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Design and implementation of Automatic Aquarium System using IOT

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:*Abstract:-* In modern days many people have fish as their pets in home. Everyone loves fishes and required aquarium for their home. But maintaining aquarium is difficult task. We need to change water time by time, feed fishes time to time. Again it is difficult to check the conditions of an aquarium manually. Therefore it important to automate aquariums. Here we have implement an IOT based system which monitor and control the whole aquarium automatically and provide real time status on user's Smartphone application. It contains water quality management in which It will monitor the physical changes in the water and will maintain it to the ideal conditions, with required changes. The aquarium will perform all the steps automatically like temperature control, turbidity level control, light monitor, feeding, water renewal etc. It will reduce the manual effort required in maintenance of aquariums by automating the aquarium management process. also automatic food feeding system operated by servo motor mechanism which used to feed fishes on regular time intervals. Dead fish mechanism is there which will detect the dead fish. In addition camera is connected to aquarium system using which user can see live operation occurring in system with the help of smart phone. The aim of our project is to replace manual maintenance of fish aquarium with an Automated system by using IOT.

Keywords: Internet of Things, Sensors, Arduino Platform, Aquarium Controller by using Smartphone.

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I. INTRODUCTION

Fish keeping is a popular trend nowadays. People from all the age groups like to keep fish at their homes, offices etc. for decoration purpose or as a hobby. Commercial fish farming and ornamental fish farming has become very popular. Therefore it's important to automate aquarium/pond. As it is difficult to check the conditions of an aquarium manually. Here, we present a IOT connected system which monitor and control the whole aquarium using electronics and will communicate or transmitting real time status to user Smartphone. The project is an automated system to take care of fishes. It will monitor the physical changes in the water and will maintain it to the ideal conditions, with required changes. The aquarium will perform all the operations automatically like temperature control, pH control, monitor lighting, feeding, water renewal etc. It will reduce the manual effort required in maintenance of aquariums by automating the aquarium management process.

II. LITERATURE REVIEW

The authors of [1] summarized the management process orguide for a successful fish culture. The aqua culturist monitors the pond in time domain and takes necessary action. Such actions include feeding, draining and refilling of water, water and temperature level monitoring, while feeding can be done 3-4 times a day, draining and refilling of water is based on the condition of water. The temperature level of aquarium is critical to the survival of the fish and requires close monitoring. An embedded wireless network and water quality measurement system for large scale aqua culture is described in [2] and [3]. The developed portable water quality measurement units are installed on a floating platform to measure water quality parameters such as dissolved oxygen, temperature. All these units possess wireless communication interfaced to communicate with central unit for monitoring by using mobile app, control and data transfer. The system described in [2] and [3] are not only expensive but also not easy to maintain. It also does not specify exactly how corrective measures will be taken electronically when abnormal conditions are detected. Smart electronic system for pond management in fresh water aqua culture is presented in [4]. The system continuously measures and control several hydro biological parameters responsible for growth of fishes. However it does not explain how dirty water can be detected and drained. This work includes automatic detection and removal of dirty water in aquarium system.

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III.   OBJECTIVE

The Objective of this project is to design and construct an automatic aquarium for those who cannot take care and keep an eye on their fish and aquarium daily and minimize the manual factor as much as possible. The aquarium will perform all the steps automatically like temperature control, automatic feeding, water changing, LCD display.

IV.   PROBLEM DEFINITION

In large scale aquarium monitoring is done manually. A person may do mistakes due to the human nature. It is difficult to maintain aquarium for working people. Unacceptable changes in the levels of water parameter values affect the life of aquatic animals. This motivated us to build a system which automates the manual work to maintain the aquarium with minimum persons required using internet technology. So we design automatic system that maintains fishes needs like food, water impurity, and cleaning of aquarium.
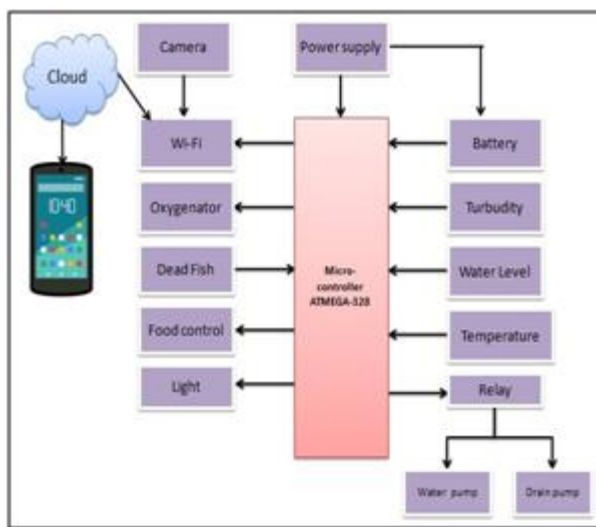
BLOCK DIAGRAM

Figure:- Block Diagram

In our system microcontroller ATMega328 is centralize unit of system. It is a three port device each port having 8 input and output pins. It is interface with all other devices in our system such as, Oxygenator- it is use to maintain proper oxygen level to whole aquarium.

Temperature sensor -it is a water proof temperature sensor and will use to sense the temperature of water.

Food controller- will provide necessary amount of food to the fishes.

Battery -We will use in absence of main power supply.

Water level sensor- is use to control water level while changing the water of aquarium.

Turbidity sensor- is use detect the impurity and PH value of the water.

Dead fish detector- will detect dead fish by using IR sensor.

Camera- is also connected to our aquarium which will give real time status of the aquarium to the owner, with the help of Wi-Fi module.

Relay- it is use as ON/OFF switch for water pump.

Display- it will show the real time status of aquarium.

Food level detector- will detect the level of food in food container.

V.   FLOW CHART
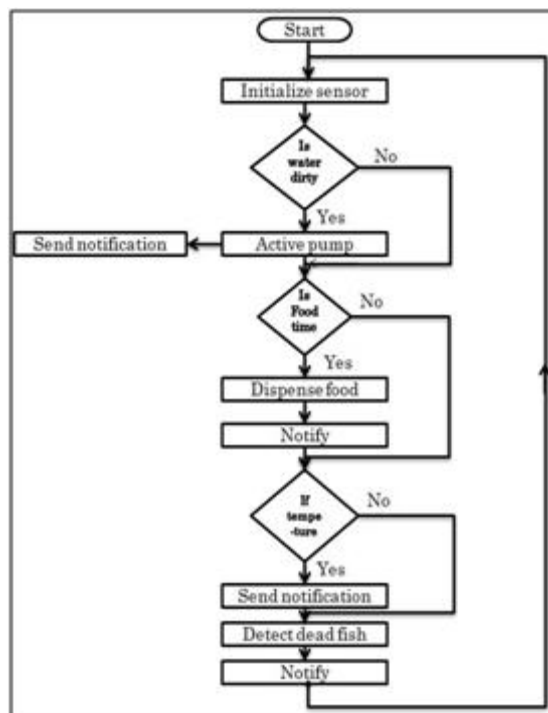
VI.   RESULTS

Figure:- Oxygenator of water

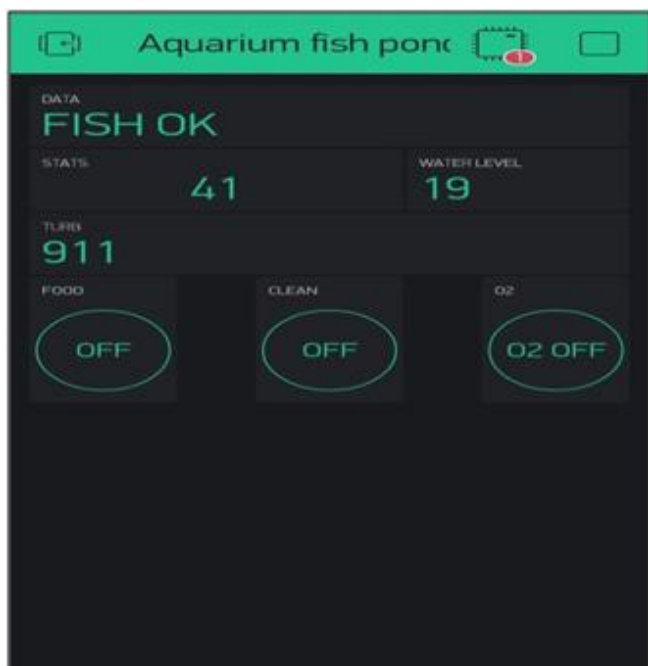_____

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Figure:- LCD display

Figure:- Blynk software

VII. CONCLUSION

This project work has been developed on IOT base automatic aquarium technique and this concept is used for improvement in the parameter of aquarium module.Automatically maintain the water level 24 cm inside tank as well as it keeps the turbidity of water very low level. The food is provided to fishes to servo operated mechanism working on 6 GCM system work on 2.4 GHz wireless Wi-Fi signal through ESP8266 (node MCU module) and all operation are controlled by ATMega328 with the help of blynk app. The IR sensor and LM35 provide data of dead fish and temperature respectively.For users convenience we have connected an IP Web Camera for observing live picturization of aquarium. By using these sensors various condition of aquarium are analyzed and highlighted on users Smartphone. All the ideas of this project has been implemented and are working well. We can implement this system in any aquarium. Automatic Aquarium will save our

time and we would not have to be worried for our fish and their aquariums for long time.

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