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ADVANCED GPS TRACKING AND FOOD DISPENSOR SYSTEM FOR PETS

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ABSTRACT

In today's perceptive, pets have become a valuable member of a family. However, the prevalence of pet lost poses a significant risk, often attributed to carelessness of parents/owners. To address this, a proposed system utilizing a microcontroller (Arduino), a GPS (Geo Positioning System) Module, a GSM Module and a Pulse (Heart beat) sensor aims to augment safety for both pets and parents/owners. The system's core relies on the GPS module's capability to detect the location of pets when it is lost or escaped. If the pet escapes beyond the geo-fencing area, it collects the location (in the form of latitude and longitude) and pulse (heart beat) rate with the help of GPS module and Pulse sensor respectively and sends those details to the owner with help of GSM module, later on the owner map those co-ordinates into real time map. This innovative approach seeks to proactively address the problem of losing pets, mitigating pet losing/dying risks and fostering a secure and healthy pet. Its implementation holds promise in significantly reducing pet losing problem, ensuring safer and healthier pet keeping and adoption The smart feeder dispenses precise portions, remotely controlled through the BLYNK IoT app which gives the user complete control of the system and includes sensors that monitor the amount of food remaining and notify the user when it is time to refill the feeder. Sometimes there will be some food which is leftover by the pet which has a great chance of getting contaminated due to the exposure of air in the open. This, when mixed with the upcoming scheduled meal, will affect the pet's health and cause illness too. To prevent this, the system provides timely removal of the leftover food that is present in the dispensing plate at regular intervals. It promotes healthier eating habits by establishing consistent meal schedules along with timely removal of leftovers and enabling real-time monitoring of consumption patterns, thus enhancing responsible pet ownership and overall pet wellbeing. It prevents overfeeding, encourages consistent meal routines, and real-time monitoring enhances responsible pet care

1.INTRODUCTION

GPS tracking is the practice of monitoring someone's location remotely by using the Global Positioning System (GPS) to determine their location. A GPS tracker for pet is a device that connects to pet's collar, chain or jacket and uses GPS (Global Positioning System) and other technologies to let user know where user's pet is and follow their every move. A piece of material worn around a pet's neck is

called a collar. Same as the jacket or the safety cloth that a pet wear is known as jacket. If user's pet ever runs away, disappears or escapes, this is one of the best ways to find them. Pets such as dogs can run for various kinds of reasons, such as lack of interest, fear, or just a strong hunting desire. The incredibly small cost of a GPS tracker might bring an important return if user's dog misses. These days, our expectations are high for anything and everything that matters to us, such as our children, our loved ones, our cars, and our pets. Pet owners consider their animals to be members of the family, so they have a variety of devices to keep them updated on their activities when they aren't around. Not only does a GPS tracker for dogs and cats allow user's pet more freedom to roam around outside, but it also reduces user's anxiety as the owner. Every year, more and more pets go missing or are stolen in these situations, a GPS may be user's hope for recovery. Collars and wearable technology are becoming more and more popular among pet owners who wish to allow their cats and dogs to roam free. Pet trackers give user peace of mind about user pet's location and can be set to alert you when your pet leaves a specified "safe area," such as user's home. Our pets want to run around and explore the outdoors without any restrictions. Many pet owners want to be able to open the door and let their dog or cat roam the neighborhood without feeling the need to watch over them or try to keep them confined. The geofencing feature with safe zone is included with Tack GPS. By establishing several boundaries, safe zones are created, which helps to maintain order. When the tracking device enters and exits these specified zones, the Tack GPS app will alert user. The primary and important benefit of a pet tracker is being able to find a lost pet. Pet trackers provide location positioning so user can see where user's pet has been going and know where to look for them if they have been missing for a long time and users are concerned. A study on lost pets found that thirty-two percent of pets go missing in their lifetime and that 14% of pet owners lose their pets within five years, which point out the need for pet monitoring. Our Internet of Things (IoT)-based automatic pet feeding system raises the bar for pet care in the rapidly changing fields of pet care and technology. Our cutting-edge system provides modern pet owners with a comprehensive solution that goes beyond simple feeding schedules. The customizable feeding schedules and quantity quantities via an easy-to-use interface are among the best features. This system adjusts to your pet's specific demands, whether it is nutritional restrictions, or you wish to change feeding schedules to fit your daily schedule. Additionally, it offers a great solution for pet owners who could spend a lot of time away from home, guaranteeing that their animal friends never go without food or have erratic feeding schedules. However, our dedication to your pet's health goes beyond meal planning and timing. We are aware that preserving food quality is critical to the well-being of your pet. When food is fed traditionally and left out in the open, it can spoil. With its sophisticated sensors, our automatic pet feeder guarantees that food stays clean and fresh. It accomplishes this by quickly clearing the distributing plate of any leftover food at prearranged intervals. This not only ensures that your pet is receiving the best possible nutrition, but it also encourages

better eating practices and lowers the possibility of health problems due to tainted or stale food. Another noteworthy benefit of our IoT-based technology is real-time monitoring. We encourage appropriate pet care by giving pet owners the chance to monitor their pets' consumption trends. This function helps create a regular meal plan that meets your pet's nutritional demands in addition to protecting against overfeeding. You might think of it as having a virtual pet nutritionist who makes sure your pet's health and welfare are top priorities. Our state-of-the-art IoT-based pet feeding system represents the love and care that pets deserve in this day and age when they are treasured parts of our homes. It strengthens the link between a pet and its owner by transforming pet care from a chore to an art. With the ease of remote control, the guarantee of food quality, and the capacity to keep an eye on your pet's nutrition in real-time, this system is proof of our dedication to our furry friends' wellbeing and providing them with the best care possible in our busy, connected world.

2.LITERATURE SURVEY

O. Santos Baquero, L. A. Akamine, M. Amaku, and F. Ferreira, "Defining priorities for dog population management through mathematical modeling," Preventive Veterinary Medicine, vol. 123, pp. 121–127, Jan. 2016, doi: 10.1016/j.prevetmed.2015.11.009.

We simulated dog population dynamics for a thirty-years period using a logistic growth model. Through sensitivity analyses, we determined the influence of the parameters used in the model. Carrying capacity was the most influential parameter in all simulations. In the owned-dog population, the influence of immigration, abandonment and births was 19%, 16% and 6% of the influence of the carrying capacity, respectively. In the sterilized owned-dog population, the influence of abandonment, female and male sterilization was 37%, 30% and 27% of the influence of the carrying capacity. In the stray population, the influence of abandonment, carrying capacity of the owned-dog population and adoption was 10%, 9% and 6% of the influence of the carrying capacity. In the sterilized stray population, the influence of births, female sterilization and male sterilization was 45%, 15% and 13% of the influence of the carrying capacity. Other parameters had lower influence values. Modification of the carrying capacity requires different interventions for the owned- and stray-dog populations. Dog trade control is a way to reduce immigration. The evaluation of sterilization effects must focus on the variations in the infertile population fraction.

"Tannop Sangvanloy and Kingkarn Sookhanaphibarn, "Automatic Pet Food Dispenser by using Internet of Things (IoT)" 2020.

The objective of this project is to develop an automatic pet feeding with Internet of Things (IoT). We developed a feeder to help allocate dry food diet to small pets such as dogs and cats. It will be very useful whenever a pet owner is outside the residence and/or unable to feed his/her pets normally. When the free feeding is happened, it will cause the obesity of pets. This machine will be also used for monitor pet's eating habits to train the pets for

scheduled meals. Nowadays, pets have been considered as part of the owner role in the human activities and lifestyles. The growing number of pets has come with the elderly population increasing. A pet is mostly treated as one of the family. Dogs and cats are the most popular pets. The pet care industry and business has continuously expanded every year, and the need of products with new technologies has been essential for helping senior people for taking care their pets. The objective of this proposed machine is to make a convenience for the pets' owners and make a promotion to raise their pets in healthy fashion. To raise a healthy, the pet feeding for each meal has to be seriously considered. When feeding is not timely ,it will directly affect the health of the pet. It can cause malnutrition and various illnesses or diseases.

S. J. Ward, S. Sherwen, and F. E. Clark, "Advances in Applied Zoo Animal Welfare Science," Journal of Applied Animal Welfare Science, vol. 21, no. sup1, pp. 23–33, Aug. 2018, doi: 10.1080/10888705.2018.1513842.

Nonhuman animal welfare science is the scientific study of the welfare state of animals that attempts to make inferences about how animals *feel* from their behavior, endocrine function, and/or signs of physical health. These welfare measurements are applicable within zoos yet inherently more complex than in farms and laboratories. This complexity is due to the vast number of species housed, lack of fundamental biological information, and relatively lower sample sizes and levels of experimental control. This article summarizes the invited presentations on the topic of "Advances in Applied Animal Welfare Science," given at the Fourth Global Animal Welfare Congress held jointly by the Detroit Zoological Society and the World Association of Zoos and Aquariums in 2017. The article focuses on current trends in research on zoo animal welfare under the following themes: (a) human–animal interactions and relationships, (b) anticipatory behavior, (c) cognitive enrichment, (d) behavioral biology, and (e) reproductive and population management.

Jayaram Kumar Kondapalli, Venkata Ramana Sanepu, Balakrishna Satyam Kothapalli, Shankar Pattabhi Ram Peketi, Venkata Dattu Naveen Kukatla, Manoj M, "Automatic Pet Feeder", International Journal of Advances in Science Engi-neering and Technology, Volume- 3, Issue-3, September 2015.

Over half of the people in the world intentionally have pets as their companions, But these pets are becoming burden to the pet owners. There is a lot of stress for the owner while feeding their pets. Over the years different automatic pet feeders are available in the market, but none of them are still not able to solve lot of problems like overeating, obesity. This project aims in rectifying the problems caused by existing feeders and designing an efficient automatic pet feeders using internet of things. This Automatic pet feeder uses a NODEMCU Micro Controller and consists of an interface with DC servo motor, relays, water pump and other hardware equipment. A software code is dumped into the micro controller to perform operations like rotating motors and switching relays on and off. The whole feeder system is controlled using a mobile phone installed with blynk software. The

user sends signals to the micro controller using blynk application through blynk cloud. When the DC servo motor runs, the motor rotates the propeller which is in the feeding device, which drops down pet food through the pipe into perforated feeding bowl.

K. E. Rodriguez, N. A. Guérin, R. L. Gabriels, J. A. Serpell, P. J. Schreiner, and M. E. O'Haire, "The State of Assessment in Human-Animal Interaction Research," Human-animal interaction bulletin, Dec. 2018, doi: 10.1079/hai.2018.0022.

This study expands previous equine-assisted intervention research by evaluating the effectiveness of therapeutic horseback riding (THR) on self-regulation, socialization, communication, adaptive, and motor behaviors in children with autism spectrum disorder (ASD). Participants with ASD (aged 6–16 years; N = 127) were stratified by nonverbal IQ standard scores (≤85 or >85) and randomized to 1 of 2 groups for 10 weeks: THR intervention or a barn activity (BA) control group without horses that used similar methods. The fidelity of the THR intervention was monitored. Participants were evaluated within 1 month pre- and postintervention by raters blinded to intervention conditions and unblinded caregiver questionnaires. During the intervention, caregivers rated participants' behaviors weekly. Intent-to-treat analysis conducted on the 116 participants who completed a baseline assessment (THR n = 58; BA control n = 58) revealed significant improvements in the THR group compared to the control on measures of irritability (primary outcome) (p = .02; effect size [ES] = 0.50) and hyperactivity (p = .01; ES = 0.53), beginning by week 5 of the intervention. Significant improvements in the THR group were also observed on a measure of social cognition (p = .05; ES = 0.41) and social communication (p = .003; ES = 0.63), along with the total number of words (p = .01; ES = 0.54) and new words (p = .01; ES = 0.54) spoken during a standardized language sample. Sensitivity analyses adjusting for age, IQ, and per protocol analyses produced consistent results.

G. Feller, "The Internet of Things: In a Connected World of Smart Objects," Accenture & Bankinter Foundation of Innovation, 2011.

The concept of Internet of Things is not new; Devices have been exchanging data automatically in real time without human intervention for years. The IoT is the ability to transform ordinary products such as cars, buildings, and machines into smart, connected objects that can communicate with people, applications and each other. Knowing how to connect machines and equipment, enterprises can generate valuable data, securely transmit these data across multiple networks, collect, store and analyze them in order to turn them into useful information in real time. We live in a world where there is so much to do but so little time. The multitasking capabilities of the present generation is at the highest ever rate. The market is flooded with Technology and Innovations. Yet something seems amiss, that something is "Control". Control over every Hardware, Electronics, Machine or Technology you own personally as well as professionally. The ability to start stop, monitor, and control and analyse system is

what makes the world truly connected. Expanding control over things has been a major intent for humans ever since the advent of fire. The human breed has been ideating to invent and disrupt different sectors to makes life easier and smoother. Connecting was another important aspect. From discovering new lands across the seas to connecting the people through the internet, the world has come a long way. But do we stop here? Off course not, we see the world as a hyper connected cluster of not only humans, but humans to objects and objects to objects themselves. This is achieved by IoT. A world which is more connected a world which is smarter. The possibilities are endless, on what we can do and what we can achieve. In 2008, 'things' connected to the internet were already more in number than people and by 2020 these internet connected things will have already reached 50 billion.[1] In this paper we provide a theoretical reference model that can be used by operators and network designers to determine the proper setup for IoT inter-communication, system architecture and common technologies.

3.EXISTING SYSTEM

Here is the provided literature survey on the existing tracking system: Some design or system of tracking system some uses GPS module to get location of the lost pet. Some new versions of the GPS detection system use Wi-fi module.

- O. Santos Baquero, L. A. Akamine, M. Amaku, and F. Ferreira have presented a paper, in this paper entitled "Defining priorities for dog population management through mathematical modeling", the efficiency of GPS trackers in locating lost pets was investigated in this study [1]. The researchers discovered that GPS tracking boosted the recovery rate of lost dogs significantly, with 82% of tracked dogs successfully recovered within 24 hours.
- S. J. Ward, S. Sherwen, and F. E. Clark have made a research in the paper entitled "Advances in Applied Zoo Animal Welfare Science", examined into whether GPS trackers reduce wild animal's poaching [2]. The data indicate that animals with GPS trackers are less likely to be poached than animals without tracking devices
- Tannop Sangvanloy, et al [1] use Internet of Things (IoT) technologies to develop an autonomous pet food dispenser. This creative technique was created by Tannop Sangvanloy and Kingkarn Sookhanaphibarn at Bangkok University and is intended to help pet owners feed their small animals, including dogs and cats, even while they are not at home. The usage of the Arduino IDE and an ESP32 microcontroller for programming and connectivity, an MG995 servo motor for food dispensing, a load cell with a HX711 amplifier for precise weighing, and Blynk software for mobile app control are the main elements of this Internet of things system. To promote healthy pet care practices, the system enables pet owners to plan feeding times, determine food amounts, and keep an eye on their pets' eating patterns

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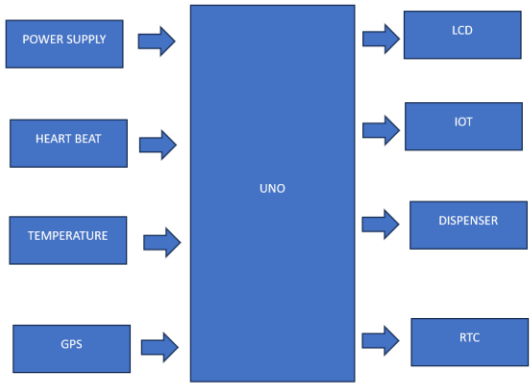
3.1. PROPOSEDSYSTEM

This paper introduces our innovative design aimed at ensuring the safety of the pet by tracking the real time location and prevent them from getting into trouble. Our proposed system utilizes a GPS module to continuously monitor pet location and a WIFI module is required to share location and pulse rate to the user phone And As Per Time The Food Will Be Distributed

3.2. BLOCKDIAGRAM



BLOCK DIAGRAM DESCRIPTION

REGULATED POWER SUPPLY:

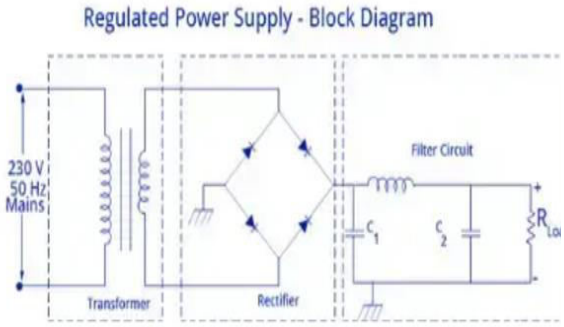


Fig: Regulated Power Supply Diagram

A regulated power supply provides a stable DC output by transforming variable AC input.

Component Overview: The essential components of a regulated power supply consist of a transformer, rectifier, filter, and regulator, each vital for ensuring a stable DC output.

The rectification process involves diodes transforming alternating current (AC) into direct current (DC), sometimes using full-wave rectification to optimize efficiency.

Filter Function: Filters, including capacitor and LC kinds, mitigate ripple and stabilize the DC output voltage.

Regulatory Mechanism: Regulators modulate and stabilize output voltage to safeguard against input fluctuations or load variations, crucial for a dependable power supply.

MICRO CONTROLLER

ARDUINO

The Arduino is a series of microcontroller boards designed to facilitate electrical design, prototyping, and experimentation for artists, hackers, amateurs, and even professionals. Individuals use it as the cognitive component for their robots, to create innovative digital musical instruments, or to develop a system that enables houseplants to notify you via Twitter when they want water. Arduino boards, namely the basic Arduino Uno, are constructed around an ATmega microcontroller, which functions as a comprehensive computing unit including a CPU, RAM, Flash memory, and input/output ports, all integrated into a single chip. In contrast to a Raspberry Pi, it is designed to connect various sensors, LEDs, tiny motors, speakers, servos, and similar components directly to these pins, which may read or output digital or analog

voltages ranging from 0 to 5 volts. The Arduino interfaces with your computer by USB, allowing you to program it in a straightforward language (C/C++, akin to Java) using the complimentary Arduino IDE by uploading your developed code to the board. Once programmed, the Arduino may operate via a USB connection to your computer or independently without it—requiring just a power source, devoid of a keyboard or display

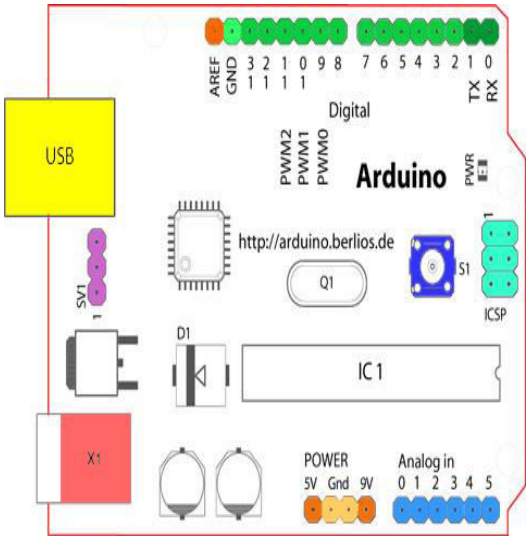


Fig: Structure of Arduino Board

SENSOR

A sensor is a device that identifies and reacts to certain stimuli from the physical world. The input may consist of light, heat, motion, moisture, pressure, or several other environmental phenomena. The output is often a signal that is either translated to a human-readable format at the sensor site or transferred electronically via a network for interpretation or further processing.

CONCLUSION

The proposed system is advance real-time GPS tracking system designed for pets which also senses the pulse of pet with a click from user's connected smart phone. It continuously monitors the pet's location using a GPS module installed in it. Whenever the pet crosses the safe zone (geo fencing) which is already set, the owner receives the notification. Upon the request or when the pet leaves the safe zone the location and the heart rate can be monitored in the registered or connected devices. this project presents a promising solution for pet safety and well-being, offering real-time location tracking, pulse rate monitoring, and potential for further development in animal health monitoring. This proposed system will revolutionize the way of tracking our pets or monitoring them. It will be proven very useful in context of monitoring their movement . It can be conclude that this system is specially designed to track location of pet animals reather than non-living things. This system has also included pulse sensor as a primary component to determine aminal health which was not previously used.

In summary, the research covered demonstrates how important and rapidly Internet of Things (IoT) technology is in helping to solve the problems associated with pet care in our fast-paced society. With a plethora of cutting-edge features like remote control, monitoring, and even sophisticated technologies like voice recognition, face recognition, and RFID, these Internet of Things (IoT)-based automatic pet feeding and monitoring systems constitute a revolutionary breakthrough in pet management. The procedures are designed to guarantee that pets are fed on time and precisely, to increase pet welfare, and to promote responsible pet care. By addressing issues like obesity, overfeeding, and food poisoning, they encourage a healthy diet.

In addition to making pet owners' lives easier, the increasing use of IoT in pet care is strengthening the link between owners and their furry companions. In our increasingly linked world, this move toward technologydriven pet care portends a better and more convenient future for both animals and their human friends.

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