

IOT BASED AUTOMATED FISH TANK MONITORING SYSTEM

Mr. K. Dinesh*¹, Ms. M. Suhitha*², Ms.M.Ranjani*³, Dr. K. Prabhu*⁴

*^{1,2,3,4}Student, Department Of Electronics And Instrumentation Engineering, Kongu Engineering College, Erode, India.

ABSTRACT

It's known that many people like to keep fish tank in their house as it can help them to relax, reduce stress and it also maintains a good atmosphere in the house. But for those with busy daily schedule it's difficult for them to spend time for fish maintenance. We've come with a solution to monitor and feed the fish even when one fails to take care of it when they're not at home with a handy app. We've used two ultrasonic sensors one for feedbox level and the other one for fish tank level. If the levels are low in either of the cases it'll be notified via app to the user to do the needful. This will save time for the users and let them have their fish tank without worrying about the proper maintenance. The app will display and intimate the user at the proper time.

Keywords: Arduino, Internet Of Things, Fish Tank, Notification, Electrical Appliance.

I. INTRODUCTION

Fishkeeping is very popular but its never going to be easy as the word is. It is a challenging job to take care of them as they are very sensitive to any changes in the surrounding. It is not safe to just give extra food to the fishes in the fish tank, as excessive food can greatly affect the health of fish and can lead to their untimely death. So, to keep away such things, there is a need to develop an automatic system that would feed the fish in the required amount and at appropriate time intervals. Currently, fish aquariums are popular because it can improve the atmosphere. Besides, the fish aquarium can be treated as a rehabilitation place for many people, and support fish farmers. However, extra feeding can spoil the water, which needs to be resolved, and in charge people need to spend most of the time in caring for lighting systems and water changing, and many other aspects otherwise, the water gets collapsed and fish will be dead.

II. LITERATURE SURVEY

(Abdullah, N. D., Kamarudin, N., Masuri, N. A. N., & Ibrahim, N.) Smart Feeder Monitoring Devices used is with Mobile Application for monitoring. Fish Monitoring is an IoT-based methodology which has real time data sensors, and monitor. This Smart Feeder is designed to feed fish automatically considering the time set by the respective person and one can even manually feed the fish according to the requirements. The idea of this project is to look on the small industry people where they have difficulties in reducing human power.

(D. Prangchumpol.) Its a model of Android Application for Automatic Fish Tank Feeding in Aquarium. In the recent times, fish aquarium in many public areas are popular because it can improve the environment in many areas. Besides this, the fish aquarium setup can be used as a rehabilitation place for many people including students, officers and also keep up with the fish farmers. However, extra feeding can pollute water, which needs to be resolved, and fish farmers are in necessity to spend most of the time looking for advanced lighting systems and changing of water, else the water will be harmed and fishes prone to death.

(Y. Lin and H. Tseng.) Fish Tank Setup: Its an IoT-Based Mini Aquarium related System. Many people try to feed their pet fishes in the aquarium tanks itself which needs to be properly cleaned and taken care or those fishes will lose their life before their term. So in this case, it is very important to detect the condition of the water closely and improve the water quality for the small aquarium tanks. Then one can report the relationship between the fish tank sensors and the actuators and to give samples about the setting. The solution given here allows the manufacturer to rapidly deploy intelligent control methods for various water condition that can occur.

(Md. Nasir Uddin, MM Rashid, MG Mostafa, Belayet H, SM Salam, NA Nithe, MW Rahman, A Aziz) Developing this Automatic Fish Feeder. The automatic fish feeder is a device that mechanically feeds the fish at a any particular time. In a process, one can control the fish feeding work by utilizing a fish feeder that combines the mechanical and electrical system to form a device instead of manually feeding fish. Owners of the fish who are far away for a very long time would have problems regarding the position of the pond or tank. Thus, such a device is extremely useful. In relation to that, the environment needs observation. For this paper, I will observe

the environment in terms of water temperature.

(Jadhav, Kajal, et al.) IOT based Automated Fish Feeder. It is known that many people like to have pets as they feel the environment of the house becomes pleasant. They are possibly terrestrial, for example dogs, cats, cows, etc., or birds such as parrots, love birds, etc., or possibly marine animals including fishes. Also, a study proved that keeping a fish at home can help the person to calm, relax and it as well continues a good atmosphere at home. Taking care of dogs, cats, etc. is somewhat simpler than that of fishes. But fishes require extra care with checking the clarity of the water, the amount of food that is fed to them, the time break at which the food is being fed as well as any small changes in the temperature

III. METHODOLOGY EXISTING METHOD

Its known that most of the people like to keep fish tanks in their house as it can help them to calm, rest, eliminate stress and it maintains a good atmosphere in the house. But for those with a busy daily schedule it's difficult for them to spend time on fish maintenance. They tend to forget feeding the fish at right intervals and leave for workleaving the life of fish at risk.

Proposed Method

The proposed project mission is to reduce the burden of the owner and automate the system of fish monitoring. Here we use a mobile app to display various parameters and also, we can feed fish during the proper intervals with the help of a servo motor.

HARDWARE DESCRIPTION

Block diagram for automatic fish tank monitor system

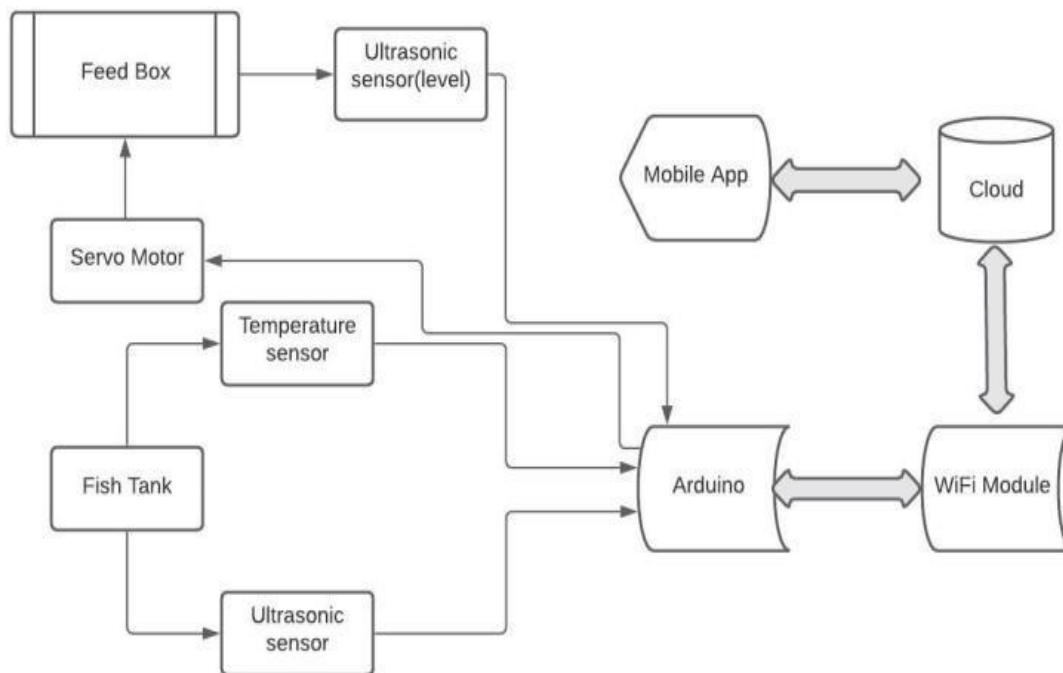


Fig 1: Block diagram of hardware components

ESP8266

ESP8266 (technically ESP8266EX) is a Wi-Fi Module constructed on L106 32-bit MCU produced by Espressif Systems. The ESP8266 SoC carries a fully functional Wi-Fi Stack that permit any Microcontroller to join to Wi-Fi signal. Along with Software Development Kits (SDKs), you can straight program the ESP8266's on-chip Microcontroller, without the requirement for an external Microcontroller. Based on the ESP8266, many third party manufacturers-initiated the manufacturing and one such manufacturer is Ai-Thinker. The initial board produced by Ai-Thinker was ESP-01(itis the similar board used in the project) and itbecame quite trendy. Based on the success of the ESP-01 Module, many more moduleslike ESP-02, ESP-07, ESP-12, etc. were discharged by Ai-Thinker. All the given boards are related with ESP8266 but the important variation is the number of GPIO Pins. So there are more modules like ESP- WROOM by Espressif Systems, NodeMCU, WeMOS, SparkFun ESP8266, etc.

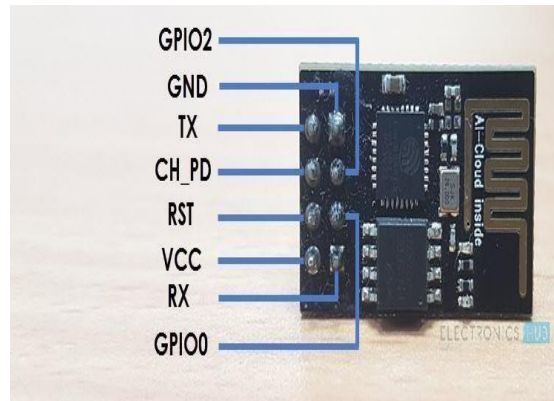


Fig 2: ESP8266

Fish tank setup

This setup of the fish tank is with a plastic storage box which is of height 10cm and diameter of 25cm. It is made to be filled with water upto 8 cm and a sensor named ultrasonic is placed on top of the tank system just to measure the level of the water present in the tank. If the level of water tank goes below 4cm there'll be a notification sent via the app for the user to let know to refill the fish tank as soon as possible. Temperature sensor is to monitor the ambient temperature and it'll be displayed in the app.



Fig 3: Fish tank setup

Feedbox setup

The feedbox contains food which is to be fed for the growing fish. It's a bottle which is inverted and the opening is connected to a servo motor which operates the opening and closing of feedbox which contains food. If the feed box level goes below 2cm then there'll be an intimation given via app to the user to refill the feedbox with appropriate amount of food.



Fig 4: Feedbox setup

Ultrasonic Sensor

An ultrasonic sensor is used to measure the length of a target object from the sensor by releasing ultrasound waves and transform the reflected sound into an electrical signal. These waves move quicker than the speed of sound in air. Ultrasonic sensors have two foremost components: the transmitter (which releases the sound utilizes piezoelectric crystals) and the receiver (which encounters the sound later it has moved to and fro from the target). Ultrasonic sensors are utilized essentially as the proximity related sensors. This sensors are also used in robotics based obstacle detection systems, and manufacturing technology. In differentiation to infrared (IR) sensors in proximity sensing applications, ultrasonic sensors are not as susceptible to interference of smoke, gas, and other airborne particles (though the physical components are still attacked by variables such as heat).Ultrasonic sensors are even used as level sensors to reveal, record, and adjust liquid levels in closed containers (such as tanks in chemical factories). Most especially, ultrasonic technology has permitted the medical industry to make images of internal organs, recognize tumors, and secure the health of babies in the womb.

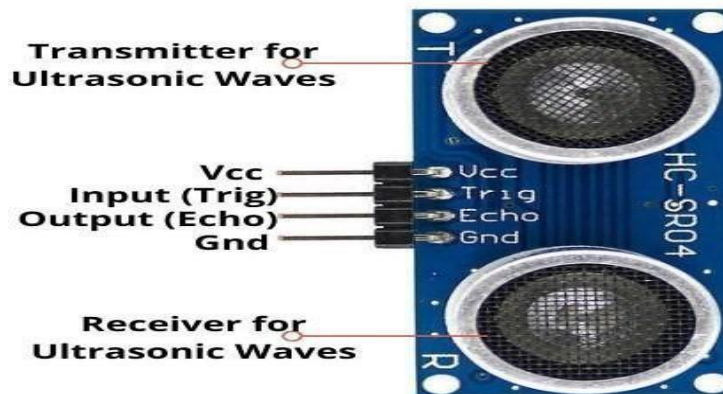


Fig 5: Ultrasonic sensor

Servo Motor

A servo motor is generally used where it can rotate with high precision. Generally these type of motor repossesses a circuit that control contributes feedback for the current location of the shaft of the motor,so the feedback permits this servo motor to make a rotate with a high accuracy. This setup is made up of a small motor that runs on a servo through a mechanism.



Fig 6: Servo Motor

MLX90614

The MLX90614(sensor) is a non-contact based Infrared (IR) Digital Temperature Sensor which is used to monitor the temperature of a particular object or a obstacle which ranges from -70° C to 382.2°C. The sensor needs IR rays to monitor the temperature of the object without any physical contact and communicates to the microcontroller working the I2C protocol.

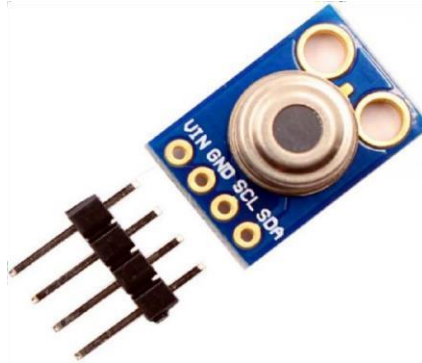


Fig 7: MLX8266

IV. RESULT

This smart device automatically monitors the fish tank and feed box setup. If the water level is low then there will be an intimation given to the user to fill the water in the tank again via a notification sent through the mobile app. We can also set the time interval for fish feeding and can also get notified when the feedbox food level is less. The mobile is a handy one for those who are busy at their work and cannot give much time to them despite their liking towards having a fish tank. The user can check the status of the fish tank and will also get notified when the levels are low. Here are the three screens of our app in figure 6.1, 6.2 and 6.3 below.



Fig 8: Screen 1

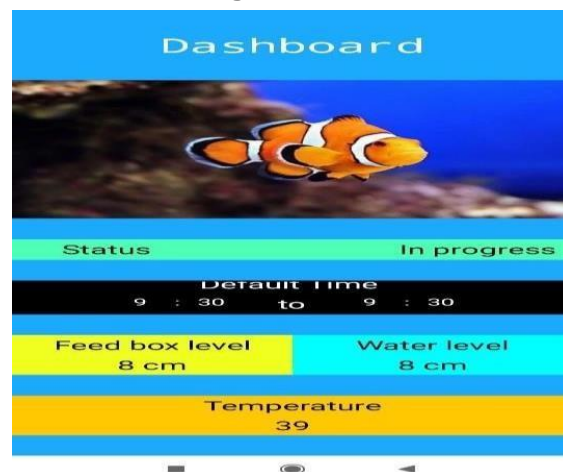


Fig 9: Screen 2



Fig 10: Screen 3

V. CONCLUSION

The software developed in the project is about monitoring the fish even when we are not physically present at home to take care of them besides our schedule. The ESP8266 device is connected with an ultrasonic and temperature sensor along with servo motor and it is connected with the mobile app using firebase and the feed box level, fish tank level, and the temperature will be displayed in the mobile app. Feeding of fish is scheduled automatically by using the mobile app and one can change the time of fish feeding based on the user's needs. This smart device monitors the fish tank by mobile app.

VI. REFERENCES

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