. You'll need code to control the motorized mechanism and connect to the internet. Set up a Google Cloud Platform (GCP) project and enable the Google Assistant API. Create an Actions on Google project to define the conversation flow for your Google Assistant app.
- **Integration:** Connect your microcontroller to Google Cloud IoT Core to manage communication between your device and Google Cloud.
- **Google Assistant Integration:** Define voice commands for interacting with the pet feeder using the Actions on Google project.Implement fulfillment logic to handle user commands and trigger actions on the pet feeder.

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- **Testing and Deployment:** Test your Google Assistant app with the pet feeder to ensure that it responds correctly to voice commands. Deploy your application to a cloud platform or run it locally on your Raspberry Pi.
- **Fine-tuning and Maintenance:** Continuously monitor and update your application to improve performance and add new features.

V. PROPOSED SYSTEM

The proposed system integrates the functionality of an automatic pet feeder with the capabilities of Google Assistant and an ESP32 Camera module, creating a comprehensive IoT solution for pet owners. The system operates as follows: Upon receiving voice commands through Google Assistant, the user can instruct the pet feeder to dispense food for their pet. The command is processed by the Google Assistant API, triggering the corresponding action in the pet feeder. The ESP32 Camera module serves a dual purpose within this setup. Firstly, it provides live video monitoring of the pet, allowing owners to remotely check on their pet's well-being and behavior in real-time via a mobile app or web interface. Secondly, it offers additional functionality such as facial recognition to ensure that food is dispensed only when the pet is present, thus preventing overfeeding and promoting responsible pet care. This integration of Google Assistant, ESP32 Camera, and the automatic pet feeder not only enhances convenience for pet owners but also promotes pet health and welfare through intelligent monitoring and feeding solutions.

VI. WORKING PRINCIPLE

The automatic pet feeder operates based on a few key components and a seamless integration with Google Assistant. Here's how it all comes together:

- **Programmable Feeder:** The heart of the system is the programmable feeder, which is designed to hold and dispense pet food. It typically consists of a food storage compartment, a feeding mechanism, and a control panel. The feeder allows you to set up feeding schedules and portion sizes to suit your pet's needs.
- **Google Assistant Integration:** The integration with Google Assistant enables you to control the pet feeder using voice commands. You can issue voice commands through your smartphone or any device with Google Assistant. When you say something like, "Hey Google, feed my pet," Google Assistant processes the command and sends the relevant instructions to the microcontroller.
- **Wi-Fi Connectivity:** The microcontroller connects to the internet via Wi-Fi. This connectivity allows it to communicate with Google Assistant and receive commands in real-time. It also enables you to control the pet feeder remotely, even when you're away from home.
- **Voice Commands:** Using natural language voice commands, you can interact with the pet feeder. For example, you can say, "Hey Google, schedule a feeding for my pet at 8 AM," or "Hey Google, feed my pet now." Google Assistant processes these voice commands and sends the corresponding instructions to the microcontroller.
- **Feeding Mechanism:** When the microcontroller receives a command to dispense food, it activates the feeding mechanism in the programmable feeder. The feeding mechanism releases the predetermined portion of pet food into the pet's bowl. This ensures that your furry friend receives the right amount of food at the specified time.
- **Notifications and Reminders:** The system can provide you with notifications and reminders related to your pet's feeding routine. For example, it can alert you when the food supply is running low or when a feeding session has been completed. These notifications help you stay informed and ensure that your pet is well taken care of.
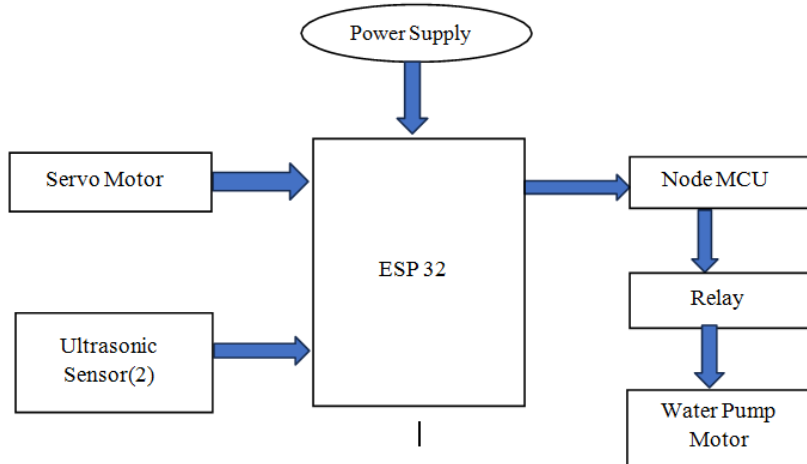
Fig 1 Block Diagram

VII. SOFTWARE USED

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board**.**

The key features are:

Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.

You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
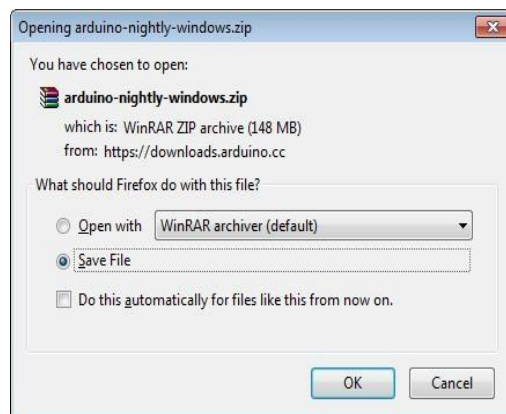

Fig 2 selection of Arduino Uno Board

Sinric Pro:

- Sign up for Sinric Pro: Visit the Sinric Pro website and sign up for an account. Once you've created your account, you'll get access to the Sinric Pro dashboard and API documentation.
- Set up your IoT devices: Ensure that your automatic pet feeder and any other IoT devices you want to control are compatible with Sinric Pro. You may need to follow specific setup instructions provided by the manufacturer of your devices.

- Connect devices to Sinric Pro: Use the Sinric Pro dashboard or API to connect your IoT devices to your Sinric Pro account. Follow the instructions provided in the documentation for your specific devices to establish the connection.
- Implement the control logic: Write the code to control your automatic pet feeder using SinricPro. This code will vary depending on the programming language and platform you're using for your IoT project. You'll need to use the Sinric Pro API to send commands to your pet feeder, such as dispensing food or checking the status of the feeder.
- Test your project: Once you've implemented the control logic, test your project to ensure that you can control your automatic pet feeder using Sinric Pro. Make sure that commands are being sent and received correctly, and that your pet feeder responds as expected
- Deploy your project: Once everything is working properly, deploy your project in your home or wherever you plan to use it. Make sure that all connections are secure and that your devices are functioning correctly.

Fig 3 Sinric Pro Login

Monitor and maintain: Keep an eye on your automatic pet feeder IoT project to ensure that it continues to work properly. Monitor for any issues or errors, and perform maintenance as needed to keep everything running smoothly.

By following these steps, you can integrate Sinric Pro software into your automatic pet feeder IoT project and create a convenient way to feed your pet remotely.

VIII. 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. Testing and refinement are crucial to ensure the reliability and accuracy of the system, taking into account factors like feeding portion control and scheduling. With proper implementation and maintenance, this IoT project can enhance the feeding routine for pets and provide owners with greater flexibility and control over their pet's care.
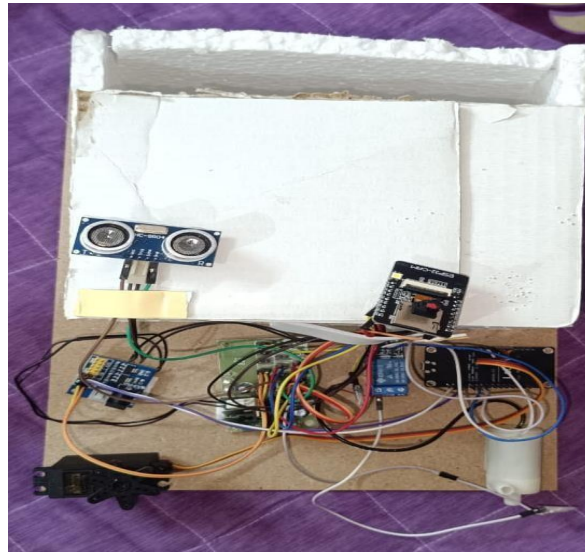

Fig 4 Voice Commands To The Pet

Fig 5 Result Of Automatic Pet Feeder User Google Assistant

IX. CONCLUSION

The interaction between humans and physical devices and objects is attracting increasing attention. Many studies have attempted to provide a natural and intuitive approachto request services. The current trend of combining pet control and IOT technology offers exciting future developments. The proposed system is also referred on smart-home technology, including the smart pet door and pet feeder. The results not only present the keyimprovement of the pet monitor system involved in the IOT technology, but also meet the demand of pet owners. The basic vision behind the IOT, it may have a new way of operationalmethod, it may have a new method of connecting devices, and there might be the even complete clean-slate approach. As the full operational definition is finalized, but there are numerous research issues that can be worked on. As a next step, we will fully integrate the other pet care devices into our system, including litter boxes, pet cam, etc. With that, the diverse needs of the owners can be met, and the health, monitor, and entertainment topics forpets are all covered. Besides, standing as the cloud term, how to connect the numerous networking devices around the globe is the next issue. In the future, we will centralize on thestudy of the IOT gateway and long-distance detection of the pets.

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