



Smart Feeder with Sound Sensing System

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ABSTRACT

The aim of this project is to develop a smart feeder with a sound sensing system using IoT technology and various sensors such as ultrasonic sensor, load cell, microphone sensor, servo motor, Arduino.. This smart feeder will be designed to provide an efficient and reliable feeding mechanism for pets. The system will consist of an ultrasonic sensor and load cell to measure the amount of food in the feeding bowl. The microphone sensor will be used to detect the sound of a pet approaching the feeder. The system will then activate the servo motor to dispense the appropriate amount of food for the pet. The Arduino microcontroller will be used to control the system, collect data from the sensors, and transmit it to the cloud-based platform. Overall, this smart feeder with a sound sensing system will provide an efficient and reliable feeding mechanism for pets. With the help of IoT technology and various sensors, this system can detect and respond to a pet's needs in real-time. This system has the potential to make a significant impact in the pet care industry, providing a convenient and reliable solution for pet owners.

Keywords: Iot-based, Ultrasonic sensor, Load cell, Microphone sensor, Servo motor, Arduino, detector amplifier.

1. INTRODUCTION

The Smart feeder with a sound sensing system is an innovative and convenient solution for pet owners to ensure their pets are fed on time and in the right amount. This system uses various sensors such as ultrasonic sensor, load cell, microphone sensor, and servo motor. These sensors are controlled by the Arduino microcontroller . The ultrasonic sensor and load cell are used to measure the amount of food in the feeding bowl, ensuring that the right amount of food is dispensed for the pet. The microphone sensor detects the sound of the pet approaching the feeder, triggering the system to dispense the appropriate amount of food. The user can then access this data remotely via a mobile application or web browser. The servo motor is responsible for dispensing the food, sensing system using IoT technology has various applications in the pet care industry. It provides pet owners with an easy-to-use and reliable solution for feeding their pets, ensuring that they are well taken care of even when the owner is away. Overall, the smart feeder with a sound sensing system is a revolutionary development in the pet care industry, providing a convenient and reliable solution for pet owners. With the help of IoT technology and various sensors, this system can detect and respond to a pet's needs in real-time, providing a stress-free feeding experience for pets and their owners.

HARDWARE COMPONENTS

Arduino UNO



Arduino can be used to communicate with a computer, another Arduino board or other microcontrollers. Arduino UNO is an open source microcontroller based on the Microchip ATmega328P microprocessor. The company, project, and user community known as Arduino creates and produces single-board and microcontroller digital devices using open source hardware and software. Hardware from this company is authorised by the CC-BY-SA licence, and the GNU Lesser General Public License (LGPL) or GNU General Public License (GPL), which permits the development of Arduino boards and the distribution of the software for Smart Feeder with sound sensing system to anybody.

Ultrasonic Sensor



Short, high-frequency sound pulses are periodically emitted by ultrasonic sensors. They move through the air at the speed of sound. If they hit an item, they bounce back as echo signals to the sensor, which then uses the interval between the signal's emission and reception to calculate the target's distance. Ultrasonic sensors are very good at reducing background interference since the time of flight, not the sound intensity, is used to calculate the distance to an object. Almost any substance that reflects sound can be found, regardless of colour.

Load Cell



A load cell is a type of transducer, specifically a *force* transducer. It converts a force such as tension, compression, pressure or torque into an electrical signal that can be measured and standardized. As the force applied to the load cell increases, the electrical signal changes proportionally. The most common types of load cell used are hydraulic, pneumatic, and strain gauge. This electronic signal can be a voltage change, current change or frequency change depending on the type of load cell and circuitry used. There are many different kinds of load cells.

Servo Motor



A servo consists of a Motor (DC or AC), a potentiometer, gear assembly, and a controlling circuit. First of all, we use gear assembly to reduce RPM and to increase torque of the motor. Say at initial position of servo motor shaft, the position of the potentiometer knob is such that there is no electrical signal generated at the output port of the potentiometer. Now an electrical signal is given to another input terminal of the error detector amplifier.

MODULE DESCRIPTION

Microcontroller Module

The microcontroller is the brain of the project and controls all the functions of the automatic pet feeder. Some popular choices for microcontrollers are Arduino UNO.

Motor Module

The motor is used to dispense the food from the storage container to the feeding tray. A stepper motor or servo motor can be used for this purpose.

Storage container Module

The storage container holds the pet food and dispenses it to the feeding tray as per the set schedule. It can be made from food-grade plastic or other materials.

Feeding tray Module

The feeding tray is where the pet food is dispensed, and it should be designed to be easily accessible to the pet.

Keypad module

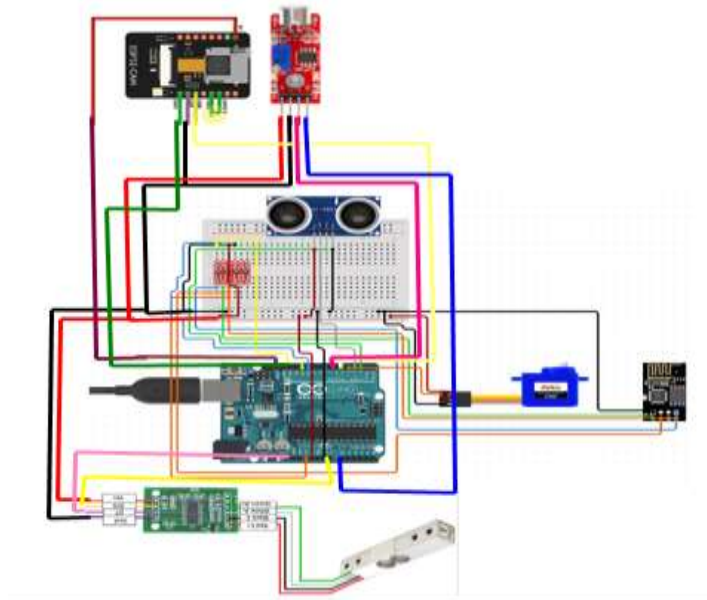
The keypad module can be used to set the feeding schedule, adjust the dispensed food amount, and other settings.

Sensor module

The sensor module can be used to detect the pet's presence or absence near the feeding tray. It can be an ultrasonic sensor or an infrared sensor.

Power module

The power module is used to power the automatic pet feeder. It can be a battery or a power adapter.

CIRCUIT DIAGRAM

CONCLUSION

In conclusion, the smart feeder with a sound sensing system using IoT and Arduino is a highly efficient and convenient solution for pet owners to feed their pets. The system uses various sensors such as ultrasonic sensors, load cells and microphone sensors, which are controlled by an Arduino microcontroller. The system is designed to detect a pet's presence through sound and respond by dispensing the appropriate amount of food. Overall, this smart feeder with a sound sensing system is an innovative development that has the potential to make a significant impact in the pet care industry. With its efficiency, convenience, and reliability, it provides a valuable solution for pet owners who are looking to take care of their pets while they are away.

FUTURE SCOPE

We were able to combine the programmes we already had and the components to function as one using a procedure that worked as intended by using the appropriate libraries and codes. Troubleshooting and code editing later, we were able to develop an, Automated pet feeders that administer food and water at the appropriate times can assist owners in sustaining and maintaining the health and condition of their pets.

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