International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 05 | May - 2021 ISSN: 2582-3930

AQUA TALK: A Smart Aquarium System using Neural Networks

M. Abirami[1], MedaDivya Sahithya[2], Kota Lalitha[3], Dodla Harshitha[4]

[1]Assistant Professor, Department of C.S.E, Panimalar Institute of Technology

[2,3,4]Student, Department of Computer Science and Engineering, Panimalar Institute of Technology,

---

ABSTRACT: In modern days many people have fish as their pets at home. Everyone loves fishes and required an aquarium for their home. But maintaining an aquarium is a difficult task. We need to feed fishes time to time and check the water level and water condition. Again it is difficult to check the conditions of an aquarium manually. Therefore it important to automate aquariums. Here we have implemented an IOT based system which monitors and control the whole aquarium automatically and provide real-time status on the user's Smartphone application. The aquarium will perform all the steps automatically like temperature, Water level monitoring, water pH monitoring and feeding. It will reduce the manual effort required in the 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. Our project aims to replace manual maintenance of a fish aquarium with an Automated system by using IOT.

Keywords:IOT, PH monitoring, water level monitoring, servo motor.

I.INTRODUCTION

In the recent years, mini aquarium tanks in various shapes and sizes are replacing classic goldfish bowls for small apartments or college dorm rooms. The key water parameters of a mini aquarium tank should be closely watched, and proper actions should be quickly taken, when some dangerous situations are detected. No one may be able to detect the abnormal situations of the tank.In existing systems one cannot feed the fish when their absence, it may bring threat to fishes, temperature of the water cannot be determined as it can be changed according to the seasons and fishes may suffer from this. Lightings cannot be monitored using the remote or switch, it is operated manually. It's not easy to monitor everything going on inside your aquarium around the clock. With regular care and maintenance, you're likely to catch problems if they occur only at your presence. Aquatic lives in the aquarium are easily affected with the changes of the aquarium condition such as temperature, feeding and the lighting. These conditions are very critical for the surviving of the aquatic lives in the aquarium. Overfeeding is one of the mistakes made by fish owners, as uneaten food will pollute the water. Such ways are not reliable supervisory is ineffective. Therefore, several solutions based on Internet of Things (IoT) were proposed to automate the detection of abnormal aquarium situations.

II. LITERATURE SURVEY

TITLE: Smart Aquarium Based on Internet of Things.

AUTHORS: R. HafidHardyanto, Prahenusa Wahyu Ciptadi, Andik Asmara

YEAR:2019

DESCRIPTION:

IoT era has been extensivelycarried out in regular life. IoT era has been carried out to clever home, clever city, and numeroushelping applications appliedwith the aid of using IoT era. IoT eraalso can be carried out in interest of maintaining fish. The aquarium machinethis isboughtwithinside themarketplacenowadays is an everyday aquarium. The aquarium machineavailable in the marketplacenowadays is already interesting, with a group of flowers and fish withinside the aquarium, however the issues that arise if the aquarium is savedwithinside theresidencecould bemuch less to the wishes of sunlight. Sometimes the lighting fixtureswhich have a diaquariumaren't adapted to the wishes of flowers or fish withinside the aquarium. Another hassle is the provision of fish feed this isnevertheless manual. Sometimes aquarium proprietors must offer fish feed manually as a minimumas soon as a day. This may be verytough if the proprietor of the aquarium has a totallyexcessive activity, so the threat of forgetting to feed fish may be veryexcessive. To triumph over the issuesstated above, it is important to have an aquarium machinethis isattractive and completely automated, each in phrases of lighting fixtures and elements of fish feeding. A clever aquarium machinethat could accommodate aquarium hobbyists with all of the activities owned with the aid of using aquarium proprietors. In this paper, we designed anew clever aquarium machinethe usage of IoT devices.

TITLE: Smart Aquarium

AUTHOR :Adil Athavani, Akshay Desai, Harsha Ruthwick S &Raviteja A

YEAR: 2017

DESCRIPTION:

Fish keeping is a popular worldwide. Almost people from all the age groups like to keep aquarium in their home, offices etc for decoration purpose or as a hobby. Fish keeping is not an easy job. We always need an aquarium or a pond for that. The hobby of fish keeping is broadly divided into three; freshwater, brackish, marine. Among all these three, freshwater is considered to be the most popular hobby of keeping fish because it is easy to handle with freshwater fish andaquariums. It has always been difficult to take care of the fish and aquariums. We have to feed the fish on time, we have to maintain thetemperature and also control the light, heater and filter of theaquarium. All these steps are done manually.

The project, Smart aquarium has been designed by keeping in mind, the problem of those who cannot take care of their aquarium every day. The feeder is powered by servo meter which on trigger of a button feeds the fish, heater keeps the temperature of the aquarium under control, and we can also control the fluroscent lamp which helps in the growth of fish and plants.

TITLE: Arduino based aquarium monitoring system
AUTHOR: Shree Charana R, Nikith Kumar K, Shariq Mohammed Khan, Girish M
YEAR: 2018
DESCRIPTION:
The hobby of fish farming is roughly divided into three parts; fresh, brackish sea water. Among the three, freshwater is considered to be the most popular fish farming hobby because it is easy to manage with freshwater fish and aquariums. It has always been difficult to care for fish and aquariums. We have to feed thefish.Over time, we have to keep the temperatureAllof these steps are done manually. The Smart Aquariumproject wasdevelopedtakingintoaccount the problem of those who cannot take care of their aquarium every day. Servometerthat feeds the fishwiththepush of a button, the heater keeps the temperature of the aquarium under control, and we can also control the fluorescent lamp that helps fish and plants grow.

TITLE: Fish Feeder using Internet of Things
AUTHOR: Sourav Meshram, GouravMeshram, BhavikaRokde, Roshan Kapse, Omesh Hedaoo5, ChandradityaMandhata
YEAR: 2019.
DESCRIPTION:
The scope behind developing IOT based fish feeder is to reduce manual work. This device can provide regular feeding without disrupting the owners work, owners can monitor feeding process with their smartphone virtually. This project deals with the idea that the fish will be fed even when you are out of station. The fish keeping is popular fad. Fish feeder using wireless communication the system can be implemented by setting fish feeder feed fishes at a certain time you can command it for dispatched the food. It will replace the manual maintenance of the fish aquarium. The Fish feeder will be atomized and can be easily controlled from the mobile phone via mobile application anytime anywhere in just one click using a dashboard.

TITLE: A Model of Mobile Application for Automatic Fish Feeder Aquariums System
AUTHOR: D. Prangchumpol
YEAR: 2019.
DESCRIPTION:
Currently, ornamental fish in the office are popular withfishermen and fish farmers as it can create a good environment in an area. Hence, fishermen shouldbecareful tomaintain and control all kinds of factors such as feeding, air pumps, light and pH.The value of the water, which can affect the quality of the water and fish,candie. With the advancement of IoT technology to control wireless devices, this research developed an automatic fish feeding system that works via a mobile app.By entering device control commands into the microcontroller device, users can use a mobile APP to automatically control the time and amount of fish feed according to theamount of fish and warn if the pH of the water is insufficient. The study found that an average efficiency rating for this system was 4.15, which is believed that this application can efficiently controlthe fish aquarium and reduce the polluted water related to improper feeding of the fish.

III. EXISTING SYSTEM

An IOT based system which monitor and control whole aquarium automatically and provide real time status on user's Smartphone application. The aquarium will perform all the steps automatically like temperature and feeding. It will reduce the manual effort required in maintenance of aquariums by automating the aquarium management process. The automatic food feeding system operated by servo motor mechanism is used to feed fishes on regular time intervals.

IV. PROPOSED SYSTEM

The main objective is to provide a smart aquarium which provides an automated feeding system along with the maintenance of water level and its purity. Refilling of water starts as soon as red light blinks which is attached to the tank. This is indicated as a sign of reduction of water level. The proposed system is also provided with sensors to check its PH and water level. The Node MCU is an open-source firmware and development kit that helps to Prototype the IOT product within a few Lua script lines and also a typical R/C servo looks like a plastic rectangular box with a rotary shaft coming up and out the top of the box is used to feed the fish automatically.

V. MODULES

1.Temperature and PH level Detection
2.Food server mechanism.
3. Water refilling mechanism

DESCRIPTION:

1.TEMPERATURE AND PH LEVEL DETECTION

Temperature sensor is used to detect temperature of water and displays it on LCD. The PH level sensor is used to detect PH level of water.A pH sensor helps to measure the acidity or alkalinity of the water with a value between 0-14. When the pH value dips below seven, the water starts to become more acidic. Any number above seven equates to more alkaline. Each type of pH sensor works differently to measure the quality of the water.

Figure.1 :PH SENSOR AND TEMPERATURE SENSOR

2.FOOD SERVER MECHANISM

A servo is a mechanical motorized device that can be instructed to move the output shaft attached to a servo wheel or arm to a specified position. Inside the servo box is a DC motor mechanically linked to a position feedback potentiometer, gearbox, electronic feedback control loop circuitry and motor drive electronic circuit. A typical R/C servo looks like a plastic rectangular box with a rotary shaft coming up and out the top of the box is used to feed the fish automatically.

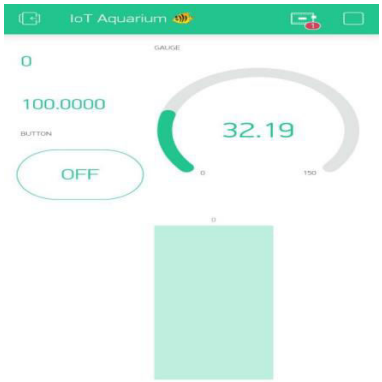


Figure.2. FOOD SERVER MECHANISM

3.WATER FILLING MECHANISM

The water level sensor is used to detect the level of water in the aquarium. If the water level goes low, water starts refilling by motor attached to it.
The sensor can judge the water level through with a series of expose parallel wires stitch to measure the water droplet/water size. It can easily change the water size to analog signal, and output
analog value can directly be used in the program function, then to achieve the function of water level alarm. It has low power consumption, and high sensitivity, which are the biggest characteristics of this module.

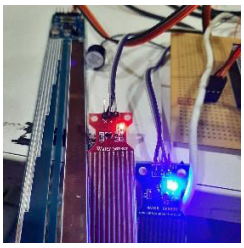
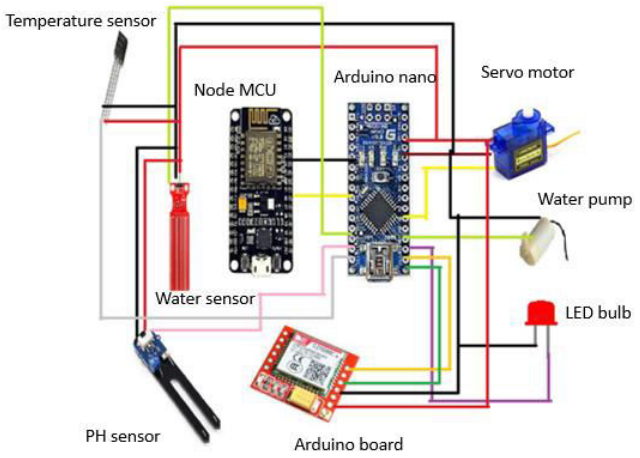


Figure.3 :WATER LEVEL SENSOR

VI. SYSTEM ARCHITECTURE



VIICONCLUSION

IoT technology is an emerging trend in today's world. One of the development of it is this Smart Aquarium. In our project, the water temperature control, feeding of fishes are automatically controlled by Fish-Bit Mobile application. The basic idea proposed in this project works well and can be implemented on any aquarium. We can also further develop to use it for commercial purposes with low cost implementation.

VIII. REFERENCES

[1] A. Dolan, ''The effects of aquarium size and temperature on color vibrancy, size, and physical activity in bettasplendens,'' Maryville College, Maryville, TN, USA, Tech. Rep., 2015.

[2] S. Sharpe. (2018). Aquarium Nitrogen Cycle: How an Aquarium
Cycles.[Online].Available:https://www.thesprucepets.com/aquarium-nitrogen-cycle-1378370

[3] C. Dupont, P. Cousin, and S. Dupont, ''IoT for aquaculture 4.0 smart and easy-to-deploy real-time water monitoring with IoT,'' in Proc. Global Internet Things Summit (GIoTS), Jun. 2018, pp. 15.

[4] T. I. Salim, T. Haiyunnisa, and H. S. Alam, ''Design and implementation of water quality monitoring for eel fish aquaculture an examination of micro bubble aeration,'' in Proc. Int. Symp. Electron. Smart Devices (ISESD),
Nov. 2016, pp. 29–30.

[5] Y.-W. Lin, Y.-B. Lin, M.-T. Yang, and J.-H. Lin, ''ArduTalk: An arduino network application development platform based on IoTtalk,'' IEEE Syst. J., vol. 13, no. 1, pp. 468–476, Mar. 2019.

[6] Y.-B. Lin, Y.-J. Shih, H.-C. Tseng, and L.-J. Chen, ''LWA rate adaption by enhanced event-triggered reporting,'' IEEE Trans. Veh. Technol., vol. 67, no. 11, pp. 10950–10959, Nov. 2018.

[7] S.-P. Tseng, Y.-R. Li, and M.-C. Wang, ‘‘An application of Internet Of Things on sustainable aquaculture system,’’ in Proc. Int. Conf. Orange Technol., Dec. 2016, pp. 17–19.

[8] K. R. S. R. Raju and G. H. K. Varma, ‘‘Knowledge based real time monitoring system for aquaculture using IoT,’’ in Proc. IEEE 7th Int. Adv. Comput. Conf., Jan. 2017, pp. 318–321.

[9] Y.-B. Lin, L.-K. Chen, M.-Z. Shieh, Y.-W. Lin, and T.-H. Yen, ‘‘CampusTalk: IoT devices and their interesting features on campus applications,’’ IEEE Access, vol. 6, pp. 26036–26046, 2018.

[10] T. Masaharu, et. al., ‘‘Effect of temperature on survival, growth and malformation of cultured larvae and juveniles of the seven-band grouper epinephelusseptemfasciatus,’’ Fisheries Sci., vol. 80, no. 1, pp. 69–81,2014

[11] Algone. (2018). The Importance of Oxygen in the Aquarium. General Aquarium & Fish Information. [Online]. Available: https://www.algone.com/oxygen-in-the-aquarium

[12] Jetajockey. (2011). Your Guide to Ammonia Toxicity. Aquarium Advice. [Online].Available:http://www.aquariumadvice.com/forums/f12/yourguide-to-ammonia-toxicity 159994.html

[13] T. Sarac. (2018). Electrical Conductivity in Freshwater Aquariums.Fluval.[Online].Available:http://fluvalaquatics.com/ca/explore/did-youknow/equipment/155-electrical-conductivity-monitoring-system parttwo/#.XAL_hzgzZ0x

[14] Practical Fishkeeping. (2016). What You Need to Know About Reverse Osmosis.[Online].Available:https://www.practicalfishkeeping.co.uk/features/articles/what-you-need-to-know-about-reverse-osmosis

[15] Y.-B. Lin, et. al., ‘‘Easy connect: A management system for IoT devices and its applications for interactive design and art,’’ IEEE Internet Things J., vol. 2, no. 6, pp. 551–561, Dec. 2015.

[16] Y.-W. Lin, Y.-B. Lin, C.-Y. Hsiao, and Y.-Y. Wang, ‘‘IoTtalk-RC: Sensors as universal remote control for aftermarket home appliances,’’ IEEE Internet Things J., vol. 4, no. 4, pp. 1104–1112, Aug. 2017