Con-Sea-Erge - Requirements

Team 25

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I. Hardware Requirements

A. Sensing Technologies

1. PH
   a) Ability to detect the pH to an accuracy of 0.1pH
2. Temperature
   a) Ability to detect the temperature to an accuracy of 1 F

B. Device Enclosure

1. Size
   a) ~2.5 in x 2.5 in x 4 in
2. Food Input
   a) Easily accessible
   b) Hold a month's worth of Beta fish food
3. Food Output
   a) Device must be able to dispense of customizable amount of food
   b) Ability to send food dispense into the tank from the external of the tank
4. Mounting
   a) Device will be mounted to the external of the tank
   b) Mounting apparatus must not require any physical alterations to the tank

C. Device Power Supply

1. Wired
   a) 5V input

D. LED

1. RGB LED
2. LED Warning Indications
   a) YELLOW: Not Connected to internet
   b) RED: Feeding motor jammed
   c) BLUE: Normal Operation
   d) GREEN: Doomsday Mode

II. Frontend Requirements

A. User Experience

1. Being able to login and manage tanks
2. Seamless tank switching with confirmation
3. Labeled tanks
4. Notifications
   a) Feeding confirmation

          b) pH level warning

          c) Temperature level warning

B. User Interface

1. Send feed command
2. Able to view previous feedings
3. Able to set feeding schedule

C. Backend Connectivity

1. Send feeding timestamp
2. Manipulate feeding schedule

D. Device Monitoring

1. Able to view PH level
2. Ability to view temperature of tank

E. Device Actions

1. Be able to feed desired amount of food at any time
2. Ability to add additional fish/devices
3. Set temp warning levels
4. Set pH warning levels
5. Ability to one-shot feed

F. Hardware

1. Application will on IOS devices

III. Backend Requirements

A. Frontend Connectivity/API

1. The backend shall connect to the frontend app and receive updates about the status of tank schedules
2. The backend shall verify login information with the frontend.

B. Hardware Connectivity/API

1. The backend shall connect to specific hardware applications
2. While the backend is connected to the hardware it shall update the hardware parameters when changes are made from the frontend

C. Backend Processes

1. Continually running scheduler for scheduled fish feedings
2. The backend shall store login information, connected devices, previous feedings and monitoring levels
3. Receiving and passing information between the frontend and hardware, including initiating feedings, signaling successes/failures, and reporting temperature and ph readings

IV. Firmware

A. Wireless/Backend Connectivity
1. Connect wirelessly to the backend
2. Connect to the internet through the use of a Wifi enabled chipset
3. Ability to push monitoring information, in a specified format, to the backend
4. Ability to receive commands from the backend, where these commands will invoke actions on the device

B. Feeder Control
1. Ability to dispense a customizable amount of food set through the backend
2. Must be able to check for a jammed feeder and throw necessary warnings
3. Must be able to set a feeding schedule through the backend

C. Temperature Monitoring
1. Ability to monitor the temperature of the tank water
2. The device can monitor the temperature and report it to the backend at a customizable interval of time set by the backend

D. Ph Monitoring
1. Ability to monitor the Ph level of the tank water
2. The device can monitor the Ph level and report it to the backend at a customizable interval of time set by the backend

E. Offline Use

Offline use is described as a device that was set up connected to the backend server and has become disconnected from the internet for some time.

1. Ability to store the feeder schedule in non-volatile memory
2. The device will continue to act upon the feeding schedule until connectivity is restored.
   a. Must be able to track time in some way without an internet connection (unless the device is reset)
   b. If the device is reset, must have the ability to dispense food on either a limited schedule or continue from the schedule before
      i. Note: after a device reset, the current real-time is unknown, therefore food will be dispensed at the intervals defined before, but not at the time of day set
      ii. once a day doomsday
3. A warning will be displayed in form of an LED, to indicate the device does not have connection to the backend server.
4. Any additional warnings will be displayed via the LED

Stretch Goals (If time/hardware/user wants allow)

- Bluetooth connectivity to phone app for offline use or setup without internet connection
- Ability to monitor if there is fish food still left in the device
- Android device application