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## Smart Aquarium System Using IoT

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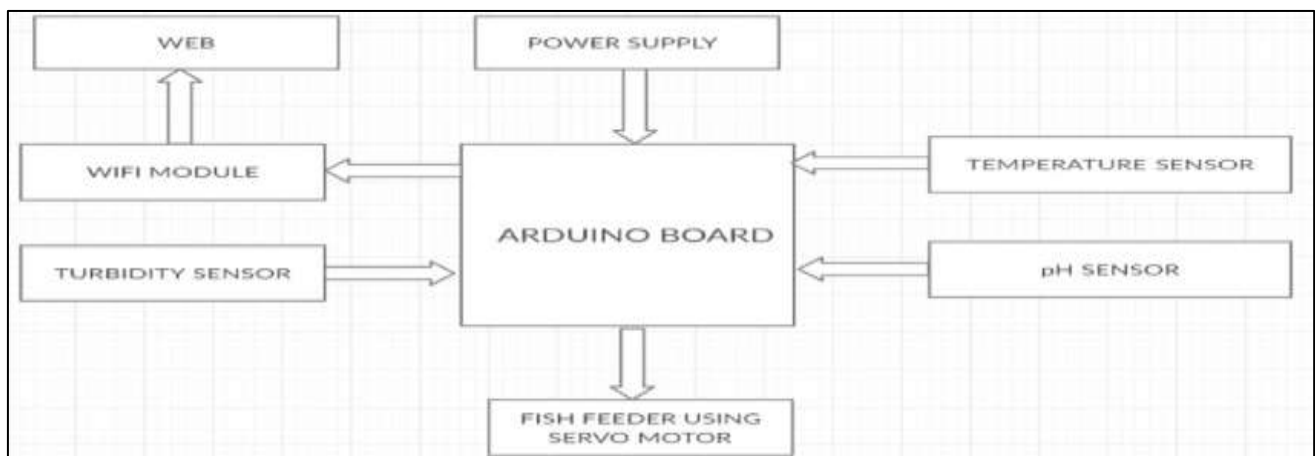
### ABSTRACT

In modern days, many people have fish as their pets at home. The fishes have been fed by the aquarist in the aquarium tanks which demands a proper setup for maintenance. The problems faced are change in water quality, feeding the fish, maintaining the temperature, controlling the lights and difficult to check the conditions of an aquarium manually. Therefore, it's necessary to monitor the physical parameters closely and enhance the water condition. So, this project proposes a system which is equipped with sensors to be operated in real-time. It performs temperature monitoring, water pH level detection, turbidity detection and fish feeding. An IoT based system is implemented to monitor and deliver the status of the aquarium to the user's web application. Thus, intelligent aquarium management has been implemented so that the fish is neither over nor underfed and thereby reducing the manual effort required in the maintenance of the aquarium.

Keywords: aquarium iot, best smart aquarium, biometric attendance system using iot, biometric system using iot, iot aquaculture

### 1. Introduction

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these things to connect, collect and exchange data, creating opportunities for more direct integration of the physical world into computer-based systems, resulting in efficiency improvements, economic benefits, and reduced human exertions. The number of IoT devices increased 31% year-over-year to 8.4 billion in the year 2017 and it is estimated that there will be 30 billion devices by 2020. The global market value of IoT is projected to reach \$7.1 trillion by 2020.



### 2. Problem Statement

Today a lot of people have aquariums in their home for keeping their pet fishes, but maintaining aquariums has become a very difficult task. There are many constraints for eg: maintain ideal conditions for the fishes to survive. Therefore to solve these problems it has become important to make the current aquariums SMART using technology. So here we introduce "Smart Aquarium System Using IOE". This model of aquarium has solutions to most of the problems faced today in maintaining the aquarium. It helps to feed the fishes regularly, the temperature sensor is used to sense the temperature of water, the pH sensors will detect the pH of the water, the turbidity sensors will keep turbidity under control.

### 3. Methodology

Pet ownership has been increasing at a steady pace in the last 20 years. After cats and dogs, the most popular pet is now the freshwater fish. The maintenance of fish aquariums is a very difficult task itself. Whenever you have to clean up your aquarium or you have to feed, you have to do a lot of things. You have to turn off your aquarium's powerhead/air pump and feed manually and turn on the air again after an hour. In the Current system all equipment such as light, heater, and filter are to be controlled manually using electrical switches. For this the person needs to come near the aquarium and manually control the electrical switches to turn on /off the equipment. The fishes need to be fed twice a day even this requires the owner to walk up to fish tank and feed the fish manually which makes the task of maintaining an aquarium much more difficult. At times when the owner is on vacation he has no control over the aquarium and also can't feed the fish. The project with which we came up is a Smart Aquarium. The project will be more efficient than the systems available in the market nowadays. In addition to the efficiency, it will be of lower cost as well. The project's audience is the group of people interested in keeping fishes at home or offices but don't have time to take care of, or they are worried to keep asking their neighbors to take care of the fishes in their absence. The project is an automated system to take care of fishes. It will replace the manual maintenance of fish aquariums with its automated functions. The Smart aquarium system is a simple system which helps a user to monitor the different conditions of water like temperature, pH value and turbidity of water. Also it allows the user to perform actions like fish feeding and controlling temperature using a fan and bulb.

### 4. Conclusion

The project was inspired by an idea, to create a system that could automatically take care of the fish and the ability to be able to control these devices remotely over the cloud. Now most of the operations happen by themselves, maintaining steady pH, water level, temperature. By using an IoT platform, it can monitor these variables, visualize the data and even control some features manually, over the internet which is successfully implemented in this project. Another important feature was the mechanical design and implementation of the fish feeding system, which is an original design. It is a rather simple design, but it efficiently does the job. There are other designs but they are complicated, so this project achieves simplicity, efficiency, time saving and cost saving. This project serves as a way to practically implement our skills to solve a very important management related problem and assist in achieving an ideal environment for fish in an aquarium

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