Computer Interfacing

Contributors:

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Project Title: An automated feeder system for pets based on their presence.

GitHub Link: https://github.com/Sajid-Mahir/Smart-Pet-Feeder---Arduino-Uno

Working Mechanism Video: https://youtu.be/s1rb3c4s8nc?si=WbNaEd-Occ09iNd2

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Smart Pet Feeder

Introduction: The main reason for this project is to ensure a timely and convenient way for the nourishment of pets which is the main responsibility of a pet owner. It is a matter of regret that in our busy day-to-day life schedule, we sometimes forget to feed our pets on time, and from that thought, we came up with the idea of this project. Moreover, even when the pet owner is on holiday this feeder can be a lifesaver for a lot of pets. The Smart Pet Feeder system will complete this obligation through a few automated processes. Within this system, there is also a system for calculating the food material left in the feeder so that the owner knows when to refill it. Additionally, a careful analysis is done to determine if the time is correct to feed the pet or not, while simultaneously assessing the distance of the pet to the feeding bowl. When the appointed feeding time comes, the system automatically activates a motorized mechanism to dispense a suitable amount of food from its storage if the pet has been near the feeding bowl for a certain amount of time. The system will detect the presence of the pet within the designated area with the help of sensors and the amount of food left in storage will also be measured through a sensor and the LED will turn on if the food is low. Thus, if the said processes work simultaneously it would be a great help for a lot of pet owners and pets.

Project Details:

Sensor and Component List:

- PIR Sensor: Used to detect the presence of the pet.
- HX711 Weight Sensor: Employed for measuring the remaining food in the storage.
- Ultrasonic Sensor (HC-SR04): Utilized to determine if the pet is in close proximity for feeding.
- Servo Motor: Controls the dispenser to provide food to the pet.
- Breadboard
- Arduino Uno R3
- Connecting Wires
- LED
- Enclosure

Project Working Mechanism:

The Smart Pet Feeder employs an automated system to ensure the pets are fed timely and help pet owners manage food properly. The collaboration of various sensors and components creates a seamless user experience for both pet owners and their furry companions.

- **PIR Sensor:**

  The PIR Sensor serves as the initial point of interaction with the Smart Pet Feeder. Positioned strategically, it detects the infrared radiation emitted by the pet's body heat, indicating the presence of the pet in the range of the sensor.

- **HX711 Weight Sensor:**

  The HX711 Weight Sensor is responsible for monitoring the food levels within the storage compartment. By employing a load cell, the sensor accurately measures the weight of the remaining pet food. This information is then used to make the LED red when the amount is low in the storage which is crucial for pet owners to track and manage their pet's nutrition effectively.

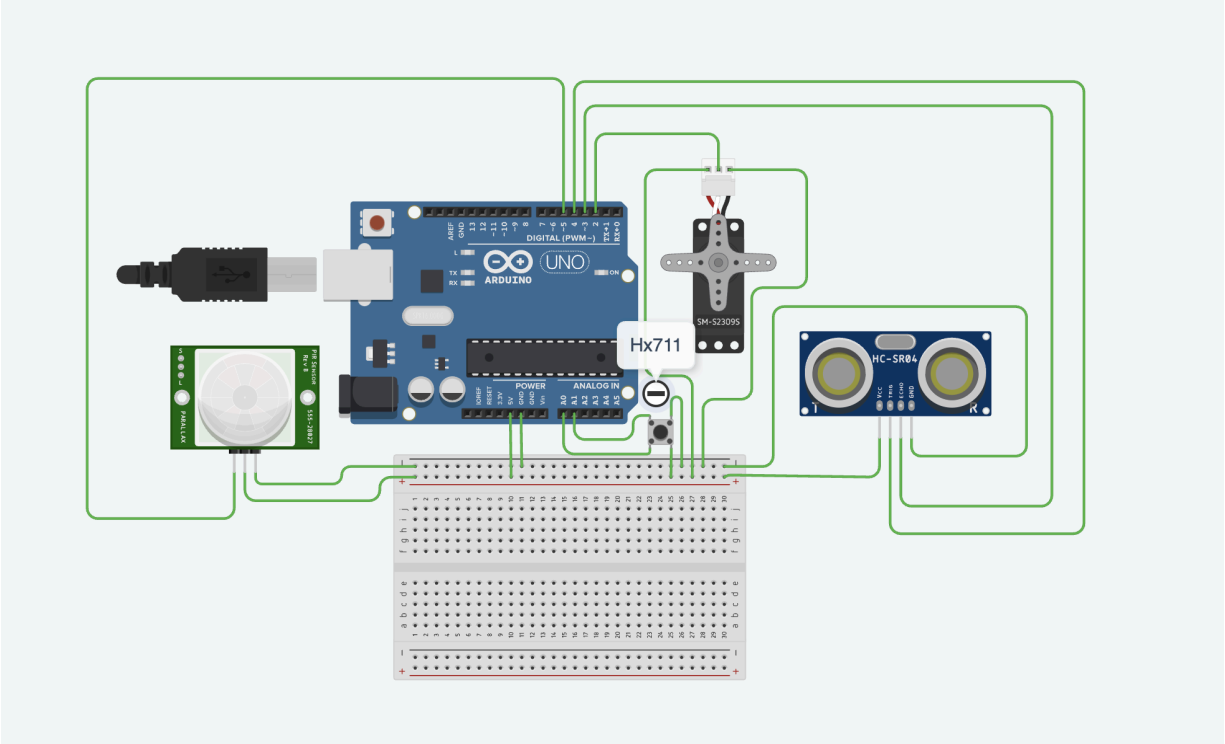
- **Ultrasonic Sensor (HC-SR04):**

  The Ultrasonic Sensor, the HC-SR04 module, contributes to the spatial awareness of the Smart Pet Feeder. It emits ultrasonic waves and measures the time taken for the waves to bounce back after hitting an obstacle. This functionality enables the system to determine the proximity of the pet to the feeder, ensuring that the pet is within an optimal range for feeding.

- **Servo Motor:**

  The heart of the Smart Pet Feeder lies in the Servo Motor, which controls the dispensing mechanism. Upon validating the presence of the pet through the PIR Sensor and confirming the proximity with the Ultrasonic Sensor, the Servo Motor moves at a certain angle and releases pet food from the storage compartment. This precise and measured dispensing mechanism guarantees an appropriate amount of food is provided, promoting a balanced and healthy diet for the pet.

Circuit Diagram:



Circuit Diagram

Project Cost Analysis:

After analyzing and buying all the materials and components, we estimated an approximate amount of BDT 2230 as detailed in the table below:

Sl.	**Name of Component**	**Total Cost**
1.	PIR Sensor	120
2.	Ultrasonic Sensor (HC-SR04)	110
3.	HX711 Weight Sensor	200
4.	Servo Motor	500
5.	Arduino Uno R3	850
6.	Connecting wires	150
7.	Breadboard small	90
8.	LED	10
9.	Enclosure	200
	Total:	**2230**

Conclusion and Future Work:

In conclusion, the Smart Pet Feeder project successfully integrates multiple sensors and components to create an automated pet-feeding system. As part of future work, we aim to implement additional features such as scheduled feeding times and remote control capabilities to enhance the user experience further. There can also be a water fountain added here as we are just doing this for dry foods and also display the whole system on an LCD so that the owner gets the full idea of the food distribution.

References

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