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SMART FISH TANK USING IOT

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Abstract- This paper proposes the design of Smart Fish tank: An IoT-based Aquarium System. The Fish owners of the fish are usually when they are away from home because they could not feed their fish on time. So we design a Smart Fish tank system using microcontroller and Arduino based android application to overcome this problems. Through this system owner can feed their fish on time and can change water on a time. Also, the user can set schedules for feeding the fish through the solenoid valve and changing the water thought the relay time.

Keywords:- *Arduino, pH Sensor, Water level sensor, Solenoid, Relay, Ultrasonic sensor.*

I INTRODUCTION

An automatic fish feeder is an electronic device that is designed to fish tank at regular intervals. They are often used when the fish's owners is on vacation or too busy to maintain a regular feeding schedule or changing the water. However, this device does come with their own drawback. Most automatic fish feeder had problem of controlling the amount of fish feed released. Too much and it will pollute the water in the tank and too little will led to starvation. Another drawback is the lack of monitoring and instant feedback from the fish feeder. Due to this, the fish owners are unaware of the problems with their fish or if their feeder malfunctions. As such, this paper is designed to overcome previous systems' flaw and give more advantages and benefits to the fish owner. In this work, the user has the ability to customize the feeding time or choose to feed their fish immediately without any present schedule. Also, since the arduino is connected to the internet, they also can check their fish condition and make sure the food disperse properly. The arduino also allowed the user to check their previous feeding status. The proposed system will help the user feeding their fish every day and changing polluted water, even when the user is far from their home. There are certain drawbacks that exist in the fish tank. One of the problems of most fish feeders was their inability to check their feeder function and the risk of returning to dead fishes due to malfunction on the feeder machine. The other drawback is, where the fish feeder feed the fishes too less or too much amount of food, thus risking the fish health from starvation or overfeeding and too much water on fish tank.

II OBJECTIVES

1. To develop an automatic home-based fish feeding system and ph level using the IoT.
2.To experimenting and implementing of the automatic home-based fish feeding system using the IoT.

III LITERATURE REVIEW

a) Automatic Fish Feeder Concept basically, there is a lot of inventions had been made and been classified as "automatic fish feeder". From those previous designs, a few are chosen due to their criterions which are quite interesting and also useful. The first design is by David C. Smeltzer which is patented in 4th April 1985. His design is capable of dispensing feed having various sizes of grains over a wide range of dispensing volumes with a high degree of accuracy. The device was able to do this by utilizing an adjustable counterbalance weight which the amount of water required are changeable to produce a dispensing action and simultaneously adjusts the vibration movement made by the fish feeder to differentiate the amount of food given out. Consequently, both the frequency of feeding and amount can be controlled by the counterbalancing the weight. Furthermore, the number of feeding can also be adjusted by changing the rate flow of the water supply by using a valve and the water supply line, plus an additional water container which is capable of measuring the volume of water supplied to the water container so as to provide an

additional degree of accuracy in degree of accuracy in setting the frequency of feeding. However, as stated by Mohapatra, Sarkar, Sharma and Majhi (2009) and Noor, Hussian, Saaid, Ali and Zolkapli (2012), for most automatic fish feeder, it is not easy to control the amount feed released. Too much will pollute the water in the pond or the tank. Plus, the constant speed to deliver the food pallet limited its usage. At the same time, it is also a waste of food. The size of the device will depend on the location it will be used or install, whether the device is used for normal aquarium or pond. For indoor aquarium, a small device will work well and the outer pond will require a bigger device with a big storage. The size of the storage will determine the number of trips the user needs to do to replenish the feed. Not to mentioned, for most of the time, the cost are proportional the size of the device. A research conducted by Faridi, Ezri, Saidin and Faizal (2011) has stated that there are two types of automatic fish feeder. There are fixed fish feeder and also mobile fish feeder. From this statement, I can infer these two types have their own usefulness based on the situations. A fixed is useful for owners that have a single pond or an aquarium. On the other hand, mobile feeders are useful to owners who have more than two or more ponds. Faridi et al. (2011) also stated, controlling the feeders will requires high precision programmable logic circuit (PLC) and also efficient. Furthermore, instead of feeder that are situated in pond, there are also automatic fish feeder feed feeder that are placed on the ocean by installing inside a buoy (James & Stanley, 2006). It is understandable that by placing the feeder inside a buoy on the ocean, by installing a camera, microphone or any other appropriate sensor, oceanic aquamarine life can be easily monitored. As long the ponds are large enough, such fish feeder can be used.

IV. METHODOLOGY

A. FLOWCHART:

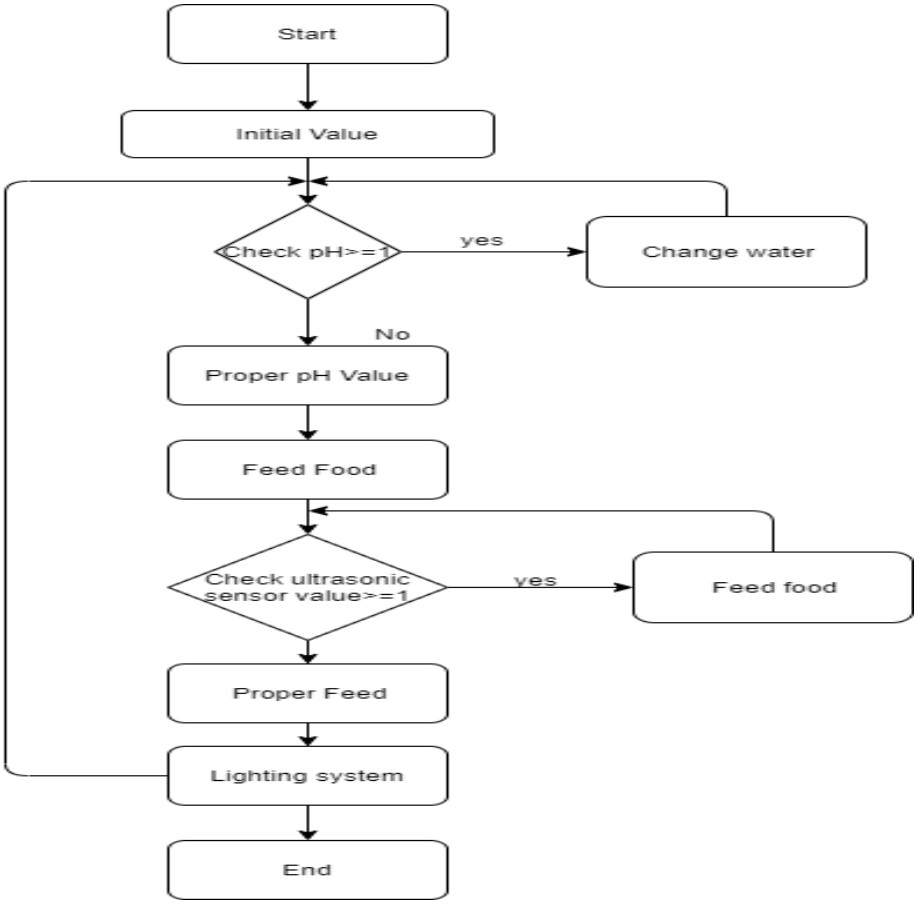

Figure.: 1. Flow chart

B. DESIGN AND DEVELOPMENT:

Design and development of an automatic home-based fish feeds system using the IoT involved the creation of a fish pond, and the installation of a fish food dispensing machine, a controller kit, an android application, a web application and app Notify application as shown in Figure 2. The details are as follow:

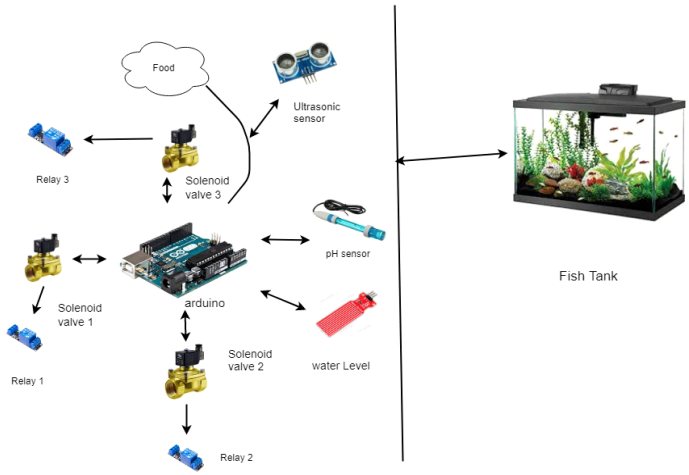

Figure: 2. Architecture of smart fish tank using IoT

1. RELAY MODULE:

The relay module is a digital switch for the microcontroller to allow it to work with high voltage appliances. The electrical capacity of this module is 10A. It can work with direct circuit and alternating circuit. It can withstand 5V pressure from the NodeMCU. LED is used to show the status of the relay module. This module is used to open and close the water in the tank as shown in Figure 3

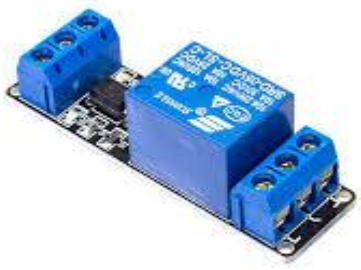

Figure. 3. Relay Module

2. PH SENSOR:

A pH meter is a logical instrument estimating hydrogen-particle work in water-based arrangements, its causticity or alkalinity. pH meter estimates the distinction in power between a PHH and one reference voltage, so the pH meter is here and there alluded to as a "metric pH meter". The difference in electric energy is related to the acidity of the solution or the pH. The pH meter is used in various applications ranging from laboratory tests to quality control.

Figure: 4. Ph sensor

V. HARDWARE IMPLEMENTATION

A. POWER SUPPLY:

The power supply must deliver a constant output regulated supply. A 230V/0-12V (1mA) transformer is used for this purpose. The primary of the transformer is connected through switch for protection. The secondary is connected to the diodes to convert 12V AC to 12V DC voltage. And filtered by the capacitors, which are further regulated to +5v, by using IC 7805.

B. WEB INTERFACE:

The web interface is design to have a user interface that the user can send command to the fish feeder. The user sends the command by pressing the input button for each fish feeder functions.

C. CAMERA:

A webcam is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet.

VI. CONCLUSIONS

A Fish tank is successfully constructed and implemented to satisfy the user objectives at home or workplace. It is controlled by a Relay which allows the user to adjust the cycle time and fish food dispensing time as when required. Further, the feeding mechanism can be easily controlled by sending SMS to the controller of the feeder system. The working of the feeder is tested for real time

situations and the final prototype is developed and installed.

The Fish tank has a wide range of useful applications in Homes, Workplace, Fish farming industries and Aquarium shops.

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