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IOT BASED AUTOMATIC AQUARIUM SYSTEM

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ABSTRACT

It is not feasible for fish owners to leave extra food in their fish's tank before leaving for an extended period. This creates the need for a device that can automatically and reliably feed a fish. The purpose of this project is to design an automated fish feeder for household use. The device can be developed to feed a single goldfish for at least 14 days without any additional input from the user. We will be using Node MCU which is latest microcontroller and having in-built Wi-Fi technology. Using Node MCU, we will be able to control water motor, Food motor, oxygen bubble motor and LED light as well. Along with this, Android app will be provided to monitor and control all these motors manually.

Keywords: Automated Fish Feeder, Node MCU, Android App, Wi-Fi, Filter Motor.

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 an 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 oxygen bubble controlling, monitor lighting, feeding, water renewal etc. It will reduce the manual effort required in maintenance of aquariums by automating the aquarium management process. We will be using Node MCU to control and monitor all the required conditions of Aquarium. A Node MCU microcontroller is used as a controlling part of the system like brain which stores real time data and sends the data to the User using Android App. Turbidity is a measure of the Aquarium water. Turbidity has indicated the degree at which the water loses its transparency. It is considered as a good measure of the quality of water. Here we will be using Level sensor which will detect the level of the water in the tank. Accordingly, water motor will be ON and OFF respective to the water level. Also, LED light can be turned ON and OFF by the user whenever required. The system is fully automatic and the control will be through Android app as well.

II. METHODOLOGY

In first part, a brief overview of the whole system is presented. In the second part, system design will be discussed descriptively. The second part includes both hardware implementation and software. System architecture: In this project a prototype of Automatic Fish Tank system is presented. Also, after a particular time food for fish is provided automatically. A Node MCU microcontroller is used as a controlling part of the system like brain which stores real time data and sends the data to the User using Android App. Turbidity is a measure of the Tank water. Turbidity has indicated the degree at which the water loses its transparency. It is considered as a good measure of the quality of water. Here we will be using Level sensor which will detect the level of the water in the tank. Accordingly, water motor will be ON and OFF respective to the water level. Also, LED light can be turned ON and OFF by the user whenever required. The system is fully automatic and the control will be through Android app as well. As our project runs on 5V DC supply for microcontroller, LCD as well as for sensors, we need to design power supply and PCB for the same.

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III. MODELING AND ANALYSIS

1) Node MCU: The Node MCU with cp2102 Wi-Fi Board is an all-in-one **microcontroller + Wi-Fi platform** that is very easy to use to create projects with Wi-Fi and IoT (Internet of Things) applications. The board is based on the highly popular ESP8266 Wi-Fi Module chip with the ESP-12 SMD footprint.

2) Air Pump: We can connect the air pipe to the two outlets and the other end with the air stones. We can fix if you want to control the airflow to the tank low, medium high level air flow. Just switch your air pump to power, the air bubbles will give more attraction and more air to your lovely fishes.

3) Buzzer: This is a small device which is mountable on the PCB printed circuit board. Its small size makes it perfect for all types of breadboard projects as well as actual electronics manufacturing.

4) Float Sensor: To open or close a circuit as the level of a liquid rises or falls. float sensor has a magnet on the float (the moving part) and a reed switch on the stem (fixed part) when the magnet comes near the reed switch the reed switch is activated and the circuit becomes closed.

5) Power Aquarium filter: This is Super-low sound, economical and high efficiency, Easy and convenient to install and clean because of double structure Number of canisters chosen depending on the number of fishes and the size of the tank. Right-angle and arched exterior combines with aquarium perfectly Make full use of limited space Beautiful and practical. Fit for both seawater and freshwater. Multi-layer dived biochemical system and physical filtration are the best assembling of aquarium. Suitable for big size aquarium.

6) LCD 16X2: It can be configured to drive a dot-matrix liquid crystal display under the control of a 4- or 8-bit microprocessor. Since all the functions such as display RAM, character generator, and liquid crystal driver, required for driving a dot-matrix liquid crystal display are internally provided on one chip, a minimal system can be interfaced with this controller/driver.

7) Relay: Relays are output devices which are used to control or operate some external devices. This is a 5volt Isolated relay module which means that there is a opt coupler used in between your control circuit and the relay thus protecting your circuit in case of any short circuit issues on the relay side. The relay is driven safely by BC547 transistor which is triggered via an opt coupler IC which serves as isolator between your microcontroller and the relay.

8) Water Motor: This DC submersible pump is small is size and is low cost. This pump can operate at as low as 3 volts. The DC submersible pumps can take up to 120 liters. This is submersible DC pump which are very commonly used in small decorative fountains. These pumps are very simple to use and work on wide voltage from 3 volts to 6 volts.

IV. RESULTS AND DISCUSSION

A whole IOT- Aquarium Set-up.

Figure 1: Set-up

V. CONCLUSION

Thus, we have successfully studied the problem regarding Fish Tank and a solution over it. We will be using Node MCU microcontroller for automation of Fish tank which be interfaced with sensor and motors and will be monitored through Android app.

We can add Webcam on Fish tank for real time visualization and it will be interfaced with microcontroller for monitoring.

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