Arduino Mega based PET Feeding Automation

B. Ravi Babu[1], P. Pavan Kumar[1], Dr. P. G. Kuppusamy[1]

[1]Electronics and Communication Engineering, Siddharth Institute of Engineering and Technology (SIETK), Puttur, Chittor District, Andhra Pradesh, India
Corresponding Author: Dr.P.G.Kuppusamy

Abstract: *Keeping pets takes many commitments. This includes keeping them company, showing your concerns and of course, feeding them on time and in the correct way. However, not everyone is a pet expert taking care of your pet's diet can be hard and time consuming. One of the top health concerns of pets are overeating and obesity. Especially at younger age, they are usually satisfied with however much is given to them. Many adult pets are fed unscientifically that later may cause short lifespan. Another problem of feeding pets is that owners might not always be home regularly. Being occupied by personal plans knowing that they still have a starving little fellow at home to be taken care of is always a concern that bothers owners. The third concern that we want to deal with is the fact that there hasn't been any product on the market right now that is able to dispense different foods for different kinds of pets. However, pets themselves might not necessarily recognize the potential health problems of eating the wrong food. Therefore, we want to take care of owners' concern of feeding by building a phone controlled automatic pet feeder that can dispense the correct amount of food on time, based on the type of animal that's demanding it. We chose this project because pet keeping is a time consuming responsibility and we want to provide convenience to owners by helping them feed their pets easily and smartly. Owners will be able to feed the correct amount of food to their pets by setting it on the phone app. The information will be transferred to the PCB via Ethernet, which will send signals to food dispensing gates.*
Keywords: *Embedded system, Arduino, Ethernet, RFID*

I.   Introduction

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and software. By contrast, a general-purpose system, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today. Modern embedded systems are often based on microcontrollers (i.e. CPUs with integrated memory and/or peripheral interfaces) but ordinary microprocessors (using external chips for memory and peripheral interface circuits) are also still common, especially in more complex systems. In either case, the processor(s) used may be types ranging from rather general purpose to very specialized in certain class of computations, or even custom designed for the application at hand. A common standard class of dedicated processors is the digital signal processor (DSP). This DSP processor is especially used for voice recognition system. The key characteristic is being dedicated to handle a particular task. Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

II.   Literature Review

There are many different types of pet feeders on the market today attempting to solve the problem of making sure that each pet has access to a healthy amount of food throughout the day, regardless of the owner's schedule. These feeders range in price from under $10 to $500 and offer varying degrees of control to the pet owner.

The most basic pet feeder is a gravity feeder, which consists of a hopper full of food which falls into a bowl as the bowl is emptied by the pet (see Figure 1). This type of feeder is The feeder in Figure 1 allows the pet owner to ensure that the pet has access to food throughout the day or for a longer period of time and that the food does not go stale from exposure to the air before the pet eats it, but does nothing to control the amount of food eaten by the pet or to keep one pet from eating another's food. This feeder is designed to be a hassle free form of free feeding. The user reviews for this type of feeder are positive for the most part, with the most common complaint being that the food hopper can be knocked off by the pet, creating a mess The rest of the pet feeders on the market are designed to provide regular feedings to pets even when the owner is not home. It is our goal to create a new type of pet feeder which will add a additional feature by providing food to pet by web access by using Ethernet. Our automatic Pet Feeder will hold enough food to feed an animal for one day and we can feed any time via app or web access.

III.   Existing system

Current automated pet feeders on the market meet various parts of our design objectives but are quite costly. The Pet want Smart Feeder by Gem Tune permits scheduled feeding and system configuration via a smartphone app. The Automatic Pet Feeder by Wireless Whiskers utilizes RFID to release food for the pet when close by and it is at the appropriate feed time.

The Pet net Smart feeder is an automated pet feeder that focuses on delivering smarter meal portions for the pet, and it comes with a smart phone application as the main user interface. The smart phone application can modify a pet's feeding schedules and monitor a pet's overall dietary habits, but it can monitor only one pet and does not support multiple pets.

The Feed and Go Smart pet feeder is a Ethernet enabled automated pet feeder that allows a user to remotely feed a pet, and it also comes with a smart phone application that can modify a pet's feeding schedule and food amount. It is also supported as a web, Android, and iOS application.

Moving away from existing general feeders, more macro components must also be considered, specifically the mechanism being used to dispense the food from the container. This mechanism must have fine control of dispensing food and also be mechanically sound enough to avoid jamming and binding along the path of the food. Several dispensing mechanisms were found in practical scenarios. The first mechanism is the paddle based dispenser seen in cereal dispensers. These are simple but often bind and do not have very fine control. The second mechanism is the sliding door dispenser. This is a simple open and close sliding door that would rarely experience any binding but would be very difficult to control portions. The final mechanism is the feed screw, or auger. This design uses a helical screw to push food along a pipe. Small amounts of food fall between each screw blade and are pushed by the rotating motion. This allows for precise feeding as well as a design that mitigates binding on the edges.

IV.   Proposed System

We are building an Arduino based pet feeding automation which can automatically serve food to your pet timely. In this circuit,16*2 LCD is used to display the time using DS3231 RTC Module. Servo motor is used to rotate the containers to provide the food. You can set the rotation angle and container opening duration according to the quantity of food you want to serve to your pet.4*4 matrix keypad to manually set up the time for feeding the Pet.DS3231 RTC (Real Time Clock) Module, which used to set time and date on which your pet should be given food. So, by setting up the time according to your pet's eating schedule, the device drop or fill the food bowl automatically. The Arduino Ethernet Shield allows you to easily connect your Arduino to the internet. This shield enables your Arduino to send and receive data from anywhere in the world with an internet connection. It is responsible for connection between mobile and Arduino mega board.

Automatic pet feeder is designed to dispense specific portion of food at certain times, so they ensure at your pet will be fed on time. Many pets have to be fed at different times during the day. In fact, it is not appropriate for our pets to eat large portions once r twice a day, but they should eat smaller and controlled quantities several times a day. In turn many puppies are trained from small to eat well.The automatic food dispenser's work by placing the time on the internal timer of the appliance, without the need to use a separate clock. Meanwhile the food is stored in sealed container so that it does not get damaged, until the time you decided and device releases the food.

Algorithm:

Step1: Download Arduino IDE Software.

Step2: Power up your board.

Step3: Launch Arduino IDE.

Step4: Open your first project.
Once the software starts, you have two options −

Create a new project.

Open an existing project example.

To create a new project, select File → New.

Step5: Select your Node MCU board.

Go to Tools → Board and select your board.
Step6: Select your serial port.

Step7: Upload the program to your board.S7

V.   Figures and Tables
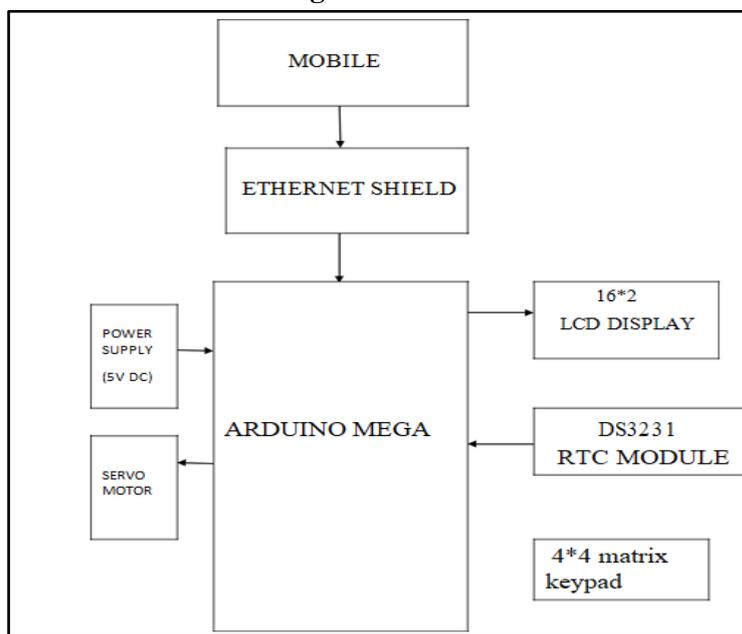
Fig. 1. Block diagram of the proposed system
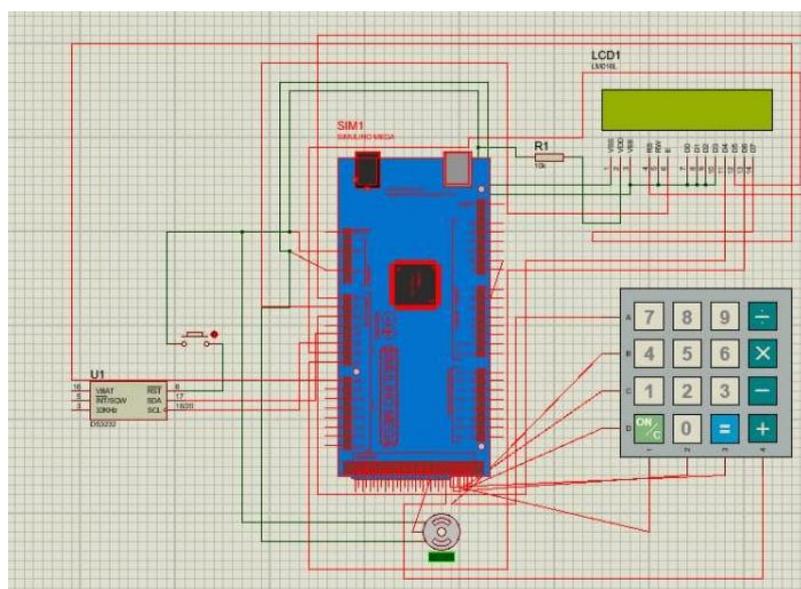
Fig. 2. Circuit diagram of the proposed system

VI. Conclusion

Pet Feeding automation was planned to ensure the time to time feeding of pet in absence of its master so that master can do his other tasks without worrying about feeding. Automatic Pet Feeding System has attractive design and aesthetic model. Arduino and IoT add Automation in the system. The report showcased the basic design of the system to be made. And also the Arduino circuit to control the functions of the system. The actual fabrication is expected in next academic semester. The success of Automatic Pet Feeding System would be great help to pet lovers. The advantages of the systems are bringe eating is avoidedand the food is kept fresh and free of contaminants.

The application of the proposed system is first, the feeder is used when the owner of the animal is not at home. Pets develop feeding rhythm overtime and get hungry just like humans if they are not feed properly. So before they have to wait too long for the next meal, the automatic pet feeder will do it.

The future direction is that keeping pets takes many commitments. This includes keeping them company, showing your concerns and of course, feeding them on time and in the correct way. However, not everyone is a pet expert taking care of your pet's diet can be hard and time consuming. Our product having following features .due to this features pet feeding is easy.

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