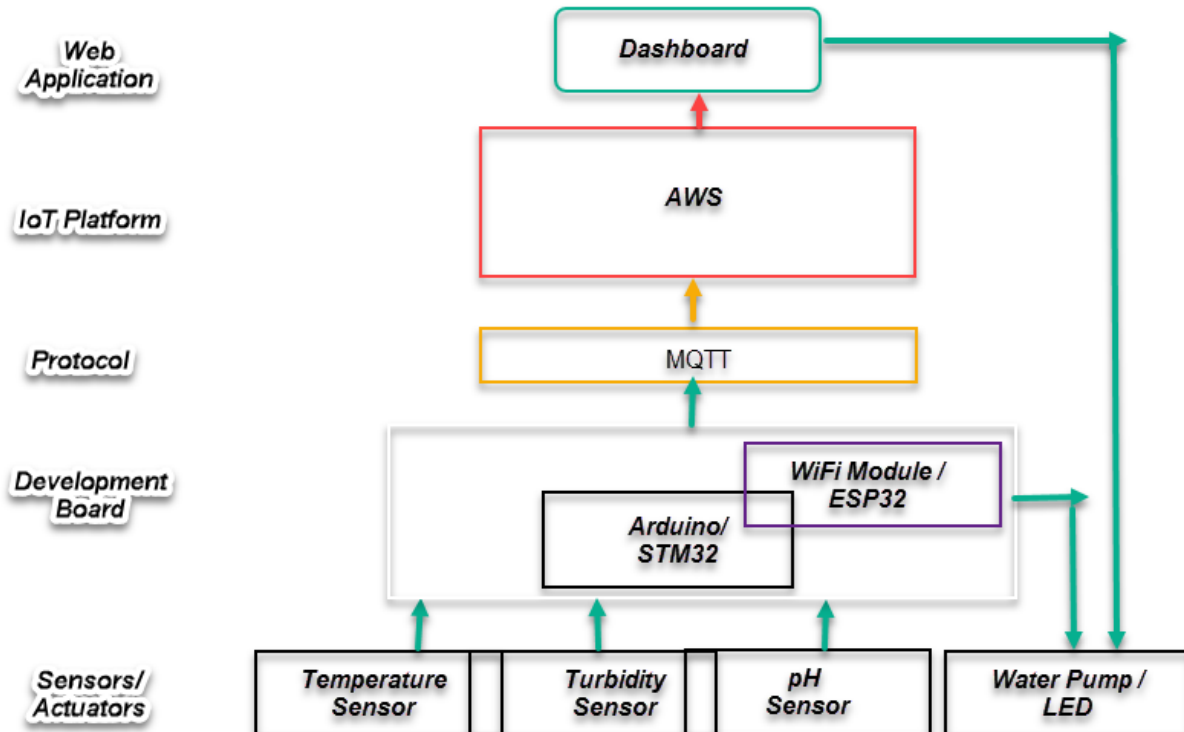


Technology

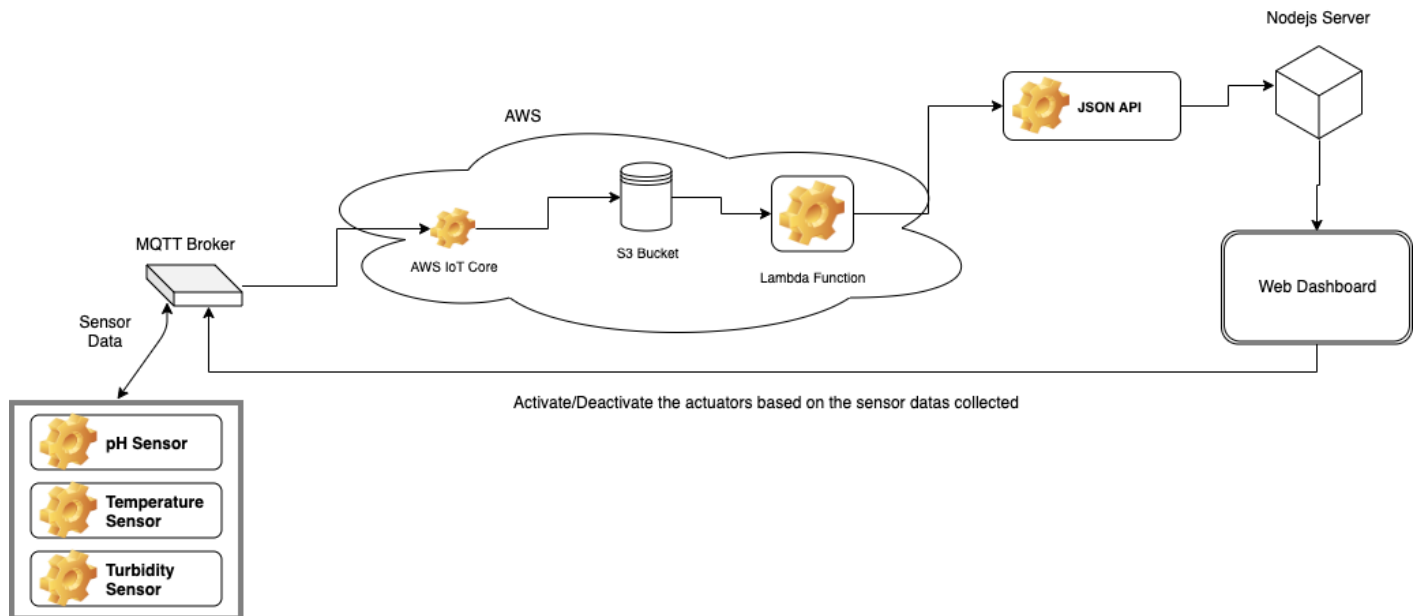
Product: Water Quality Monitoring System for Fish cage

Architecture:



The main purpose of the device is to monitor three important parameters of water i.e. pH scale, Turbidity and Temperature. The pH and Turbidity sensors monitor the impurity of the water. The sensor data on comparison with the old data if found impure a water pump will be activated to add pure water in the fish cage. From the temperature sensor data if the temperature data is high and not moderate a signal would be sent to the operator side which will turn on the LED light to notify the rising temperature. With the LED turned on the operator can send a signal to the water pump to add cold water in the fish cage to maintain the moderate temperature. All the data will be presented in visual form through a web-based dashboard which will be hosted on the cloud platform.

System Architecture:



MQTT Broker (AWS Core IOT)

Sensor datas are transmitted through a message broker to the IoT core through publish method for data preprocessing.

Lambda Function

AWS lambda function allows us to write functions (e.g. in python) to process the data without setting up a server.

AWS S3 Bucket

S3 bucket is used for storing data. The data is either stored in raw format or json format.

DEVELOPMENT BOARD

STM3 And Arduino Uno

The development board will housed upon Microcontroller STM32 and Arduino Uno for connecting the sensor and Wifi module(ESP32).

SENSORS

Waterproof DS18B20 Digital temperature Sensor

DS18B20 digital temperature sensor is used for measuring temperature of the water. To keep the water in moderate temperature, old temperature data is used for calibration to achieve moderate water temperature.

Analog data - Celsius

Analog Turbidity Sensor

Analog Turbidity sensor is used for monitoring water impurity. An LED is used to for passing light in the water. The amount of light scattering data is used for the detection of water impurity level. Impurity of the water is also monitored by detecting the ionised charged present in the water.

Analog pH Sensor

With analog pH sensor the acidity level of the water is measured.

ACTUATORS

Water pump

Based on the value of Turbidity and pH sensors data, we have the knowledge to find out whether the water is polluted or not. And also with Temperature sensor we have the temperature data. Water pump will be turned off/on to add pure water to maintain the water purity and also water is also used to pump in cold water if water temperature rises.

LED indicator

An LED indicator will be used to provide the end user as a feedback for the water characteristic whether to take actions of not.

CLOUD SERVICE

UBUNTU Server

An Ubuntu server will be hosted on the AWS cloud to run the MQTT broker service and along with Node js Server for data visualisation.

JSON rest API

JSON rest API is used as processed dataset for visual representation.

Web Dashboard

Web dashboard is used as platform to display the dataset in visual form. With Web dashboard the end user can also send command back to actuators whether to take action or not.