

Review on Development of Automatic Pet Food Dispenser using Digital Image Processing

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Abstract

The paper has a project design aimed at which pet owners can feed their pet even without their presence or Interferences, like older versions of pet feeder. This system makes use of the Digital Image Processing technique for implementation. In the project, if RFID Receiver detects the pet, the Camera captures the pet's image and processes it. If the image is matched with the stored data, a servo motor and solenoid valve will be activated to dispense food and water, respectively. The servo motor is rotated to serve food, and the solenoid valve is opened for the water flow. This design also contains the call for the pet at feed time and a refill alert. This system is implemented to feed more than one pet of different species by the DIP technique. All the activities are uploaded to the server so the pet owner can see the report whenever they want.

Keywords— Digital Image Processing, Automatic pet feeder.

I. INTRODUCTION

An automatic pet feeder is one of the new technologies for feeding the pet. It will help pet owners in taking care of a pet in their absence. During the time owners not at home, they can feed their pet. This is designed to help owners to take care of their pets. This system is one of the pet feeders that will be implemented using DIP. The feeder will dispense a predetermined amount of food automatically at the moment when the Camera processes the image of the pet. Being a pet lover, one should know the fact that those pets need proper diet management. The responsibilities of life also include pet owners taking care of their pets in a proper manner. Pet care should be fun, not a burden. So the goal of the project is to help the owner with pet care by providing the needful.

The project helps the owner of the pet to feed them on time, even during their absence. The system act in two ways, one is feeding the pet, and another one sends the detailed feeding information to the owner.

II. LITERATURE SURVEY

The purpose of the literature survey is to investigate the topic of “Automatic Pet Food

Dispenser using DIP.” The following section explores different references that discuss various topics related to our project.

[1] “Intelligent Food Dispenser (IFD)” - Hari N. Khatavkar, Rahul S. Kini, Suyash K. Pandey, Vaibhav V. Gijare, 2019.

This food dispenser is controlled using an android application that gives control to the device through a Wi-Fi module to dispense food. The microcontroller FRDM KL25Z is programmed in a way it sets the motor to work. There are two basic parts for dispensing the food. A storage box is used to store the food that has an opening on storage. The storage box has a lid beneath the box. The lid is attached to a DC motor that is interfaced with an FRDM board. The amount of time for openings of both lid and storage box coincide will decide the amount of food dispensed. Once the food is dispensed, the motor is programmed to rotate, thus closing the lid. The android app proved helpful in this case. It can control time for how long the motor stays in the opening position.

[2] “Digital Image Processing-A Quick Review” - R. Ravikumar, Dr. V. Arulmozhi, 2019.

Images are the evident sources in image processing applications. Image processing will change the human-computer interaction in the future. A huge number of image processing applications, tools, and techniques help to extract complex features in an image. While presently, image processing works beyond multidimensional and check what is actually in an image. Several techniques are being played on images in real-time, but image processing is the core. The image processing applications, tools, and techniques help to extract complex features of an image. Image processing works on the single dimensional image and multidimensional image and checks what happens with the image. Image processing is the core for many developing techniques in real-time aspect.

[3] “A Remote Pet Feeder Control System via MQTT Protocol” - Wen-Chuan Wu, Ke-Chung Cheng, Pei-Yu Lin, 2018.

At present, most commercial pet feeders are stationary systems. The owner can control the feeder



to dispense food to their pet in a remote mode using smartphones. Few feeders have a camera function that allows the owner to observe pets at home. Anyhow, these machines are stationary and cannot move. The photos are also in a fixed shoot angle, while pets can move around the house. Henceforth, this paper will design a remote control system on a toy car equipped with a camera, feeding food and water. It allows the owner not only to receive an image by the remote Camera through an android device but also to control its movement through MQTT protocol to achieve the purpose of pet food and water supplement.

[4] “Automatic Pet feeder” - AasavariKank, Anjali Jakhariye, 2018.

Different sensors are employed for this system of pet feeders to work efficiently. A proximity sensor is going to be connected to an Arduino. Once the pet is detected in the feeder’s surroundings, the food from a container is put in a food bowl. Whenever the sensor detects motion at a distance from the feeder, once the pet comes near to the food bowl, the food will be served. A servo motor is employed in the system for locking purposes. Together, all these components will determine the efficiency of the feeder.

[5] “Pet feeding Dispenser using Arduino and GSM Technology” - Smruthi Kumar, 2018.

This paper focuses on the topic where the pet owners can feed their pet in their absence by sending a message to a system through a Mobile phone. GSM technology is adopted in this system to receive a text from the owner. The solenoid valve and servo motor are activated once the message is received. This causes the servo motor to rotate in order to dispense the food. Also, water to be free-flowing, the valve will be open. Once the feeding process is done, the owner will receive a message. This concept is for the family that has a busy schedule and who are not able to feed the pet.

[6] “Automatic Pet Monitoring and Feeding System Using IoT” – Subaashri S, Sowndarya M, Sowmiyalaxmi D K S, Sivassan S V, Rajasekaran C, 2017.

IoT is a platform that can embed hardware as well as software. IoT is an efficient way for data access. SOAP dependant mechanism with web service is used to manage diversified devices in the home environment. Numerous sensors are employed to monitor various pet activities, like the presence of food in the plate is monitored using an IR sensor. To enable the transmission of the pet’s identity, an RFID tag is used in the pet collar. Arduino acts as a gateway for sending a piece of information collected to cloud storage, where the data can be accessed and retrieved using a smartphone. The whole network will be wireless; therefore, the loss cannot be found. To realize, two smartphones based SDR prototype

involving IEEE 802.15.4 and IEEE 802.11. For 802.11p, the min. The required sampling rate is 10MS/s; thus, we use PPSK and QPSK, each is 4bytes. The work can further be improved by adding RTC to the feeder.

[7] “Remote Controlled and GSM Based Automated Pet Feeder” - Prashant Singh, Amit Kumar Sharma, PayalSood, Paramdeep Singh, 2015.

In the paper, a new design has been proposed to be controlled using an interactive remote controller that helps eliminate the manual settings of previous versions of the pet feeder. This design contains a lot of new features as compared to previous versions. In this design, users can adjust feed time, the time gap between consecutive pet feeds, and the quantity of food that is served. This design also contains the call for the pet at feed time, pet food refill alert, dual power supply with battery charger, Message alert system to an owner in case of the pet not getting fed, safety lock for the food container, a sensor-based system in order to serve previously served feed in case of leftovers and it is a priority feeder with a dual option to serve as the owner can opt for a multi-time and pet can opt for 1 time between feed time gap.

[8] “Automatic Pet Feeder” - Manoj M, 2015.

This is a system in which food is fed at regular intervals. The timings will be pre-programmed using a microcontroller. The system consists of two knobs along with a dc motor. Whereas one knob is to control the interval of time in which the food is to be fed, and the other knob is to control the opening time and the closing time of an outlet of food. A dc motor controls the opening and closing of the food outlet. A buzzer is employed to indicate the food that is being fed. There might be chances of food getting stuck on the way, in order to avoid this problem a vibrating dc motor will be used. At first, food has to be loaded into a feeder column, a microcontroller is to be reset, and the timing required in both knobs is to be selected. Once the microcontroller is reset, depending on the timing of two knobs, the food will be dispensed.

[9] “Smart Dog Feeder Design Using Wireless Communication, MQTT and Android Client” - Vania, KanisiusKaryono, Hargyo Tri Nugroho I, 2016.

This device can provide regular feeding without disturbing the work of an owner. The process can be monitored by users using their smartphones remotely. It can provide RFID authentication, setting feed time, and serving portion through a smartphone. It can also send feeding reports and the arrival of the dog during the feed time. All settings about feed time, portion, stock, and waiting time will be set on an Android Phone. SDK 18 will be installed using the Appliance Hub application. The feeder has stock information

and the feed schedule, waiting for the time and name of the owner from a server using MQTT protocol.

[10] “Programmable Pet Feeder” - TessemaGelilaBerhan, WorkuToyibaAhemed, TessemaZelalemBirhan, 2014.

Pet feeders are automatic devices that dispense food at an already set time. The system is mainly time-based systems and dispenses a specified amount of food at specified times. This is a programmable system that is controlled using a microcontroller. It employs an LCD screen for displaying the input; a buzzer is used to alert the pet at mealtime. A stepper motor is used to control the speed, and a turntable is divided into different sections to place different food. The owner can select the food that has to be dispensed out at the specified time.

III. CONCLUSION

This design is implemented to feed more than one pet of different species. The accuracy of the system is high as we are using Digital Image processing. This design of pet feeder provides few other features which will be more convenient for both owner and pet. This system also provides all information about the feeding of pets like is it getting fed or not, is it getting fed in proper quantity or not that might help to get rid of the overfeeding problem. This design also helps in stopping food from getting waste by providing the left feed first.

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