**National Institute of Technology, Hamirpur (HP)**

**Incubation Centre**

**Innovative Research Incubation Club (IRIC)**

**Project Proposal Form-2017**

1. **Faculty Name:** Dr. Rohit Dhiman
2. **Department:** Electronics & Communication Engineering Department,

National Institute of Technology Hamirpur (HP)-177 005

1. **E-mail ID:**  [rohitdhiman.nitham@gmail.com](mailto:rohitdhiman.nitham@gmail.com)
2. **Contact No.:** : (91)-98824-10890
3. **Research/ Project Title:** IoT Enabled Real-Time Aqua Guider.
4. **Research/ Project Description:** The various technical aspects and details of the project have been detailed in following write-up.
5. **Introduction:** Aquaculture is the considered as secondary farming in India. As the second largest country in aquaculture production, the share of inland fisheries has 85 percent in total aqua production. But there are many problems challenging this sector. The major problem in aqua-farming is the sudden change of dissolved oxygen, Ph value, Ammonia level and minerals in water. These abnormal changes cause problems for the shrimps or fishes in the pond. Normally farmers make a weekly check of these levels. But fishes or Shrimps are sensitive towards these changes in water and sometimes leads to the sudden death of all in the pond. Aquaculture operations can spread parasites and disease into the wild. The table below gives a view of parameters optimum levels in water to be considered for aqua farming.

|  |  |
| --- | --- |
| **Water Parameters** | **Optimum level** |
| Dissolved Oxygen | 3.5-4 ppm |
| Salinity | 10-25 ppt |
| Water Temperature | 26-32 (°C) |
| pH | 6.8-8.7 |
| Total nitrite nitrogen | 1.0 ppm |
| Total ammonia (less than) | 1.0 ppm |
| Biological Oxygen Demand | 10 ppm |
| Chemical Oxygen Demand | 70 ppm |
| Transparency | 35 cm |
| Carbon dioxide (less than) | 10 ppm |
| Sulphide (less than) | 0.003 ppm |

Thus, to overcome this major problem we are designing a real-time monitoring system through IoT which provides information to farmers regarding these values in water by using sensors on periodic bases. If the value greater than the limit it directly sends an alert message to concern framer and doctor associated with the farm. Some sprinkler motors are used to create motion in water order to separate or move the minerals which are stagnant at one point by creating an artificial sea environment for the fish or shrimp in the pond. Through the proposed system we can develop a real-time water monitoring system for farmers and artificial sea environment for fishes and shrimps.

1. **Objectives:** The study is focused to accomplish the following objectives—

* To measure the parameters in water affecting the growth of fish or shrimp.
* Upload the data into the cloud using Intel Galileo Gen2.
* Providing an alert message for the farmers when these levels increase threshold. Turning on the sprinklers remotely by farmers.

1. **Methodology:** The block diagram (Fig. 1) below gives an overview of the methodology developed in this project. The different sensors are connected to the microcontroller for sensor data processing. The data is uploaded into the cloud in regular intervals and processed for analysis. The alert message is send to the farmers and to the doctor associated with the pound if the threshold value of the sensors is overflowed. The sprinkler motors are activated by the farmer at regular bases remotely.

Micro Controller

(Galileo Gen2)

Sensors

(pH, Ammonia, DO)

Data Uploaded to cloud

Alert Message to Farmer

Sprinkler Motor

**Fig.1:** Block diagram of the proposed methodology.

1. **Components to be used:** The following electronic components are required to achieve the aforementioned objectives.

|  |  |
| --- | --- |
| **S. No.** | **Component** |
| 1 | Microcontroller (Galileo Gen2) |
| 2 | pH Sensor |
| 3 | Ammonia Sensor |
| 4 | Dissolved Oxygen Sensor |
| 5 | Salinity Sensor |
| 6 | Sprinkler Motor |
| 7 | Temperature Sensor |
| 8 | Humidity Sensor |
| 9 | CO2 Sensor |

1. **Project Completion Time:** 1 year**.**
2. **Student Skills Required, Pre-requisites (if any):** Embedded Systems.
3. **Number of Students Required (UG/ PG) for the project:** 3-4 UG Students