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AUTOMATIC AQUARIUM WATER REPLACEMENT WITH TIMING FISH FEEDER

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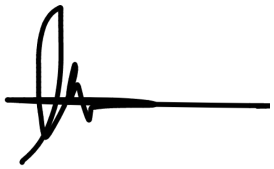

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Supervisor Name : TS NIZA BINTI MOHD IDRIS

Date : 15 FEBUARY 2021

DEDICATION

This project is earnestly dedicated to my beloved parents, who have been my source of inspiration and gave me strength when I thought of giving up, who continually provide their moral, spiritual, emotional, and financial support and taught me to work hard for the things that I aspire to achieve. I am truly grateful for having them in my life.

To my brothers, mentor, friends, and classmates who shared their words of advice and encourage to finish this study. Your encouragement is successfully made me finalize this study.

Last but not least, I devoted this project to the Almighty God, thank you for the guidance, vitality, power of mind, safety, skills and also for giving me a healthy life. All of these, I offer to you.

ABSTRACT

Many people in modern days have fish at home as their pets. Everybody loves fish and a minimum of one aquarium is necessary for their home. Yet it is a difficult task to manage aquarium. We need to adjust the amount of water from time to time and feed the fish periodically. Also, manual inspection of an aquarium's conditions is tough Therefore, automating aquariums which involves creating a system easier to handle is necessary. Here we have an Arduino-based system that automatically controls the whole aquarium. It involves water replacement management in which the water can be replaced, with necessary adjustments, through ideal conditions. The aquarium must automatically sort out feeding and water changing process. It will decrease the manual effort required in maintenance of aquariums by automating the aquarium management process. Also, an automatic feeding device powered by servo motor mechanism that used to feed fish set at a certain time. Not only the fish are able to live their life in a best environment, fish's keeper also happy if they knew their fish is in good shapes.

ABSTRAK

Ramai orang di zaman moden ini mempunyai ikan di rumah sebagai haiwan peliharaan mereka. Semua orang suka ikan dan minimum sekurang-kurangnya satu akuarium diperlukan di kediaman mereka. Namun, adalah sukar untuk menguruskan akuarium. Kita perlu menukar jumlah air dari semasa ke semasa dan juga memberi makan ikan secara berkala. Juga, pemeriksaan manual keadaan akuarium sukar Oleh itu, ada perlu untuk mengautomatikkan akuarium supaya lebih mudah dikendalikan. Di sini kita mempunyai sistem berasaskan Arduino yang secara automatik mengawal keseluruhan akuarium. Ini melibatkan pengurusan penggantian air di mana air dapat diganti, dengan penyesuaian yang diperlukan, melalui keadaan yang bersyarat. Akuarium akan secara automatik memberi ikan makan serta proses penukaran air. Ini akan mengurangkan usaha manual yang diperlukan dalam penyelenggaraan akuarium dengan mengautomatikasi proses pengurusan akuarium. Juga alat makan automatik yang dikuasakan oleh mekanisme motor servo yang digunakan untuk memberi makan ikan pada selang waktu yang tetap. Bukan sahaja ikan dapat menjalani kehidupan mereka di persekitaran terbaik, penjaga ikan juga gembira jika mereka tahu ikan mereka dalam keadaan baik.

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Introduction

1. 1 Introduction

People now always keep breeding fish to find a new gene, to make them as decorative as possible. For thousands of years, fish have been cultivated as food in lakes and ponds. However, brightly coloured yet tame specimens of fish were always respected as pets instead of food. Both ancient and modern cultures have kept the fish for practical and decorative purposes.

Fish keepers are often referred to as "aquarists" because most of them are not solely interested in fish keeping. There are three type of water categories that these fish originated from which is, freshwater, brackish and also marine (also called as saltwater).

Understanding that fish is the third most popular pet to keep, after dogs and cats, that might be surprising. According to the 2017-18 National Pet Owners Survey, 68 out of 100 American households own a pet. Study by the American Association of Pet Products (APPA) reveals that 12. 5 million US households keeping a freshwater fish and 2. 5 million keeping a saltwater fish.

Keeping a fish is a favourite trend nowadays. People from all the age groups yearning to keep fish at their homes, or in their office. Commercial fish farming and ornamental fish farming has become very popular. Therefore, it is a must to have an automatic fish tank system. It will keep our life easier to maintaining those fishes. Here we give automatic aquarium water replacement with timing fish feeder. The system will perform the operations like water renewal and feeding automatically. These actions can reduce the workload of people who keep many pet fish as a hobby.

1. 2 Background of the project

The purpose of this system is to design and develop an aquarium system. The fish owner will be able to personalize the feeding time or to feed their fish immediately without delay. The purpose and definition of this system are listed below according to identification and usage objectives and this system can only dissolve dry food. This method can reduce the work of making the water changing for the aquarium.

1. 3 Problem statement

In these modern days, people always want to keep pet but tend to forget to look after them. It makes them think it's a troublesome to do that sort thing of work. Because of the workload is too much, they think to do it next time. Sometimes they are too busy with work that they forget to do the cleaning work. This system is created to reduce the workload and help them easily to changing the fish tank water.

Fish is a living thing too. It just needs to be fed. Due to the world's busyness today, it is often overlooked to feed fish because it is considered a trivial matter. Often, people forget to feed the fish because they do other thing first and then they forget that the fish is not fed yet.

1. 4 Objective

The main point of this research is creating a system that not only benefit the fish, but also the fish keepers. Specifically, the objective is as follows:

i) To design an automatic aquarium water replacement system

ii) To construct system equipped with timer fish feeder

1. 5 Scope

The scope of this project can be seen as follows:

For the aquarium water replacement, these factors take into account:

- Size of the aquarium
- Input water valve
- Water pump

While, these items needed to make the fish feeder:

- Motor servo
- Container/Cup size

1. 6 Project Significant

The finding of this project is to design and construct an automatic aquarium system for those people who cannot care and keep an eye on their fish constantly and reduce workload to the maximum extent possible. The aquarium will perform all the procedure automatically like an automatic feeding and water changing while displaying the result on the LCD.

1. 7 Expected Output

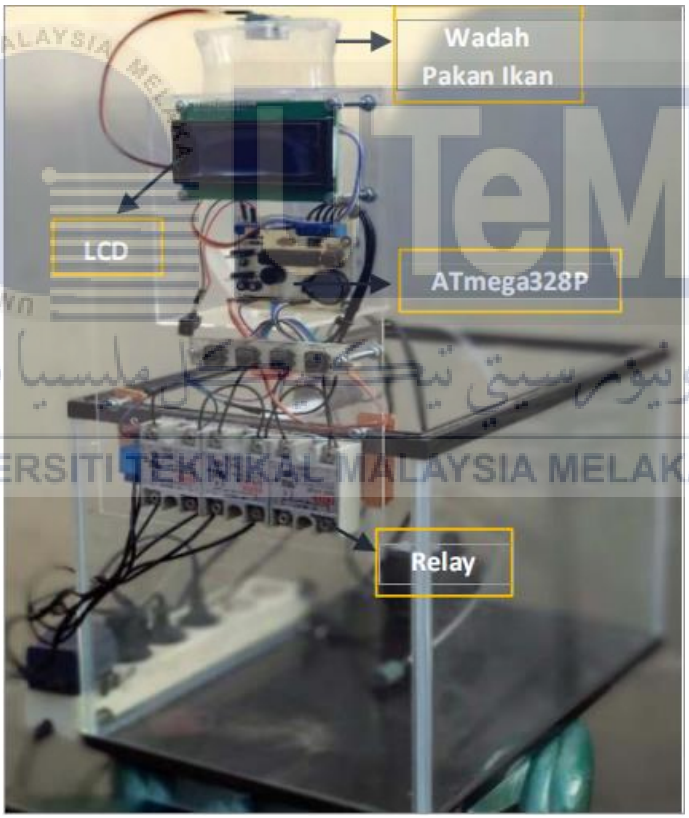

Figure 1. 1 Expected Result

1. 8 Summary

This project provides an automatic water changing system for an aquarium. The aquarium has a certain volume of water that occupied from the shape of the tank. The water replacement will come from the pipe straight into the tank through some microprocessor based electronic circuitry. The water sensor will calculate how much water will go into the tank. Next, the automated fish feeder can feed the fish within the given time. The fish food will go into the container provided with an adjustable discharge opening. The container attached to an electric timer so it can gradually dispense the fish food into the aquarium. It will dispense the food by rotating 360 degree. Which means, we put the food into the container, then we set a given time. When the time comes, the container will turn 360 degree to automatically to feed the fish.

Chapter 2

Literature Review

2. 1 Introduction

This chapter explained the literature review for the survey that have done in order to get as much information and details on this project. All information and data for this portion are taken from the article and web asset that are related to the inquired topic and will be clearly cited. The idea of the assistive innovation for the visually are impaired are not all that antiquated. Along these lines, there are a couple ventures are discovered identified with this framework. All the pass works identified with this proposed framework will be show in this section. The preferred standpoint and lacking of the task will likewise talk about here.

2. 2 Research on existing project

2. 2. 1 Design and implementation of Automatic Aquarium using IoT

This article was written by Dr. R. M. Rewatkar, Mr. Harish T, et al (April 2018) summarized that in modern day, many people have fishes as their pet in home. Fish keeping is a popular trend nowadays. People from all age group like to keep fish at their home or office. So, they present an IoT connected system which monitor and control whole aquarium using electronic and will communicate or transmitting real time status to user via Smartphone. Such action involves feeding, draining and refilling water, controlling water and temperature while feeding can be performed 3-4 times a day. The temperature level of aquarium is critical to the survival of the fish and required close monitoring. All these unit has wireless

communication embedded in them to communicate with central unite for monitoring by using mobile apps. But the system is not only expensive but also not easy to maintain. The system also does not determine how true the data will be measured if there any abnormal or undesirable events. This work also does not explain how dirty water can be detected and drained. However, the work of this project has been developed on IoT-based automated techniques and has improved considerably in the aquarium module. The food is provided to fishes is servo operated on mechanism working on 6 GCM system work on 2. 4 GHz wireless Wi-Fi signal through ESP8266 and all operation are managed by ATMega328 using the 'blynk' software. The ESP8266 is a low cost Wi-Fi Module that have self-supporting System on Chip(SOC) with an integrated TCP / IP protocol stack that can provide any microcontroller with a Wi-Fi link to your network. ATMega328 is an 8-bit and 28 Pins AVR Microcontroller, assembled by Microchip, follows RISC Architecure and has a flash type program memory of 32KB. The Infrared(IR) sensor and LM35 provide data of fishes and temperature respectively.

2. 2. 2 Food and water replacement aquarium based ATmega328P microcontroller

This article was written by Anak Agung Arta Darmika, I Gusti Agung Putu Raka Agung and Yoga Divayana (June 2019) summarized that technological developments have encouraged many human lives in automatic matters. One of the uses is the application of household appliances for example, an aquarium. With automation, work can be done easier and become more practical, efficient and economical. So, with the help of ATmega328P microcontroller as main function, they worked an automatic food dispenser and water replacement aquarium function. While using the same microcontroller, they also use motor servo, Liquid Crystal Display (LCD), ultrasonic sensor, buzzer, solid state relay and C programming language. The LCD can be used to record the time for the food dispenser dispense the fish food. They record the time using Real-time clock(RTC) which is one of the ATmega328P function. The servo motor is used