AquaFeedPi

Objective:-

To predict when fish are hungry, you can monitor behavioral patterns or physiological changes. While it is challenging to determine when fish are hungry, they do not exhibit clear signs like other pets, such as dogs.

Usually, aquarium fish swim toward the surface because they associate the surface with food due to positive reinforcement, especially domesticated fish.

Theory:-

The lack of clear cues presents a challenging aspect of this project.

We can divide the indicators into two categories: Environmental and Behavioral.

1. Environmental Indicators:-Changes in water conditions can indirectly indicate hunger or feeding requirements.

a) pH Levels: (Possible)

The decomposition of uneaten food increases the alkalinity (pH) of water.

A sudden rise in pH may indicate that food is not being consumed, signaling potential hunger or overfeeding scenarios.

b) Dissolved Oxygen (DO) Levels: (Possible)

Well-fed fish are less active and consume less oxygen compared to hungry fish, which may exhibit increased swimming and oxygen consumption.

c) Nitrate/Nitrite Levels:(Sensor issue)

Low nitrate levels over time may imply that fish consume all provided food without leftovers, indicating efficient feeding and potential hunger at scheduled times.

2. Behavioral Patterns

Observing how fish behave under different feeding conditions can provide important insights:

a) Surface Activity:Hungry fish often swim near the water surface, eagerly waiting for food.

Movement and Agitation:Increased erratic movements or gathering near feeding zones can indicate hunger.

b) Feeding Frenzy:A sudden rush to the feeding area when food is dropped may imply prior hunger.

Possible Solution:-

1.Infrared (IR) Motion Sensors:(Possible)

Detects increased activity near the feeding area (e.g., fish swimming near the surface).

Example: HC-SR501 PIR Motion Sensor.

2.Underwater Cameras + Image Processing:

Use OpenCV or machine learning to analyze fish behavior (e.g., clustering near the feeder).

3.Water Quality Sensors:

Monitor parameters like dissolved oxygen or ammonia levels, which correlate with feeding activity.
Example: DFRobot Analog Dissolved Oxygen Sensor.
4.Ultrasonic Sensors:
Detect movement near the feeding zone (e.g., HC-SR04).
5.Load Cells:
Measure uneaten food to adjust feeding schedules (e.g., HX711 Load Cell). Usually used for dog feeder setups, so we have to see if it will be possible for fishes.