SMART FISH FEED PROJECT

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Project Title	LED at night by using a solar cell charger
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Abstract

Smart Fish Feeder can help solve the problem for people who don't have enough time to feed the fish. For example, college students are constantly late for class due to the responsibility of feeding their fish properly. Or an office worker who is sometimes too preoccupied with their work to remember to feed them. Managing your time to care for your fish has become more difficult. Who will be feeding the fish? They can't exactly go buy their food. That is why we have been working on an idea that will make life a lot easier. That is the start of the 'Smart Fish Feeder'.

Smart Fish Feeder is a machine that can automatically feed the fish by setting the timer, meaning that people can decide to feed them everywhere, any time, whatever they want.

Smart Fish Feeder allows the individual user to input the quantity of fish to indicate the amount of food required. Furthermore, the users are also able to arrange the feeding time by inserting the schedule. Once the users input such information, the machine will automatically calculate the exact food necessary for the precise number of fish and eventually send the notifications to the clients via the mobile application when the food is running out from the tank, as well as when the water temperature is immoderate or unstable.

Acknowledgments

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Introduction

Background

In the 21st century, As technology improves drastically and time has always been taken up with other activities or works of the ever-changing world. The animals, especially the pets we have at our home, are being left unattended and sometimes even forgotten. Sometimes we even need to travel or work in another country for a long time. For example, let's consider the main problem of those who have fish. Who will be feeding our fish? They can't exactly find theirs.

As we observed, many people nowadays don't have enough time to feed the fish. Imagine a college student constantly late for class because of the responsibility of properly feeding their fish. Besides, they are sometimes too busy and even forget to feed them. It has become harder to manage your time to take care of your fish.

What if there is a machine that would help support those people who don't have enough time with their fish? The fish would be so happy and the people having those fish would be able to do more things and don't worry about their fish, right? That's why we have been creating an innovation that would make life much easier. This product is named ' Smart Fish Feeder'.

Our project's purposes are to support not only ordinary people but also busy company employees who have a limited amount of time to take good care of their fish and to predict fish health. By Smart Fish Feeder, we aim to provide our clients the convenience as they can entirely set the schedule for feeding the fish from anywhere and any time while working on the tasks that need to be completed.

Purpose of the project

To create a way for fish owners to be able to feed the fish more conveniently by aiming to provide our users the convenience as they can entirely set the schedule for feeding the fish from anywhere and any time while working on the tasks that need to be completed.

The hypothesis of the project

Our Smart Fish Feeder feeds the fish as the user sets.

Scope of study

Studies some of the coding parts of Ardunio and NodeMCU that relate to the project. Studies the fish and information about the fish foods.

Expected results

Our Smart Fish Feeder connects to Blynk and works perfectly to feed the fish the correct amount of food with the correct timing or as requested from the user.

Project duration

The project was started from November 2021 to December 2021

Background Theory and Related Work

Automatic Fish Feeder Concept

There are a lot of inventions that have been made and been classified as “automatic fish feeders”. From the research of previous designs, a few are quite interesting.

One from David C. Smeltzer, which was patented on 4th April 1985, His design is capable of dispensing different sizes of food and dispensing different volumes of food with a high degree of accuracy by water counterbalance weight.

Research conducted by Faridi, Ezri, Saidin, and Faizal in 2011 has stated that there are two types of automatic fish feeder. There are fixed fish feeders and also mobile fish feeders. Faridi had also stated that controlling the feeders with efficiency will require a high precision programmable logic circuit (PLC).

James & Stanley in 2006 talks about installing a fish feeder inside a buoy. It is understandable that by placing the feeder inside a buoy on the ocean, by installing a camera, microphone, or any other appropriate sensor, oceanic aquamarine life can be easily monitored. As long as the ponds are large enough, such fish feeders can be used.

Microcontroller

In all devices, they must have a unit that will be able to receive all the input, compute all the things that need to be calculated such as distance and manipulate the other unit to produce outputs. Typical microcontrollers include a central processing unit (CPU), memory, input/output (I/O), along with certain peripheral functions such as timers, and analog-to-digital converter (ADC) all in a single chip.

In recent years, for making prototype devices, the microcontroller known as Arduino is used most of the time. Arduino is designed, manufactured, and supported with electronic devices and software, allowing people around the world to easily access advanced technologies that interact with the physical world. Our products are straightforward, simple, and powerful, ready to satisfy users’ needs from students to makers and professional developers.

The Wio Terminal is a SAMD51-based microcontroller with Wireless Connectivity powered by Realtek RTL8720DN that’s compatible with Arduino and MicroPython. It supports both Bluetooth and Wi-Fi providing backbone for IoT projects. The Wio Terminal itself is equipped with a 2.4” LCD Screen, Microphone, Buzzer, microSD card slot, Light sensor, and Infrared Emitter.

Procedures

Equipment

The hardware we use include the following:

WIO Terminal - Connect wifi, display information and control all sensors

Breadboard - Connect all sensors.

DS18B20 - To measure the temperature of the water

Servo Motor - To open the food gates

RPR220 - An Infrared sensor

Procedures

1. Discuss - We discuss creating a plan on what and how are we going to do our project including the hypothesis, function of the machine, the equipment needed, and thinking of how will it all come together
2. Design - We lay our plan and design the wireframe and design our smart fish feeder using TinkerCAD, online 3D modeling software, to give a rough idea of how the smart fish feeder model will look in the end. Also, create the circuit design and design the coding algorithm.
3. Make - We had put all of the Smart Fish Feeder parts together starting with the main WIO Terminal circuit, created a connection to the Blynk which we had set up for the Smart Fish Feeder, and constructed the main model and housing of the fish food of the Smart Fish Feeder.
4. Test - We had tested out our system of feeding the fish if it works correctly as intended.
5. Debug - We debug the problem that had come up including the code unable to be compiled, any coding problem that had been don't one with and without our own making, the problem with the connection to the Blynk application and to the old NodeMCU refusing to accept any code given to it before we had to replace it with a WIO Terminal. We repeat this testing and debugging process until it works as we propose.

Functions

There are multiple functions of this machine. People can simply select the schedule by using the device and feed their fish via the mobile application while spending quality time in any place and when the time reaches, the machine will deploy the food automatically or press the button on the application to feed. The users can open the application to check the status of the fish and the machine. Plus, there is a notification to the users when they are running out of food as well. Users can also measure the water temperature to examine and predict the health of fish. The users can input the quantity of fish to measure the amount of food to deploy.

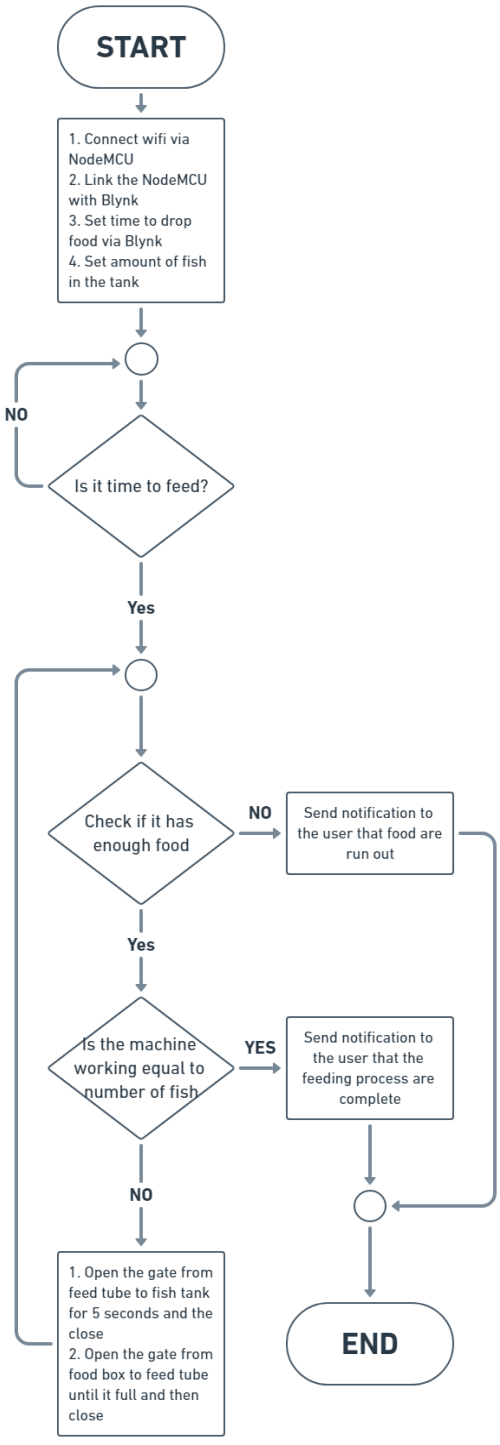

Figure 1: Algorithm flowchart

Architecture The hardware and software come together to create our Smart Fish Feeder:

Use the internet as a signal to activate the device via WIO Terminal ATSAMD51
Use the Blynk server to access the time to set the timer.
Use Servo 9 grams to deploy the food gate.
Use an infrared sensor to check the food remaining.
Use a temperature sensor to check the water temperature

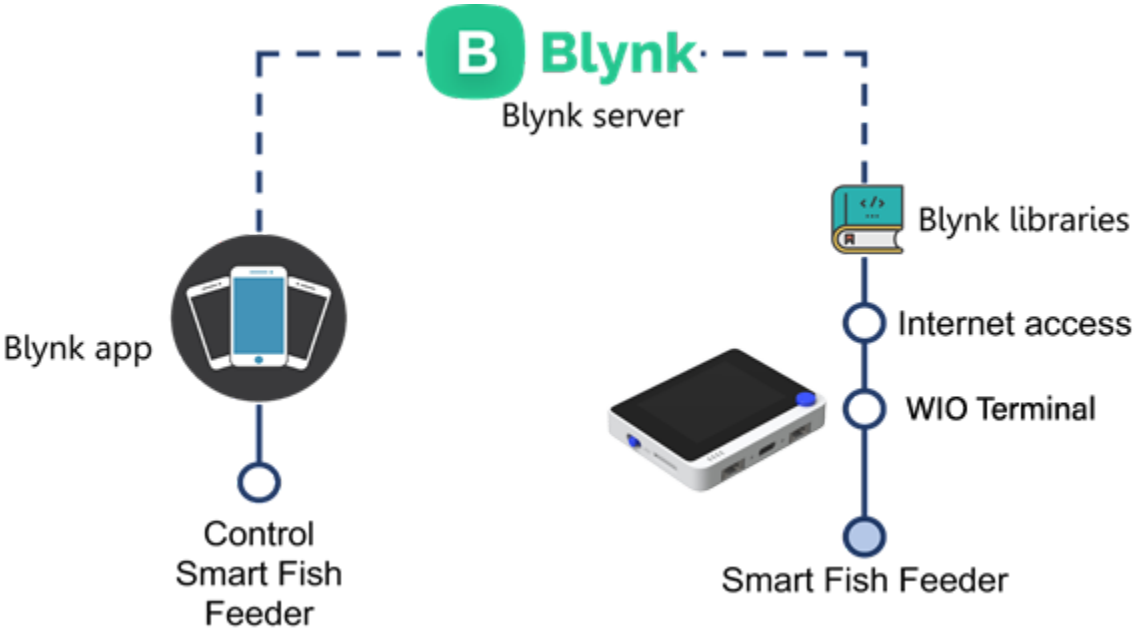

Figure 2: Software Architecture

Wireframe and Design

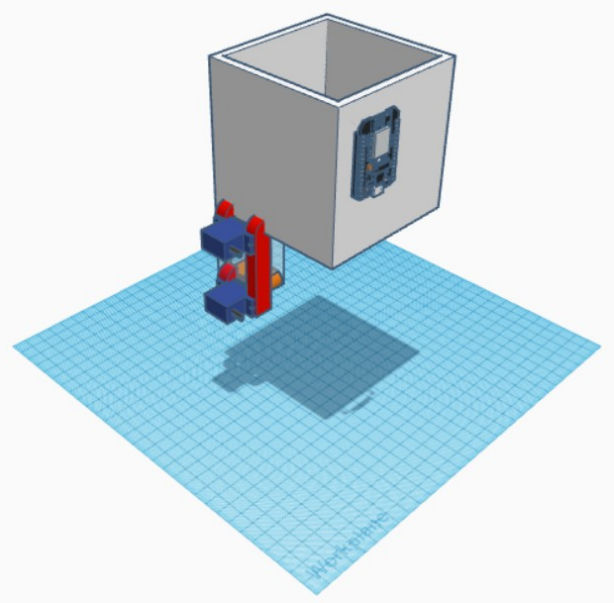

Figure 3: Isometric view of the model

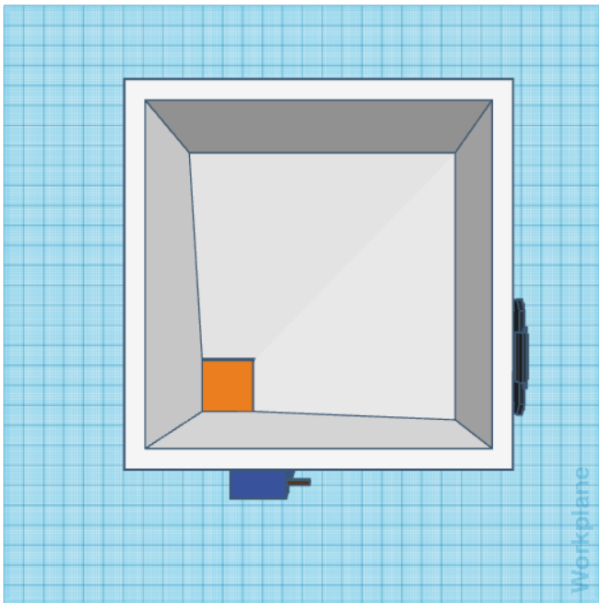

Figure 4: Top view of the model

Figure 5: Circuit diagram

Conclusion

The Smart Fish Feeder that we have created has worked to provide our users the convenience as they can entirely set the schedule for feeding the fish from anywhere and any time while working on the tasks that need to be completed. The user can simply select the schedule by using the device and feed their fish via the mobile application while spending quality time in any place and when the time reaches, the machine will deploy the food automatically or press the button on the application on our Blynk application to feed. When the Smart Fish Feeder receives the input. It opens the gate from the feed tube and food box with the correct interval to feed the fish the correct amount of food as expected from the machine

Recommendations

Integrate a camera system to the Smart Fish Feeder to let the user also see the lovely fish while they are away.

Reference

Milda Gustiana Husada & Muh. Zulian Nurhidayat (2021) Fuzzy logic implementation in water quality monitoring and controlling system for fishwater cultivation. INTERNATIONAL CONFERENCE ON GREEN TECHNOLOGY AND DESIGN 2020

Mitree Duangsawas & Jaruwan Somsiri. 1985. Water properties and analytical methods for fisheries research. Ministry of Agriculture and Cooperatives. Page 17-93

Mitree Duangsawas. 1983. Water properties and fish farming. National Institute of Inland Fisheries, page 1-23

Richy (2020-07-28). How to Choose the Best Automatic Fish Feeder. Retrieved November 10, 2021, from https://web.archive.org/web/20141202145758 /
http://www.electronicpetfeeder.net/fish.php

Global Journals Inc. USA (2016) Development of Automatic Fish Feeder. Retrieved December 12, 2021, from
https://globaljournals.org/GJRE_Volume16/3-Development-of-Automatic-Fish.pdf

Blynk. (n.d.). Introduction to Blynk. Retrieved November 20, 2021, from
https://docs.blynk.cc

Blynk libraries. (n.d.). GitHub. Retrieved November 27, 2021, from
https://github.com/blynkkk/blynk-library

Seeed studio. (n.d.). Basics of the TFT LCD Screen of wio terminal Retrieved November 27, 2021, from https://wiki.seeedstudio.com/Wio-Terminal-LCD-Basic/