AUTOMATIC PET FEEDER USING ARDUINO AND IOT


ABSTRACT

The work is about pet feeding machine automatically for a daily minimum period of time of eight hours when all people of nuclear family members are busy at work for the survival in the metro cities and other cities. This set up is controlled by the Mobile app automatically. The pets of home can get food after an interval of half hours and the same can be monitored using mobile app and the owner of the pet always ensure about the feeding of the pet especially dogs and cats when they are busy at work. The food for pet has been kept inside a box while leaving home. The food would be served to the pets automatically up to a certain quantity only when the pet comes near to the box when they feel hungry. It is an excellent idea to protect the pets from starving whenever no one is at home and all are busy with their scheduled routine works and job at office or in business. The cost of a care taking of a pet has been reduced down due to the launching of such machine in the market. Such idea is being globally getting popular due to automatic system and mobile app involvement. Our study not only presents the key improvement of the pet monitor system involved in the ideas of the Internet of Things, but also meets the demands of pet owners, who are out for works without any trouble. The objective is to allow pet owners to automate simple things, like monitoring, and feeding controls. Implementing smart pet houses will assure pets owners an increased comfort and peace of mind especially when pets are unattended.
INTRODUCTION:

Nowadays most of us are fascinated to have pets at their home. But these pets have to be taken 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 proper food on time. This paper addresses the above issue by introducing an Automatic Pet Feeding System to ensure feeding pet on frequent interval of time. Automatic Pet Feeding System consists food storage, servo motor, dispenser, feeding bowl, etc. It also features Arduino to automatically control the operations. It is also possible to make more hi-tech by adding cameras and audio box to check activities of pet and talk to it. Automatic pet feeding system features a machine which can feed pets (e.g. dogs) automatically after frequent intervals in absence of his master. By using machine master don’t have to stay with his pet every time to feed it and he gets liberty to do his other works outside without caring about his pet. Dish for feeding pet could be filled in number of ways one is we can set the time and date using Arduino UNO which is displayed on LCD screen fitted on body of pet feeder. This is our automatic pet feeder powered by arduino, using a auger, and programmable with two feeding times with user set quantity of food, with a battery backed up internal clock. There are some pet feeders available in UK. They are either the type that rotate and unveil a meal, up to four times only, or the half decent machine with a hopper is hard to program, forgets everything if you remove the batteries, and frequently fails to even deliver any food. America has some good machines but they start at $300 USD, and shipping would be painful to the India, so we decided to make one. Our project is automatic pet monitoring and feeding system using Internet of Things. The emphasis on choosing this as the title is because, to initially give solution to a problem faced by almost everyone. Human interference on the part of taking care of pet when they are busy is difficult. And hence our system will be efficient enough to overcome the hurdles faced by human in taking care of pet. This Pet care System is a complete equipment for monitoring all the pet activities and also by making the pet feel free. Furthermore, the project is subdivided into several modules each of which has the IR unique feature. They are pet monitoring door, pet food feeder and pet collar system. Components which we are using are

- Arduino Uno
- Buzzer Module
- Ldr Module
- Iot Module
- Liquid Crystal Display
- Power Supply
- Rotart Encoder
- Servomotor
- Motor Driver
- Ultrasonic Midule

COMPONENTS:

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards, EAGLE files.

![Fig 2.1.1 Arduino uno board](image-url)
BUZZER MODULE

Buzzer is an electronic device commonly used to produce sound. Light weight, simple construction and low price make it usable in various applications like car/truck reversing indicator, computers, call bells etc. Piezo buzzer is based on the inverse principle of piezo electricity discovered in 1880 by Jacques and Pierre Curie. It is the phenomena of generating electricity when mechanical pressure is applied to certain materials and the vice versa is also true. Such materials are called piezo electric materials. Piezo electric materials are either naturally available or manmade. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to plug and play.

LDR MODULE

A photo resistor or light dependent resistor (LDR) is a component that is sensitive to light. When light falls upon it then the resistance changes. Values of the resistance of the LDR may change over many orders of magnitude the value of the resistance falling as the level of light increases. It is not uncommon for the values of resistance of an LDR or photo resistor to be several Mega ohms in darkness and then to fall to a few hundred ohms in bright light. With such a wide variation in resistance, LDRs are easy to use and there are many LDR circuits available. Light detecting resistor (LDR) module most sensitive to environmental light intensity is generally used to detect the ambient brightness and light intensity.

IOT MODULE

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi ability as a WiFi Shield offers (and that’s just out of the box. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area.
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LIQUID CRYSTAL DISPLAY

We come across LCD displays everywhere around us. Computers, calculators, television sets, mobile phones, digital watches use some kind of display to display the time. An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates to a display 16 characters per line in 2 such line.

![Fig 2.5.1 LCD display](image)

POWER SUPPLY

Most microcontrollers operate over a wide voltage range and draws only a few milliamps of supply current. But as with any digital circuits, the supply current is an average value. The current is drawn in very short spikes on the clock edges. If I/O lines are switching, the spikes will be even higher. If all eight I/O lines of an I/O port changes value simultaneously, the current pulses on the power supply lines can be several hundred mA. If the I/O lines are not loaded, the pulse will last for only a few nanoseconds. Such a current spike cannot be delivered over long power supply lines; the main source is the decoupling capacitor. In Atmel AVR devices where power and ground lines are placed close together there will be better decoupling than the devices with industry standard pin-out.

The main power supply should also have a tantalum or ceramic capacitor to stabilize it. With power supplies 4V and under the maximum clock frequency is 8MHz. The voltage regulator IC steps down voltage from 12V (from an adaptor or battery) to 5V for the MCU and provides a regulated output voltage of 5V to the microcontroller. IC 7805 is a voltage regulated integrated

ROTARY ENCODER

A rotary encoder also called a shaft encoder, is an electro-mechanical device that converts the angular position or motion of a shaft or axle to analog or digital output signals. A rotary encoder is a type of position sensor which is used for determining the angular position of a rotating shaft. It generates an electrical signal, either analog or digital, according to the rotational movement. There are many different types of rotary encoders which are classified by either Output Signal or Sensing Technology. The particular rotary encoder that we will use in this tutorial is an incremental rotary encoder and it’s the

SERVO MOTOR

Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially since it will fit in small places. It comes with a 3 horns (arms) and hardware.
MOTOR DRIVER

Motor Driver circuits are current amplifiers. They act as a bridge between the controller and the motor in a motor drive. Motor drivers are made from discrete components which are integrated inside an IC. The input to the motor driver IC or motor driver circuit is a low current signal. The function of the circuit is to convert the low current signal to a high current signal. This high current signal is then given to the motor. The motor can be a brushless DC motor, brushed DC motor, stepper motor, other DC motors etc.

ADVANTAGES

- Easy to feed the pets at the absence of the owner
- Manages the dog weight properly
- Pet is fed independently
- Ensures very planned feeding and less washing
- Keeps the environment very clean
- Pets may become very advanced in the new era
- Can be controlled by an mobile app
- Seriously avoids the tension for the owners on pets

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 mechanical means. Makes the owner and the pets very happy. Those who people really like and respect their pets can easily bought this product and ensures the pet is safe.

REFERENCES:

1. Getting Started with Android referred from developer.android.com/
4. Reto Meier, ”Professional Android 4 Application Development”, 2012, Wiley India.