

IIT ASSIGNMENT - 1

The Solving Problem Process

STEP 1 : Understand & Define the Problem

Problem Statement/Analysis

The local animal shelter is looking for a low cost, programmable automated pet feeder system. The primary function of the system is to dispense food for cats and dogs at scheduled times. In addition, the system also needs to monitor whether the food was dispensed and consumed. If an error occurs, such as food not being dispensed or not being eaten, the feeder should alert staff immediately.

Assumptions

1. Pets are going to eat the same type of food which is going to be mostly dry (simpler to dispense and less likely to clog the filter) .
2. Feeding time is going to be set for two times in a day, which can be configurable.
3. A weight sensor under the bowl will measure whether the food has been eaten.
4. A level sensor in the hopper will monitor the food activity.
5. Alerts can be communicated through LED.
6. A Real Time Clock (RTC) is available to ensure accurate scheduling.
7. The servo motor dispenses a fixed portion per cycle.
8. After dispensing, the system waits 10 minutes and then checks if food was eaten.

Constraints

1. The system must be low in cost with minimal sensor and actuators, to ensure affordability and easy maintenance.
2. Limited memory and processing capacity due to the use of low cost hardware.
3. Servo motor is going to dispense a fixed portion of food everytime, .
4. Power cuts can occur and cause interruptions, system should resume safely without losing the feeding schedule.

Inputs

1. Time from the RTC for feeding schedule.
2. Hopper level from the level sensor to detect whether the food is available.
3. Bowl weight from the weight sensor to monitor whether the food has been eaten.

Outputs

1. Servo motor rotation to dispense food portions.
2. Alerts through buzzer/LED if errors occurs.
3. Feeding log entries to record weather the food was dispensed and consumed.

