

Assignment 1: Solving the problem

Part1: On the solving problem process

Problem statement: A local animal shelter has a need for a cost-effective, automated pet feeder that can be programmed to distribute exact quantities of food at certain times and monitor the degree of food consumed. It also has the capability to inform the staff in case of malfunctioning of dispensing or if the food is not eaten by the animal.

Objectives

- . Make sure cats and dogs always get their meals on time.
- . Automatically give out the right amount of food.
- . Keep an eye on whether the pets are actually eating or not.
- . Save shelter workers from having to do every feeding by hand.
- . Warn staff right away if something goes wrong.

Functional Requirements

- . Let you set different meal times and food amounts.
- . Drop the food into the bowl at those times.
- . Check if there's food in the container before trying to feed.
- . Double-check that the food really came out.
- . Notice if the pet eats the food or leaves it.
- . Send a warning if:
 - . No food came out.
 - . The food stays in the bowl too long.
- . Have a button so you can feed instantly if needed.
- . Keep a record of every meal—when it happened, how much, and if it was eaten.

Non-Functional Requirements

- . Shouldn't be too expensive—use simple parts.
- . The food portions should be pretty close to exact (within about 10 grams).
- . Needs to work almost all the time (at least 95% reliable).
- . Easy for staff to use and clean.
- . Should still work during power cuts (with backup battery).
- . Could be upgraded later to send messages to phones or emails.

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Inputs:

- . Feeding schedule (time(s), portion size)
- . Food-level sensor (is there enough food in hopper)
- . Dispense feedback (motor encoder or switch to confirm rotation)

- . Bowl weight (load cell)0-proximity sensor to detect consumption.
- . Manual override feed common

Outputs

- . Food dropping into the bowl.
- . Alerts with lights, sounds, or even phone/email.
- . A little screen showing the status.
- . A log of all feeding details.

Assumption:

- . One food type and consistent portion size mechanism
- . One bowl feeder (no muti bowl mixing)
- . Shelter staff will respond to alerts.

Limitations

- . No advanced pet recognition
- . Limited memory for schedule
- . Low cost sensors may be less precise.