Automatic Pet Feeder

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Abstract: **This project proposes the use of technology to tackle the issues being faced by pet owners. Pet owners who are working individuals and live alone face a huge problem, they are not able to feed their pets on time. The method approached to solve this issue was to construct an IoT-based Automatic Pet feeder, it is one of the new technologies used for feeding pets and maintaining the diet of their pets by feeding them on time. It is built with Raspberry Pi 3B+ as its core. The automatic pet feeder will automatically dispense a predetermined amount of food and water to the bowl as per the settings made by the owner. The feeder assures hygiene and quality of the food. It will solve a huge problem that 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, by doing so the pet's health will be well maintained.**

Keywords: **Automatic, efficiency, diet, feeder, IoT, health, hygiene, pet, quality, Raspberry Pi.**

1. Introduction

Working pet owners have busy schedules and owners to go out often are not able to maintain their pet's diet by feeding them on time, our Automatic Pet Feeder using Raspberry Pi Model 3b+ serves as a helping hand for such situations. The feeder will automatically dispense food at the time the owner sets. The hygiene of food bowls is also maintained. The feeder also makes sure that the pet has access to water at all times. With the help of the automatic feeder, the owners can do their work without having to worry about their pet's meal.

A. Problem Definition

Sometimes when owners need to go out, they fill the bowl with excess food that results in the pet overeating and that leads to obesity or the owners feed the pet according to the time it is convenient for them and that leads to indigestion of the pet. Not feeding the pets at the right time can also have an impact on the mental health of pets, they tend to get anxious and aggressive due to hunger. Pet owners should understand that pets need proper diet management. Pets should be fed the right amount of food on time to avoid various health issues. This automatic pet feeder can solve this problem by feeding the pets the right amount of food at the right time and thereby maintaining the well-being of the pets.

B. Objectives

- The main objective of this project is to create an automatic feeding machine for pets.

- The user can set the time to feed their pet and the food will be dispensed accordingly.
- To ensure that pet has access to clean drinking water at all time.
- This feeder will solve a huge problem many pet owners face i.e., making sure that their pet has access to a healthy amount of food at the time set by the owner and water throughout the day regardless of the owner's schedule.
- It will improve the lives of both pets and pet owners.
- It is important to maintain the diet of pets just like a human for keeping them healthy and with this feeding machine it can be achieved.

2. Literature Survey

[1] This paper explains the working of the major components they used in brief such as Servo motor, Auger, Arduino UNO, ESP8266 Wi-Fi module. The report showcased the basic design of the system to be made. And also, the Arduino circuit to control the functions of the system. [2] This paper showcased Owners can monitor feeding process with their Android smartphone virtually. Smart Dog Feeder can give authentication with RFID, set feeding time, sent feeding report. Every setting about feeding time, portion, stock and waiting time will be set on Android with minimum requirement of Jelly Bean version, SDK 18 and has been installed with Appliance Hub application. Smart Dog Feeder has stock information, feed schedule, waiting time and owner's name from server uses MQTT protocol. Smart Dog Feeder will save the schedule and set RTC alarm which will interrupt when the feed time has arrived. Authentication process is done by checking RFID tag which is attached on dog collar. [3] This study examines the ability of computation, communication, and control technologies to improve human interaction with pets by the technology of the Internet of Things. It addresses the improvement through the pet application of the ability of location awareness, and to help the pet owners raise their pet on the activity and eating control easily. It implements WSN technology through which it not only gains object's environment information but can also distinguish each object precisely. This pet feeder used an RFID tag on the collar for identification. [4] This device comes with an android application that can be easily used from anywhere. An IP

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camera module is installed, used to monitor the pet. The feeder is not only used for feeding but also calls the pet at feeding time. Feeding pets responsibly and smartly is difficult for a lot of people.

[5] This research proposed a pet feeder system which is divided into two main sectors including measurements and control unit. The system performs periodic measurements of the pet's weight and food level inside the tank. For identification of the dog, the RFID smart system is used which can detect the tag of the dog to allow for services. The Smart Pet Food Dispensing Algorithm is based on the energy fact of food, type of cat, cat's weight to regulate the flow rate of the feeder. [6] The paper explained the Automation process and how to set up Raspbian OS. It proposes an Internet of Things based automated feeder system that uses Raspberry pi to drive its remote control, scheduling and intelligence. Such IoT-based feeder system can be designed in a way that it dispenses precise amount of food or other provisions at specific time intervals, reduce the amount of time owners spend on feeding and monitoring of household pets.

3. Design Methodology

The main idea of this project revolves around feeding the pet in the absence of pet owner. The software requirements are Raspbian OS and Python 3.9.
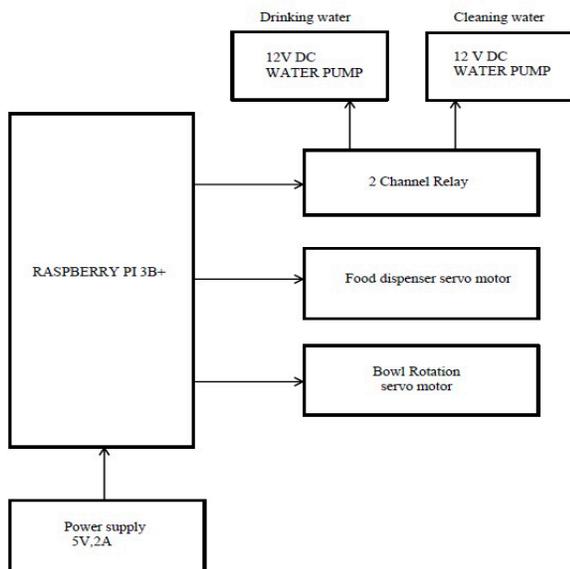

Fig. 1. Block diagram of automatic pet feeder

The Raspberry Pi Model 3b+ microprocessor forms the control unit of the entire feeder system. The Raspbian OS and the programs for the feeder are written and stored in the 32GB SD card. Peripheral devices like the mouse and keyboard are connected to the 2.0 USB ports. Desktop is the output device and its VGA cable is connected using a VGA Female to HDMI male converter adapter to the HDMI port on the Raspberry Pi.

- The user can set two meal times (morning and evening).
- The user will set the feed time, once it is the feed time, the servo motor (M1) linked to the bowl for rotation purpose will rotate 90° and dispose anything present in

bowl (mostly water).

- Relay is turned ON and then cleaning water is pumped to bowl to clean bowl and then servo motor (M1) rotates the bowl discarding the water.
- The servo motor (M2) linked to the feed container will rotate 90° for a few seconds to dispense the dry feed into the bowl.
- After sometime (say 10 minutes) the servo motor (M1) will rotate the bowl to dispose any leftover feed.
- The relay is turned ON and cleaning water is pumped to the bowl to clean bowl and then servo motor (M1) rotates the bowl discarding the water.
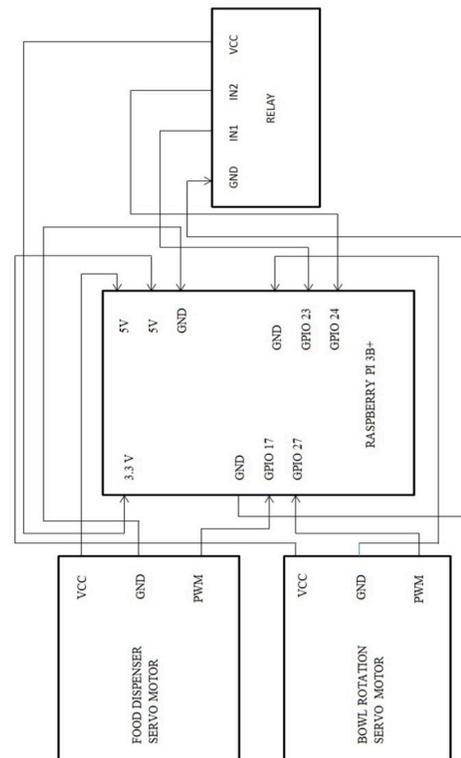- Drinking water is pumped to the bowl and the bowl is filled with water

Fig. 2. Circuit diagram of automatic pet feeder

4. Results

- The feeding time was set through the program and the program was executed.
- The Feeder first cleans the bowl (disposes any residue of the bowl).
- The feeder dispenses dry food into the bowl
- After 5 minutes the cleaning water is dispensed into the bowl and the bowl rotates to dispose the contents in the bowl.
- Drinking water is dispensed into the bowl.

Fig. 3. Front view of automatic pet feeder

5. Conclusion and Future Scope

The theory behind the project is to maintain the health of pets by making sure they are fed on time, maintaining the hygiene and quality of the food being served, and improve the lives of both pets and their owners. The concept design was considered based on a thorough literature review of previous papers and research about the context of IoT, Arduino, and Raspberry Pi-based Pet Feeders. This provides enough information to achieve the first objective of the project which is constructing the prototype for a feeding machine. For project demo concern, we have developed a prototype module. In future, this project can be taken to the product level. To make this project as user friendly and durable, we need to make it compact and cost effective. Going further, most of the units can be embedded along with the controller on a single board with change in technology, thereby reducing the size of the system. Additional components like Camera, Speaker and remote access can be implemented.

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