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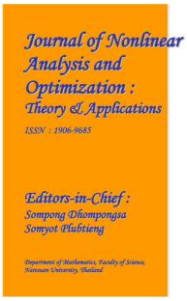


IOT BASED DOG CARE USING RTC

[1]B ROHITHA,[2]V DIVYA SREE,[3]B NIKITHA,[4]Dr K PAVAN KUMAR
[123]Student,[4]Associate Professor
Department Of Computer Science Engineering
Dr.K.V.Subba Reddy Institute of Technology, Kurnool,AP

Abstract:

Pets needs special treatment and special care. Now a days thanks to busy lifestyle, this task is not as simple because it won't to be. The goal of this work is to introduce, design and implement a smart pet system. The interaction between human and physical devices within the globe is gaining more attention and it requires a natural and intuitive methodology to use. According to this idea and living well, life has been a growing demand. Thus, the way to raise pets in a straightforward way has been the most issue recently. This study examines the flexibility of computation, communication and control technologies to enhance human interaction with pets by technology of the internet of things. This work addresses the advance through the pet's application of the flexibility of location-awareness, and to assist pet owners raise their pet on the activity and eating control easily. As people prefer to keep pets, pets also need special treatment and care. So, keeping pets is additionally not a straightforward task. We want to feed our pet timely. But, thanks to our busy schedule we are unable to try and do so. We've got designed a wise pet feeder system. This can help us feeding pets anytime. We are going to be ready to feed pets irrespective of where we are.

INTRODUCTION

Automation recently has been a age in demanded in an industrial scale and also in our standard of living gadgets, customers are interested in automatic devices quite anything which is for the aim of ease in use and time saving, companies are attempting to meet the strain and therefore the automation industry is becoming stronger and more developed every day, to be more descriptive automation may be a method of controlling and operating procedures in an automatic manner with the assistance of electronics and software which will be programmed and implemented with machine learning technologies, automation isn't very new, it's been there within the market since 1960"s when the primary ATM machine was introduced, with the assistance of such machinery the method became much easier faster and more convenient for the customer. People love their pets and contrariwise, but there are times you wish to

depart your pets reception for long durations alone and this is often a problematic issue. Well, we here propose to style a doggy daycare robot which will monitor still as feed the dogs or cats in an exceedingly timely manner. Our project is automatic pet monitoring and feeding system using Internet of Things. the stress on choosing this because the title is because, initially to relinquish solution to an issue faced by many of us who keeps the pets. Human interference on the a part of taking care of pet once they are busy is difficult. And hence our system are efficient enough to beat the hurdles faced by humans in taking care of pets. This pet care system could be a complete equipment for monitoring all the pet activities (especially for dog) and also by making the pet be at liberty. Furthermore, the project is subdivided into several modules each of which has their unique feature. The system can feed the pets, monitor the movement of pet and update the status to the owner. Feeding pets responsibly and smartly is difficult for plenty of individuals. the matter becomes especially obvious when the owners have a heavily occupied personal life. When owners don't have time to feed them on time, they will leave the feeder full before leaving. The unhealthy diet will nearly always cause pathological state for his or her pets. per the recent research, one in all the highest health concerns are overeating and obesity. Younger pets are usually never satisfied and may keep eating until nothing is left. Even adult pets can have an identical habit, which causes a way shorter lifespan for the pets. Our project is automatic pet monitoring and feeding system using Internet of Things. Human interference on the a part of taking care of pet after they are busy is difficult.

METHODOLOGY

The intent of our project is to avoid the difficulties associated with feed the pet when pet owner isn't reception. The proposed device is useful for feeding the pet automatically and also to take care of pets' diet. This pet feeder isn't only used for feeding but it also calls the pet at feeding time. Overall to own a good and ore personalized experience of keeping pet, this device would be useful. Automatic Pet Feeder using Microcontroller and Node MCU will feed the pets whenever the owner wishes. With the press of a button from anywhere in Blynk mobile application through internet the user can feed their pet. this method is extremely user friendly. Dispensing dude consists of a container that acts as storage for the food, dc motor to mechanize the dispensing action and a Node MCU with motor driver to regulate the motor. Basically, the output current offered by developing boards like Node MCU is within the order of 40mA and dc motors require a decent 500mA to drive them that's why the motor driving shield comes in. The logic. The robot is intended so as to feed the dogs whenever the owners are off from them. This robot is integrated with a camera module that permits for live streaming over IoT platform to induce on demand footage of home. The robot takes monitoring far beyond a security camera as you'll control the robot online over internet and move through your house any time you would like. Here the spinner could be a

mechanism to dispense food. The dc motor rotates the spinner, spinner dispense the food into the bowl slowly. additionally, because the user can serve the food to his pet whenever he wishes. Whenever the user presses the button within the keypad. The robot has 3 wheeled drive system with a feeding tray and one steel bins, one in all these two bins' stores food for the dog or the other pets present in house and also the other bin stores water for pets. It also contains the feeding tray, which is opened during the feeding to the dog, at that point food is dispensed to the feeding tray and it's eaten by dog after the dog completes the eating of its food the feeding tray get closed and therefore the message is shipped to the owner that dog had its food. this complete system is controlled by ATmega328p microcontroller and Node MCU that enables for efficient controlling of all robot functionalities.

One of the best things is having a pet at home. But one ofthe biggest issues with maintaining a pet is consistent feeding. Each pet's diet and feeding habits need to be carefully examined in order to raise a healthy pet. Pets' health is directly impacted when food is not given to them on schedule. As a result, the proposed machine will provide a solution to the problems like malnutrition and obesity. The major benefit of this clever automatic pet feeder is the ease as you simply need to refill it every few days. This saves youtime and energy because they operate on timers that can dispense food to pets numerous times each day to meet their nutritional needs. As a result of electronic automation and IOT, the machine's IOT-based design allows for a much more individualized user experience. In order to decrease the risk of disease, it can be used to monitor the amount of food supplied to the pet at each meal. The ideal pet owner is one who is constantly on the road and has inconsistent schedules since an automatic pet feeder can feed the pet according to the personalized schedule and helps make it easier to keep a regular feeding plan. Parallelly, is also useful for elderly dog owners who have difficulty bending over to fill their pet's feeding bowls on a daily basis. These devices assist the dog in reducing the physical and emotional stress that traditional approaches may worsen. The proposed design is easy to clean and maintain compared to other machines withmore complex designs, where cleaning can be challenging and the unit may need to be disassembled to properly clean moving parts. The pet care market and industry are growing yearly.

LITERATURE SURVEY

One of the main issues with IOT automated systems is the integration of heterogeneous data from various sensors and their ability to execute joint jobs. Interoperability appears to be the primary objective in these systems by providing [1] a common method of accessing and concealing the heterogeneity of various home devices. Every pet owner has a unique lifestyle; [12][2] using this machine will be different from the traditional method of owners feeding their dogs by hand since it will provide more accurate feeding at the times we specify, as well as the abilityto manage it from a distance something the traditional method cannot provide. In [3] the smart pet door is

made witha detecting tag on the collar that enables the pet owner to keepan eye on their pet's movements. To remotely operate the car, anautomated system is created employing an Internet protocol (IP)camera and a microcontroller. [15][8] A MQTT (MQ TelemetryTransport) server, the microcomputer receives MQTT messages from mobile devices. Through its specified pin layout, the microprocessor transmits the GPIO (General Purpose Input /Output) signals to the motor hardware. The microcomputer will simultaneously receive video streaming from the IP (Internet protocol) camera. The screen of the mobile phone can receive this streaming. This design makes use of a brand-new embedded development board and a brand-new Wi-Fi development board. The CC3200 uses the compilation function of the Yocto Project Linux kernel. [7], which can undertake routine and quantitative feedingroutines, as well as automate pet feeding and watering. The feeder has a more precise control over the food and water delivery thanks to Internet of Things (IoT) technology. Real-time monitoring of the pet's behaviour can be done with a remote camera, and the feeding situation can be observed with a phone[14]. This pet feeder design [10][13] has elements that make pet care more convenient for both the owner and the pet. In order to help solve the overfeeding issue, this system also provides information about the pet's feeding, including whether it is eating or not and how much is being consumed. This approach also aids in reducing feed waste because it supplies the leftover feed last. A interactive remote control is provided [9], this design also eliminates the traditional manual adjustment of pet feeders Additionally, this design does away with the standard manual adjustment of pet feeders. The priority feeding of pets could be adjusted to use a camera rather than sensors as an example of an innovation. On demand, this device may also send a brief video clip [5] [6] of the pet eating to the owner via multimedia message. IoT can be used to diagnose health problems such as body feeding, remote monitoring, and temperature analyses [4]. used sensors built into Radio Frequency Identification (RFID) tags that can be tracked using GPS to address the issue of animal identification at great distances. a smartphone app, a Raspberry Pi camera, and an automatic [11] pooping pad.Three tiers of the automatic feeder receive equal distributions of food. The serving size is decided by a weight sensor, and Arduino controls the feeding mechanism. The Raspberry Pi webcam is used to keep an eye on both the automatic feeder and the poop pad. Both a client and a server are performed by the Raspberry Pi.

Motivation

As pet owners, users should be aware that their pets need careful dietary management as well. Life's obligations can also hinder pet owners from adequately caring for their animals. If the customer is unexpectedly away from home or simply wants to focus on something else, they can be assured that their beloved pet will be cared for and fed on time, every time. The aim of this project is to make pet ownership easier for owners by providing

an automatic pet feeder. Furthermore, we discovered a market gap while searching for a comprehensive framework for tracking and controlling these three devices. Some pet care apps, such as Petsafe, only have a food feeder app rather than adding water dispensers and litter boxes to create an ecosystem. The feeding and defecation roles of pet care systems were included in the above study. However, when it comes to a more in-depth health study, the data obtained by these three programmers is inadequate. As a result, the current research aims to combine three basic pet care subsystems while still keeping a more detailed record of a pet's health status. As a result, pet owners can use a mobile application to get a rundown of their pet's basic condition at any time and from any place. Then there are illnesses that pets suffer from as a result of irrational feeding habits, suchas obesity and overeating.

4. DESIGN OF HARDWARE

ARDUINO UNO

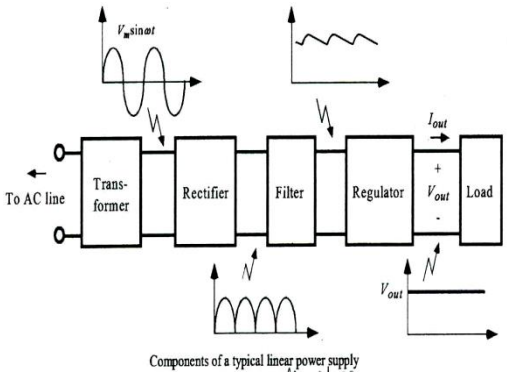
The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-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. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.

Fig: ARDUINO UNO

4.2. POWER SUPPLY

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as “Regulated D.C Power Supply”.



Components of a typical linear power supply

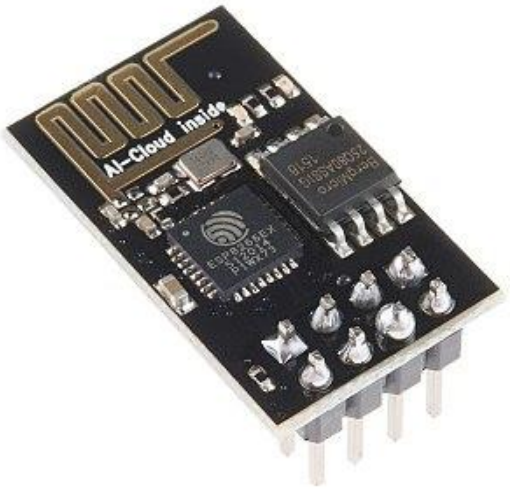
ESP8266 WIFI

The **ESP8266** is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced

by Shanghai-based Chinese manufacturer, Espressif Systems.[1]

The chip first came to the attention of western makers in August 2014 with the **ESP-01** module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.[3]

The **ESP8285** is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.[4]



4.7. LCD DISPLAY

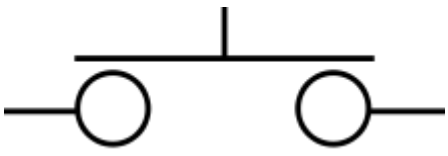
A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

Fig: 4.10. LCD

PUSH ON-SWITCH

A push button is a momentary or non-latching switch which causes a temporary change in the state of an electrical circuit only while the switch is physically actuated. An automatic mechanism (i.e. a spring) returns the switch to its default position immediately afterwards, restoring the initial circuit condition. There are two types:

- A push to make switch allows electricity to flow between its two contacts when held in. When the button is released, the circuit is broken. This type of switch is also known as a Normally Open (NO) Switch. (Examples: doorbell, computer case power switch, calculator buttons, individual keys on a keyboard).



- A push to break switch does the opposite, i.e. when the button is not pressed, electricity can flow, but when it is pressed the circuit is broken. This type of switch is also known as a Normally Closed (NC) Switch. (Examples: Fridge Light Switch, Alarm Switches in Fail-Safe circuits).

Many Push switches are designed to function as both push to make and push to break switches. For these switches, the wiring of the switch determines whether the switch functions as a push to make or as a push to break switch.

SERVO MOTOR

A **servomotor** is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration.[1] It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.

Servomotors are not a specific class of motor, although the term *servomotor* is often used to refer to a motor suitable for use in a closed-loop control system.

Servomotors are used in applications such as robotics, CNC machinery or automated manufacturing.

Mechanism

A servomotor is a closed-loop servomechanism that uses position feedback to control its motion and final position. The input to its control is a signal (either analogue or digital) representing the position commanded for the output shaft.

The motor is paired with some type of position encoder to provide position and speed feedback. In the simplest case, only the position is measured. The measured position of the output is compared to the command position, the external input to the controller. If the output position differs from that required, an error signal is generated which then causes the motor to rotate in either direction, as needed to bring the output shaft to the appropriate position. As the positions approach, the error signal reduces to zero and the motor stops.

The very simplest servomotors use position-only sensing via a potentiometer and bang-bang control of their motor; the motor always rotates at full speed (or is stopped). This type of servomotor is not widely used in industrial motion control, but it forms the basis of the simple and cheap servos used for radio-controlled models.

More sophisticated servomotors use optical rotary encoders to measure the speed of the output shaft[2] and a variable-speed drive to control the motor speed.[3] Both of these enhancements, usually in combination with a PID control algorithm, allow the servomotor to be brought to its commanded position more quickly and more precisely, with less overshooting.[4]

RTC

A **real-time clock** (**RTC**) is an electronic device (most often in the form of an integrated circuit) that measures the passage of time.

Although the term often refers to the devices in personal computers, servers and embedded systems, RTCs are present in almost any electronic device which needs to keep accurate time of day.

The term *real-time clock* is used to avoid confusion with ordinary hardware clocks which are only signals that govern digital electronics, and do not count time in human units. RTC should not be confused with real-time computing, which shares its three-letter acronym but does not directly relate to time of day.

Purpose

Although keeping time can be done without an RTC,[1] using one has benefits:

- Low power consumption[2] (important when running from alternate power)
- Frees the main system for time-critical tasks
- Sometimes more accurate than other methods

A GPS receiver can shorten its startup time by comparing the current time, according to its RTC, with the time at which it last had a valid signal.[3] If it has been less than a few hours, then the previous ephemeris is still usable.

Some motherboards are made without real time clocks. The real time clock is omitted either out of the desire to save money (as in the Raspberry Pi system architecture) or because real time clocks may not be needed at all (as in the Arduino system architecture[4]).

BUZZER

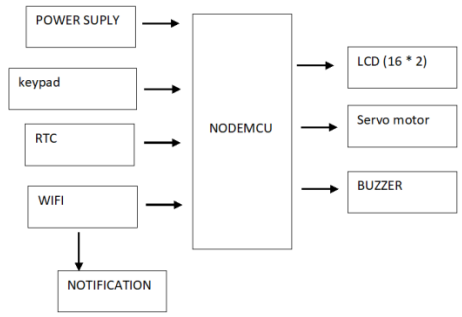
There are many ways to communicate between the user and a product. One of the best ways is audio communication using a buzzer IC. So during the design process, understanding some technologies with configurations is very helpful. So, this article discusses an overview of an audio signaling device like a beeper or a buzzer and its working with applications.

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

Buzzer Pin Configuration

PROJECT DESCRIPTION

BLOCK DIAGRAM:



Arduino Uno R3: It is employed to regulate the Pet Feeder's operations for a variety of purposes. The proposed IoT pet feeder's block diagram is shown in Figure 1. For starting user-friendly communications and producing single-board microcontrollers for controlling digital devices, Arduino's open-source hardware and software are employed. The most recent model of the Arduino Uno is the Uno R3. The reference versions of Arduino are the Arduino board and Integrated development environment (IDE) software, both of which are upgradable. The Uno-board, the first in a line of USB- Arduino boards, is the default design for the Arduino platform. In the creation of Arduino boards, a variety of microprocessors and microcontrollers can be utilised. The boards with digital and analogue I/O pins that can be connected to breadboards or shields (for prototyping) and other circuits are taken into consideration. The boards can alsobe programmed using serial communications connections, including USB on some variants. The computer languages C and C++ as well as the common Application programming interface (API) known as "Arduino language" can be used to create programmes for microcontrollers. Along with conventional compiler tool chains, the Arduino project alsooffers an IDE and a command-line interface (Arduino-cli) built in Go. Red LED: An average 5mm has a 2V forward voltagedrop and a forward current of 20mA. When a LED is connected to the Arduino, a current-limiting resistor must be used. Piezo Buzzer: This device replaces the electromagnet found in most speakers. To produce sound waves, one uses the piezoelectric effect. Applying a square wave could be used to create sound at the desired frequency.

Real-Time Clock(RTC): An RTC is a time-measuring electrical device (often in the form of an integrated circuit). The Real Time Clock module's internal battery makes sure that even when the systemis turned off, the computer keeps the right date and time. Once this module is installed, use the Time Preferences or Set Clock command to enter the proper date into the computer and save it. The workbench clock will then always show the right time.

Servo Motor SG90: It is a servo motor with a low price and great output power.It can rotate upyo 180 degrees,with a maximum of 90 degrees ever step.To regulate its movement, it simply needs a single outputpulse signal.In contrast to a DC motor, a servo motor is employed for precise position control.The white/yellow wire is the control signal, the black/brown wire is ground, and the red.orange wire is 5V.But other colouring schemes exist. The 5V wiremust be linked to a separately regulated 5V source rather than the Arduino’s 5V supply due to the high power consumption of servos.

There are no complicated steps in the procedure, making it simple to use. As it employs an onboard battery in the RTC, it is light and portable and may be powered by energy. As a result, this model aids in the elimination of the overweight and obesity issues that are prevalent in dogs and cats, which make up over 55% of the population and pose serious health risks like heart and lung issues, kidney illness, and diabetes.

The system dispenses appropriate amount of food in feeding tray as instructed by user online and so feeding opens to grant the food to dog, also it calls out your dog to tell about feeding time. Once the pet had its food it closes the feeding tray. All of this could be monitored online by the pet owner. This IoT based dog daycare robot are ready to feed pets efficiently and also save the animals or pets from starvation. Integrating features of all the hardware components used are developed in it. Presence of each module has been reasoned out and placed carefully, thus contributing to the most effective working of the unit. Secondly, using highly advanced IC's with the assistance of growing technology, the project has been successfully implemented. Thus, the project has been successfully designed and tested.

CONCLUSION

The robot dispenses appropriate amount of food and water in feeding tray as instructed by user online and so slides open the feeding tray, also it calls out your dog/cat by name to tell about feeding time. Once the pet has eaten it closes the feeding tray. All of this could be monitored online by the pet owner. This IOT based pet feeder are able to feed pet efficiently and also save the animals or pets from starvation

FUTURE WORK

In the future, we would be working to make this system even more efficient and would try to implement it in a better way and would try to reduce the price of it. Apart from that, we have given a lot of thought to also provide a statistical report through the system itself, through which the owner would be able to track the amount of food and water consumption, along with an increase or decrease in the diet. All of this would be provided on a weekly or monthly basis so that the owner can track all of this information and thereafter, make relevant changes in the feeding pattern of the pet.

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