

Step 1: Understand & Define the Problem

Problem Statement

A local animal shelter requires a low-cost automated pet feeder system that will reliably dispense food for cats and dogs at scheduled times, monitor food consumption and alert staff of any issues that occur, e.g. food not dispensed, food not eaten, etc. This system should be programmable, easy to maintain and be made up of low-cost components.

Required Features

- Scheduled food dispensing
- Monitoring of food consumption (using weight sensors)
- Alerts for possible errors (empty food container, food not eaten, food not dispensed)
- Low-cost and simple design

Assumptions

- Stable power supply
- Limited memory and processing (low-cost)
- Staff can manually refill the food container
- Feeder only caters to one bowl at a time

Inputs

- Feeding time (real-time clock)
- Food level sensor (checks the stock of the food container)
- Weight sensor under bowl (measures food dispensed and consumed)
- Error detection signals (e.g. jammed motor)

Outputs

- Motor rotation to dispense food
- Alert notification (sound or light) for staff
- Data logs of feeding times and consumption