ECE1901-Technical Answers for Real World Problems (TARP)

Poseidon's The Automated Fish Tank

Team Members

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Abstract

The Automated fish tank system is known to be very useful for feeding , cleaning and monitoring activities and that can been utilized in many ways. The idea of the Poseidon's automated fish tank system is originated from a bunch of many problems. The feeding process of fish manually doing and measurement of the food for specific fishes is one of the main problems in many peoples who are doing fish farming at home. The second problem is the lack of availability of time to keep the aquarium meeting the mandatory fish needs that need to be reviewed regularly and the cleaning of water manually 2 weeks or 4 weeks once or every day is difficult Along with these there are known that important parameters such as condition of pH water and the availability of food is essential to keep the habitat conducive for living. Therefore We are implementing the project with automated Food feeder ,automatic cleaning without human interference ,notification will sent to Telegram handle using ESP32Camera Module.

Introduction

The automated fish tank works in Manual and Automatic mode. We can switch to manual mode to clean the tank by our own(1 or 2 times in a year rarely). This system works in automatic mode. For every 12 hours in a day the feeder feeds the food into the tank water. This is done By using RTC(Real-Time clock) and We have included a tank cleaning mechanism which often cleans the tank (Front-View Glass).It ensures that hard calcium stains are no longer present. If we clean the tank very rarely then these calcium precipitate deposits hardly on the surface of fish tank's glass then its quite difficult to clean and it reduces the aesthetic and clear vision of the fish tank. Once in a while(On user demand basis) we can set the frequency of cleaning the tank. While cleaning ,the high turbidity water will be sucked out and fresh water is fed-in , parallelly the glass cleaner does it's work too. Finally to ensure the process is done a picture of the Fish tank will be sent to the user's telegram handle. The picture has been taken using the Esp32 camera module. Food is dispensed using hopper mechanism. RTC module is used for time-based working.Water level is lively calculated using ultrasonic sensor.(To avoid over draining the water) *(Water level = Position of the Ultrasonic sensor(height) – Ultrasonic Sensor detected value).* Water inlet and outlet work is done by DC motors. Servo motors are used in cleaning and feeding mechanisms. Esp32 based camera module is there for letting the owner to know the current status of the Fish tank, if he is in remote place.

Block Diagram

POSEIDON'S - THE AUTOMATED FISH TANK
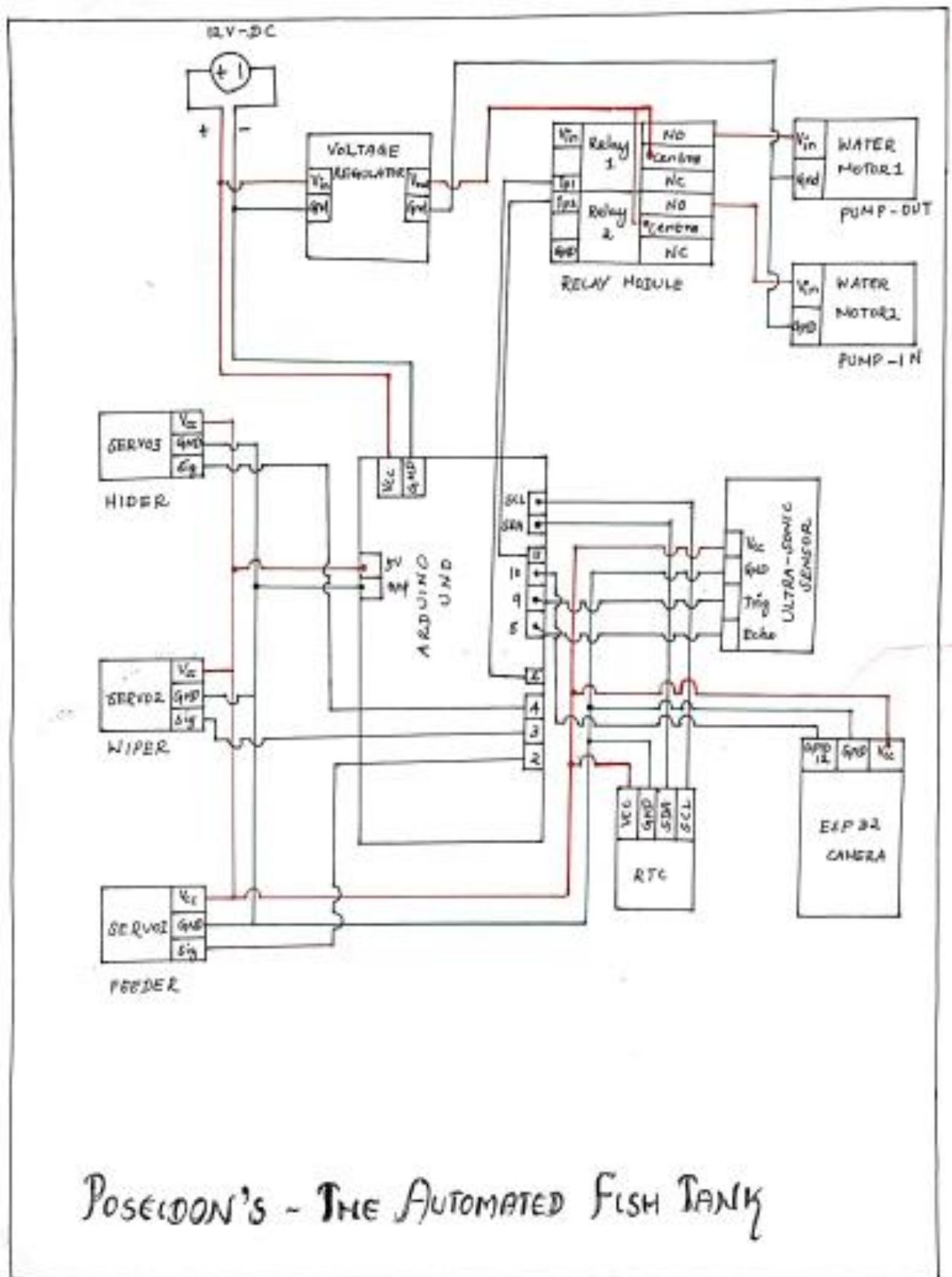
Explanation of the Block Diagram

All the sensors are integrated using Arduino uno(microcontroller). Vcc pin of the ultrasonic sensor, camera module, RTC module and servo motors connected with Vcc pin of the Arduino uno. Ground pin of the ultrasonic sensor, camera module ,RTC module and servo motors connected with ground pin of the Arduino uno. Totally three servo motors are used , one is used for feeding purpose, second one is used for hiding purpose, third servo motor used for wiping the fish tank.(Hider-4th pin of arduino,wiper-3rd pin of the Arduino ,feeder-2nd pin of the Arduino) .RTC module is used for setting real world time for fish feeding. SDL and SCL pins of the RTC module connected with respective Arduino pins.

Camera module (ESP32) is used to capture the image of fish tank and that will be sent to user by telegram bot.12th pin of the ESP32 is connected with 10th pin of the Arduino. Ultrasonic sensor is used to measure the distance of water level in the fish tank. Trigger and Echo of the ultrasonic sensor is connected with 9th and 8th pin of the Arduino. 12V DC supply is used for to provide power supply for all the components. Input 1 and Input 2 of Relay module is connected with 6th and 11th pin of the Arduino. Two motors are connected with Arduino. It is used for pumping in and pumping out the water in the fish tank. Input pin of the of motors connected with Normally open terminal of the relay modules respectively.

Methodology
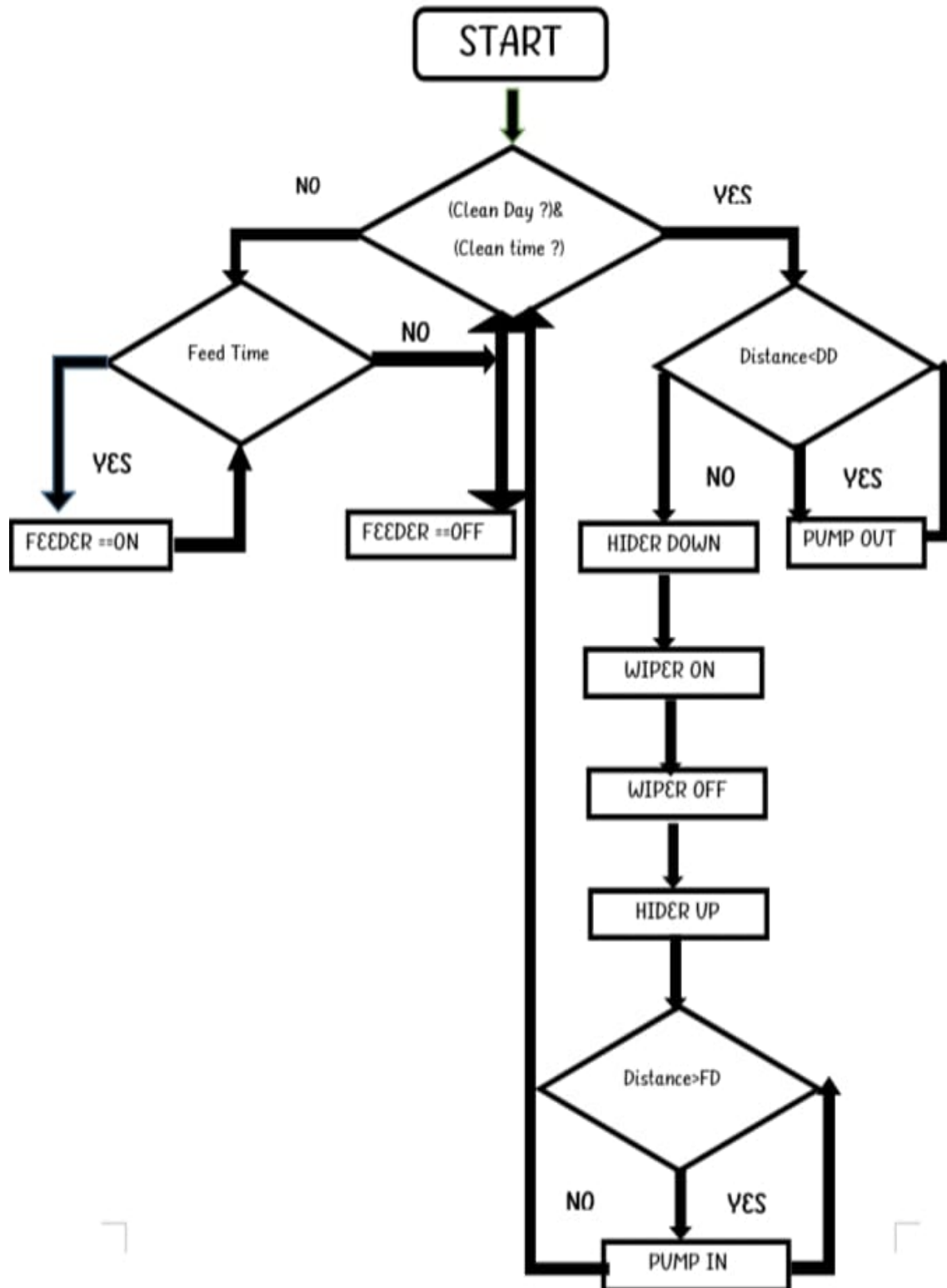
Results
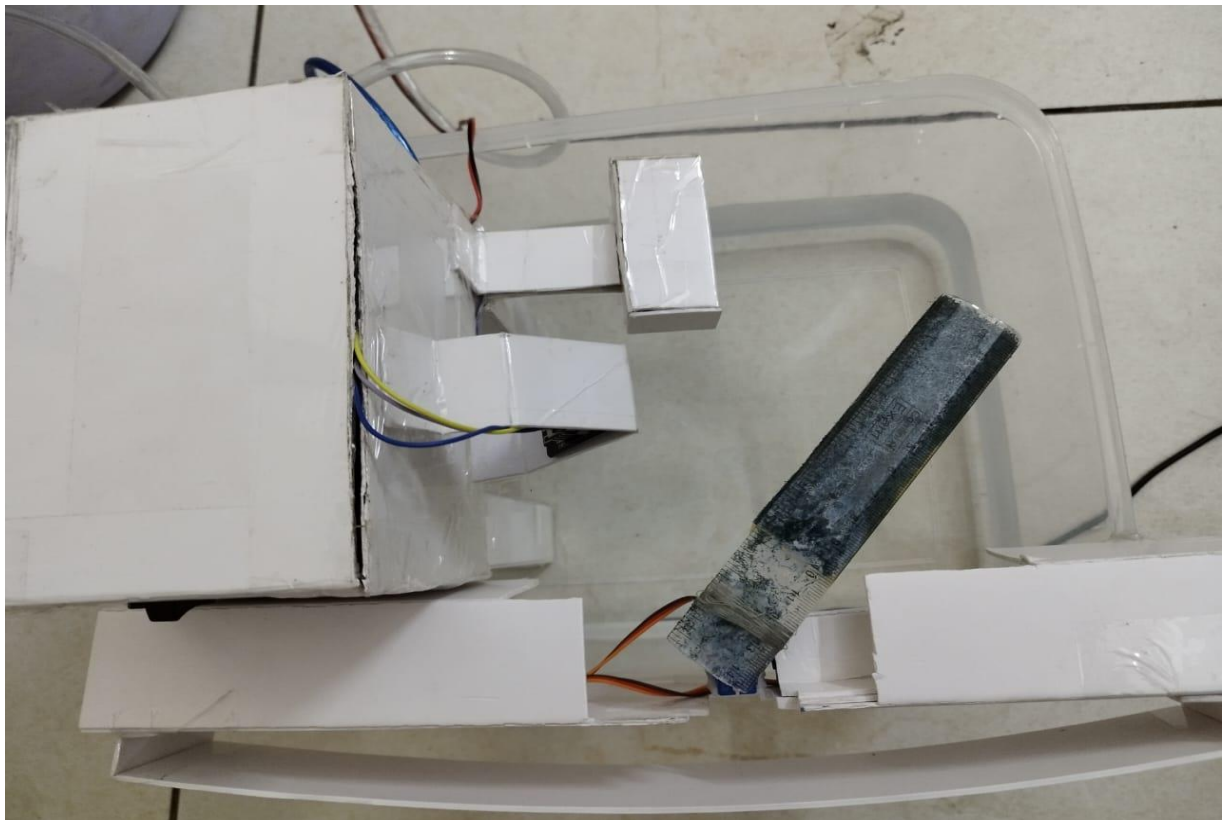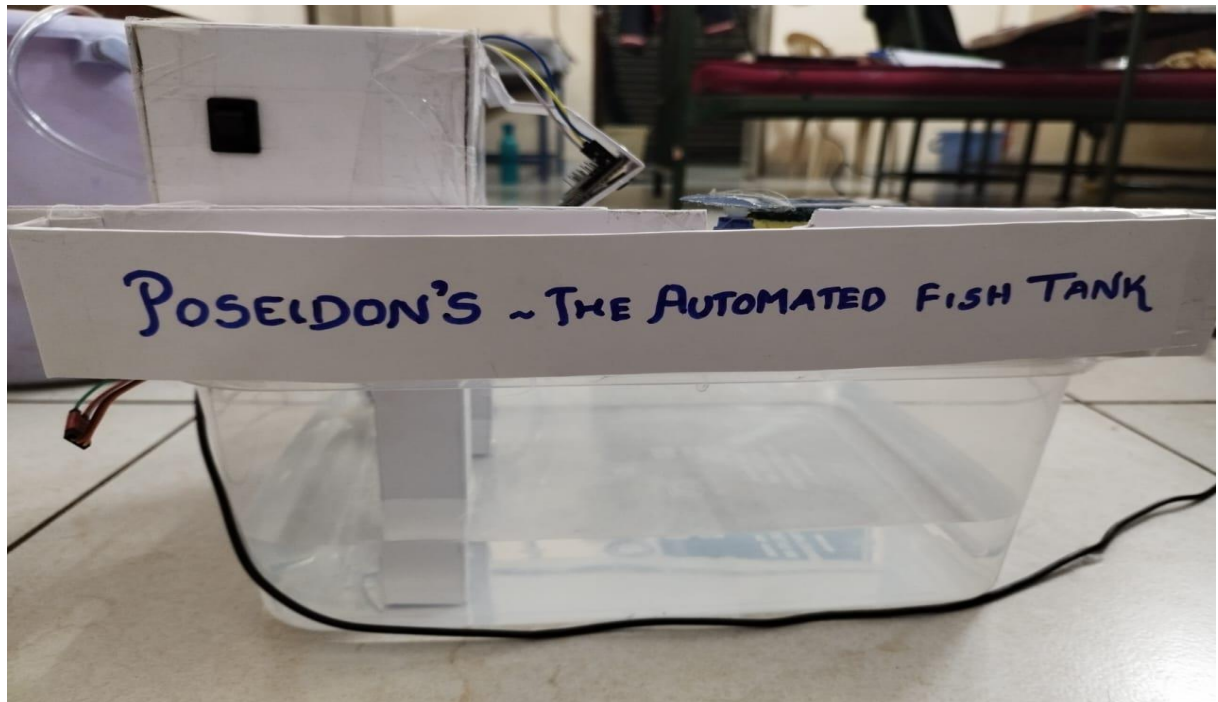
Discussion

The hardware implementation of this system working perfectly. First the feeder will dispense the food with respect to the RTC module time set by user. Next the cleaning process will do by wiper and hider, the cleaning day and time set by user. If the cleaning time occurs the motor will pump out water from the fish tank, then the ultrasonic sensor measures the distance of water level before and after pump out the water, once the distance reaches the threshold value the pump in process will take over the by the another motor.

This is next step of this automated fish tank. Wall of the fish tank was cleaned with the help of wiper and hider, first the wiper will enter into the fish tank, it will wipe over the tank, once the cleaning process is done, then it will take it outside with help of hider. The Camera module perfectly take the picture once the cleaning process is done, and it will be sent to user with the help of telegram bot. All the components are integrated successfully with help of Arduino and all the process are working perfectly.

Conclusion

Finally, The Poseidon's Automated fish tank was integrated successfully using Arduino and all other components. With the help of this fish tank, we can easily monitor the fish tank. Fish-feeding was easily done with help of this automated fish tank.Cleaning process time of the fish tank is more combability for user. The cleaning time and feeding time is flexible for user setting, if the user wants to change it, he can easily change the time, once the cleaning process done user can easily monitor the fish tank from anywhere with the help of telegram bot. So, the Poseidon's Automated fish tank user friendly and eco-friendly. With the help of this project the fishes will be save from die without food and the fish tank was maintains very clean with this project.

Future Scope

The Poseidon's Automated fish tank automatically done all the process like feeding, cleaning and monitoring of the fish tank. In future this project will be implements by moving the fish to the separate compartment with water within the fish tank for a particular time and the cleaning process will be done. Thus we can clean the entire water. Here, we are implemented the project when the fish is inside the tank in low level water .That time the cleaning process will done partially. so, in future the project can be implements by this way.

References

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Work Distribution among team members

Member	Contribution of the project
1.Aadhavan M	Full circuit implementation and programming of the project
2.Harivarman P	Implementation of the prototype model and Programming of RTC module
3.Dhanushiya D	Connect camera module(ESP32) with the design and develop the notification sending system.
4.Kaviya K	Connect camera module(ESP32) with the design and develop the notification sending system.