

SMRTTECH 4ID3 Project Proposal

Title of project: Automatic Pet Feeder

Stakeholder(s): Online Retailers, Pet Owners (community), Pets (End User)

Description of challenge, including the needs of the stakeholder(s) as it may relate to the challenge.

Pet owners face following challenges:

- Ensure pets are fed on time
- Managing different food types (cat, dog, etc.)

- Note: Pick **one** specific challenge area only

Current manual feeders or basic automated ones are:

- Not versatile
- Cannot differentiate different foods
- Lack cloud-based features ensuring feeder is always stocked

How might IoT help in addressing the challenge?

- Automation and remote management is enabled by IoT by connecting the feeder to the internet.
- Ultrasonic and RFID sensors detect and identify the pet's presence.
- IoT technology facilitates the ordering of the pet food through cloud integration.

Professional/industrial/high-level articulation

– PART-A

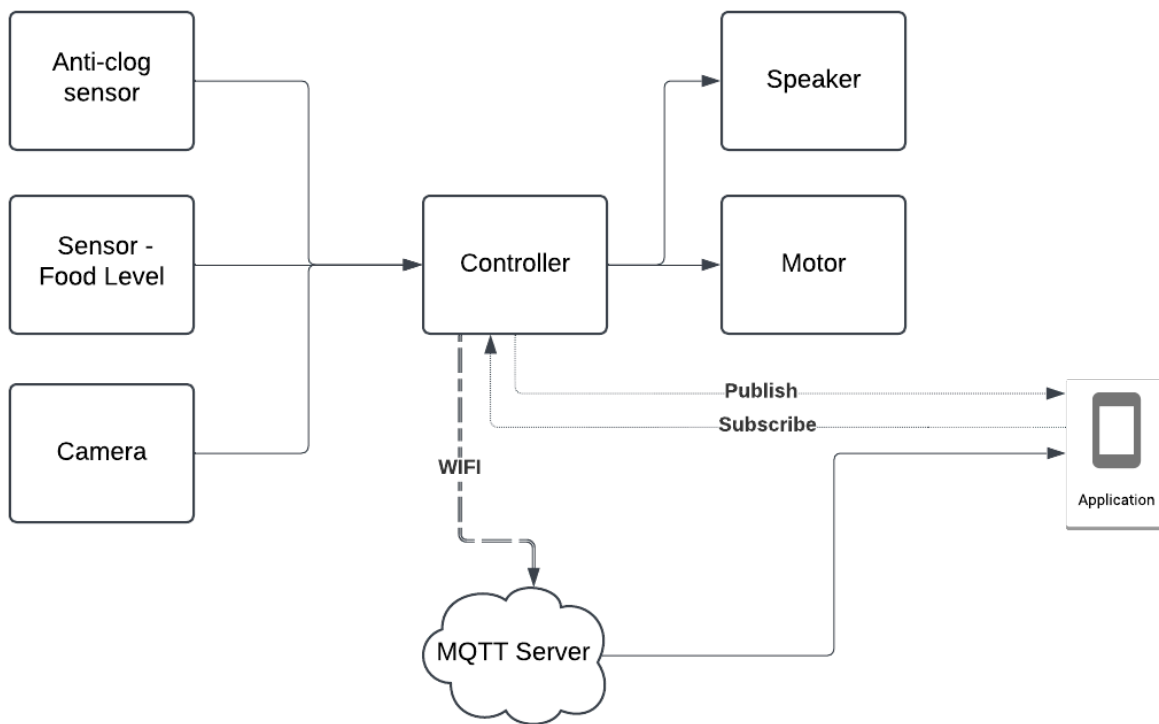
- Description of the **current** solution, including a block diagram of the current solution
- Shortfalls of the **current** solution

Current Solution

- Portion Management + Meal Scheduling
- Pet Monitoring
- Usage History
- Application Software

Shortfalls

- Only dispenses food
- Only dispenses one type of food
- Manually purchase food to restock
- Costly



– PART-B

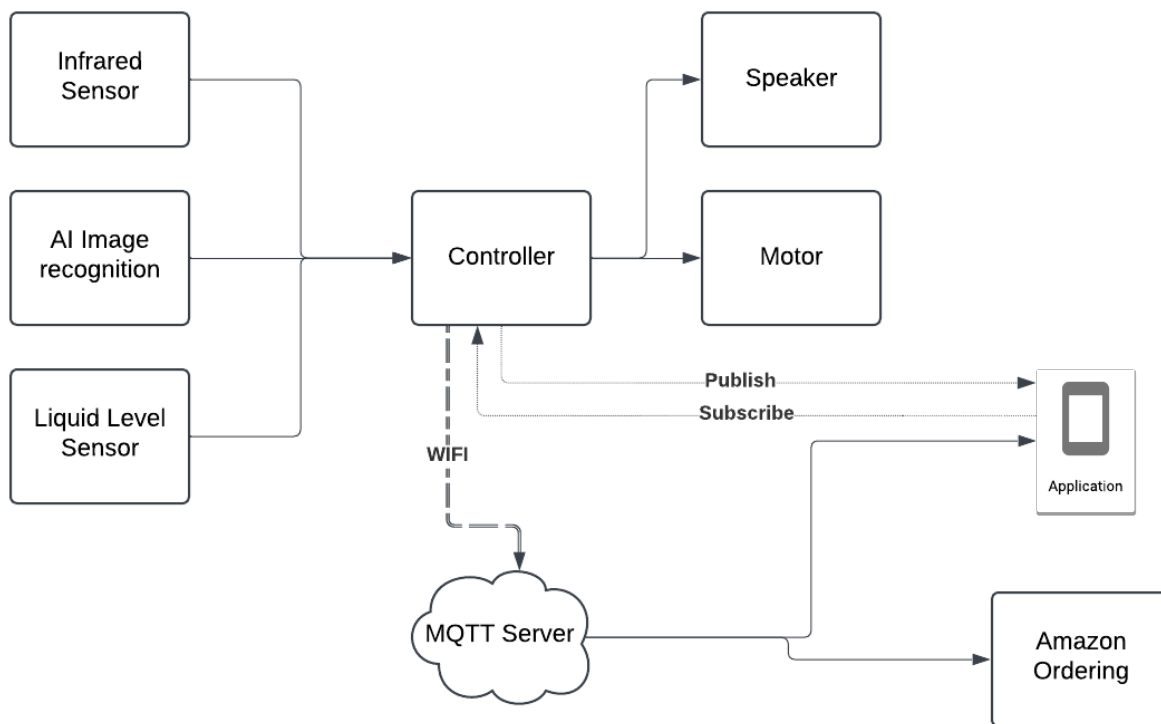
- Description of **your proposed** solution, including IoT-based network block diagram of your proposed solution.
- How does **your proposed** solution overcome the shortfalls of the current solution

Project Description

- AI Image recognition to detect presence + identify type of pet
- Infrared sensors measure levels of food
- Liquid level sensors measure water level
- Real-time control + Monitoring via Application

Overcome The Shortfalls

- Cloud integration ensures timely restocking.
- Feeds more than one pet
- Dispenses food and water
- Cost effective



– **Proof-of-concept (4ID3 Course Project – the project deliverable)**

- Description of **your proof-of-concept** solution, including IoT-based network block diagram of your proof-of-concept solution

Animal Recognition

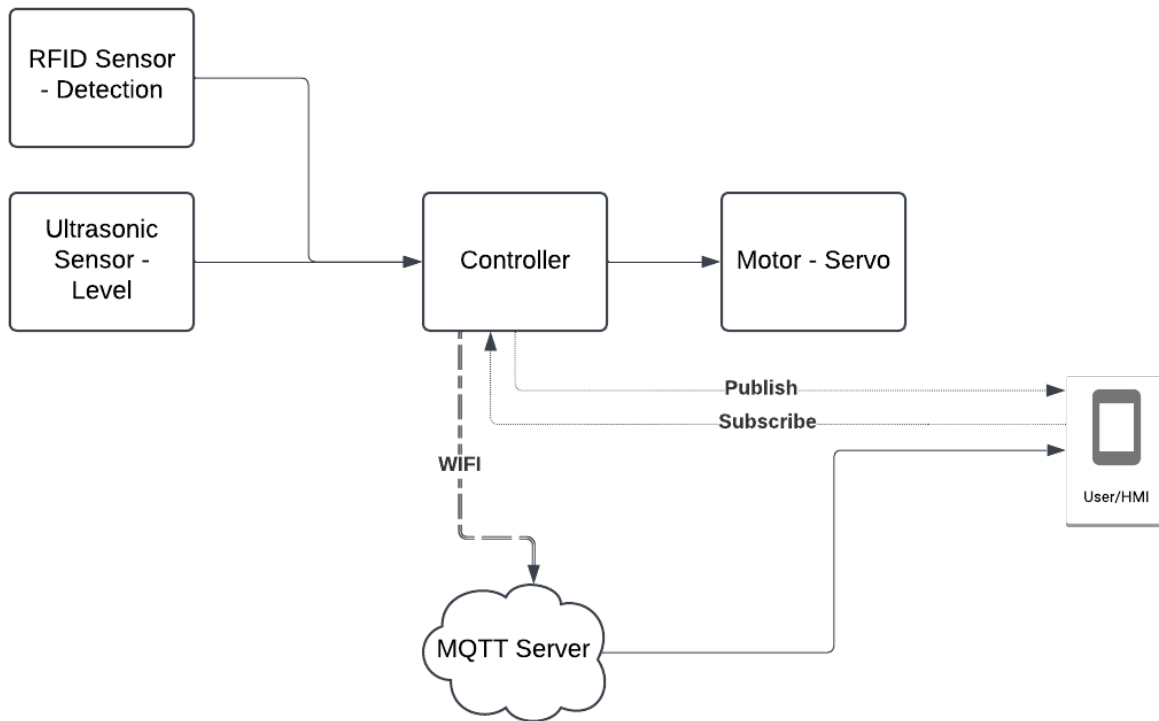
- **Using RFID tags** multiple pets can access their food on a timely basis
- **Unique ID's** will dispense their respective foods – which can be customized

Remote Feeding

- **Using an MQTT protocol** users can dispense food manually or in a timed fashion
- **Emergency stop** to terminate dispensing

Inventory Management

- **Ultrasonic level sensors** will be used to monitor the food left in the reserve
- **Restocking through Amazon** can be customized to ensure food is always available



- Explanation of why you have chosen what you have chosen for **your proof-of-concept solution** (i.e., you commit to demonstrating this in your final project presentation), and how does it **link to and/or differ from your proposed solution** at the professional/industrial/high-level articulation

Our proof-of-concept solution meets many of the requirements of the proposed solution while using components that are more easily accessible. The use of an RFID sensor would help differentiate the pet through a collar RFID tag similar to our camera recognition in the proposed idea, this would help in dispensing the type of food for the specific pet.

– **Budget**

- Budget of your **proof-of-concept solution only**, including bill of material (quantity, description including purchase web-links, and cost)

Component	Quantity	Cost	Total
Arduino Kit	1	\$40	\$85
Ultrasonic Sensor	2	\$6	
RFID Sensor	1	\$5	
Servo Motor	1	\$15	
3D Printed Components	1	\$19	

- **Risks**
 - Any risks (technical, business, management, etc.) that **may adversely affect/impact your proposed solution or your proof-of-concept solution**
- **Sensor Malfunction from pet interference**
 - **Mitigation Tactic**
 - Use high-quality, pet-proof components
- **IoT/Cloud integration issues due to network reliability**
 - **Mitigation Tactic**
 - Ensure fallback mechanisms for feeding if IoT fails
- **Retailer Dependence**
 - **Mitigation Tactic**
 - Maintain multiple retailer partnerships to always ensure stock availability