A low-cost automated pet feeder must dispense foods for the pets at scheduled times. It needs to monitor whether the food has been consumed or the amount of food that has been consumed and if there is any issue (low food in storage and/or uneaten food left in the bowl) it needs to alert the staff.

The required functions of the pet feeder are:

1. Dispense food at scheduled times
2. Monitor food consumptions via sensors
3. Alert staff if food is low or uneaten
4. Operate reliably with minimal human interaction

The required inputs, outputs, assumptions and limitations are as follows.

1. Inputs:
    a. Scheduled feeding times
    b. Current time
    c. Status from the weight sensor under the feeding bowl to determine the amount of food consumed
    d. Status from the food level sensor in the storage to determine the amount of food left

2. Outputs:
    a. Servo motor to dispense food
    b. Alert the staff member if there are any issues (using buzzer)

3. Assumptions:
    a. The sensors are highly reliable
    b. The alert system works perfectly
    c. The dispenser works perfectly
    d. It takes 15 minutes (at max) for a pet to consume food
    e. The food dispenser is calibrated to release one consistent, fixed-size 'serving' of food with each activation.
    f. A full food storage bin is defined as containing exactly 10 servings. Therefore, each time food is dispensed, the total amount decreases by a fixed 10% of the original total.
    g. At least one pet can be fed with 1 food serving level left in the storage
    h. Staff take 5 minutes (at max) to respond to the alert accordingly
    i. No pets are to be fed within 5 minutes interval
    j. Persistent alerts for uneaten food are intentional. The system prioritizes animal welfare, so a continuous alert is designed to compel an immediate staff response to ensure a pet's feeding is not missed.

4. Limitations:
    a. Limited memory
    b. One type of pet food
    c. Pets need to have a 5-minute interval between feeding times so that the staff can discard the leftover food (if left)
    d. Requires 5-minute gap between feeding times for cleanup if necessary
    e. System works for 24 hours and then halts; needs to be restarted everyday
    f. Only 10 pets can be fed in a day
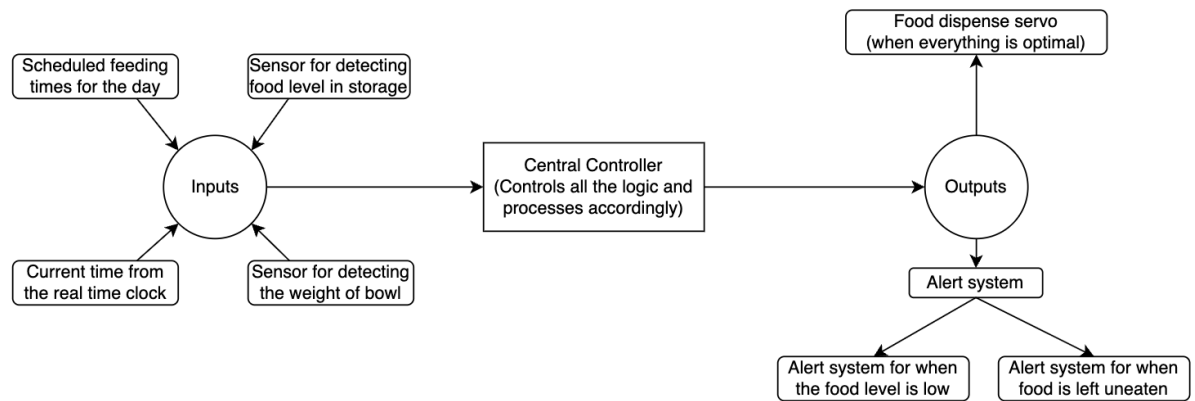
A brief system diagram has been shown below.

Fig: Diagram of the system

There are four types of output, one central controller (e.g. Arduino) that processes the logic and accomplishes tasks accordingly and finally we have the output: primarily of two types: servo motor to dispense food and buzzer alert system for primarily two different issues.