

GSM Web-Based Centralized Remote Wireless Automatic Controlling and Monitoring of Aquafeeder

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Abstract. This project is about producing a prototype to feed fishes at fish ponds of remote location with the use of GSM mobile phone. An automatic fish feeder is an electric device that has been designed to give out the right amount of pellets at the designed time. In this project, the automatic feeder designed consists of photovoltaic solar cells that are used to generate electricity and storing it into batteries. Solar charge controllers can be used to determine the rate of which current is drawn and added from the batteries. GSM cellular communication is used to allow user to control from a distance. Commands or instructions are sent to the operating system which in return runs the servomotor and blower by blowing certain amount of fish pallets into the pond to feed the fishes. The duration of the feeding processes is fixed by the user, hence the amount of fish food pallets released are precisely the same for each time. This technology is especially useful for fish farmers where they can remotely feed their fishes.

1. Introduction

1.1 Problem Statement

Fish farmers run daily fish feeding operation manually with paid help. This is particularly difficult for larger farm with various types of fish and ages. An independent system that runs automatically to replace the conventional feeding method by sending instruction via Web server and GSM mobile phone. The server will send an SMS to the remote automatic feeder equipped with GSM receiver, and this will trigger the servo motor to operate and release the food.

1.2 Project Objectives

The objectives are as such:

- To design a GSM web-based centralized remote wireless automatic controlling and monitoring of aquafeeder.
- To build a prototype of the aquafeeder.

2. Literature Review

2.1 Photovoltaic System

A photovoltaic system, also known as a PV system is a display of components designed to use the Sun as the power source to supply usable electric power for a wide range of usage [11]. A solar array or photovoltaic array are made out of solar panel which consist of several photovoltaic modules, to generate usable direct current (DC) electricity from converting solar radiation (sunlight). An inverter is usually installed into the



PV system to produce alternating current (AC) by converting the DC power generated [12]. The alternating current then can be used to power loads such as motors and lights. In PV array the modules are connected in series to obtain the desired voltage then the individual strings are joined parallel so that more current can be produced by the system.

2.2 Current aquafeeder

The device comes in three main sections, namely: mobile phone, controller and action unit.

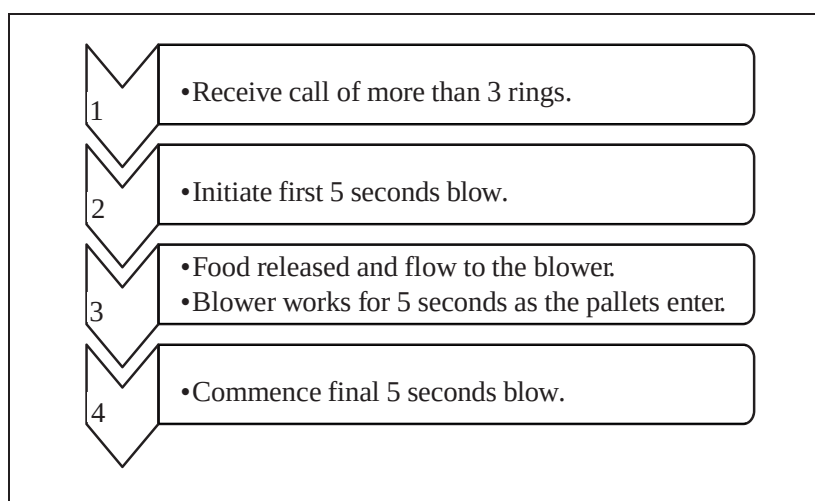


Figure 1. The Flow of Each Initiation

By using Global System Mobile (GSM), the feeding operation can be done with just a call away. Since mobile telephone is readily available, the user does not need to carry heavy and unnecessary device. The use of this technology enables remote activation [12]. When feeding time, the user can control and switch the device ON or OFF.



Figure 2. Wavecom GSM Modem

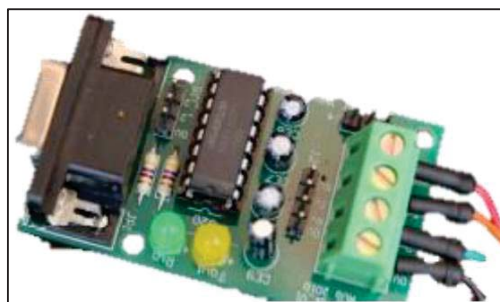


Figure 3. Maxim Max 232 for RS-232 to TTL converter

3. Methodology

3.1 Study the Present Prototype

The circuit consists of:

- Arduino microcontroller.

- Power Management Unit (PMU).
- Auger and Blower controller module.
- TTL to RS-232 converter and GSM Modem.

3.2 Familiarization with Arduino

Arduino is a single board microcontroller. This controller enables the application of interactive devices; especially devices that interact with environment by sensors and actuators. The hardware consists of an open-source hardware board designed around an 8-bit ATMEL AVR microcontroller, or a 32-bit Atmel ARM. Current models feature a USB interface, 6 analog input pins, as well as 14 digital I/O pins which allow the user to attach various extension boards. There are plenty of models in the market to choose from based on their suitability to our objective.

4. Result and Analysis

4.1 Call and SMS

These methods of initiation are as easy as calling your contacts. You only need to dial or send an SMS to the number used on the Arduino. A feedback will be sent to the user's number upon each successful feeding.



Figure 6. Methods of Initiation (Call and SMS)

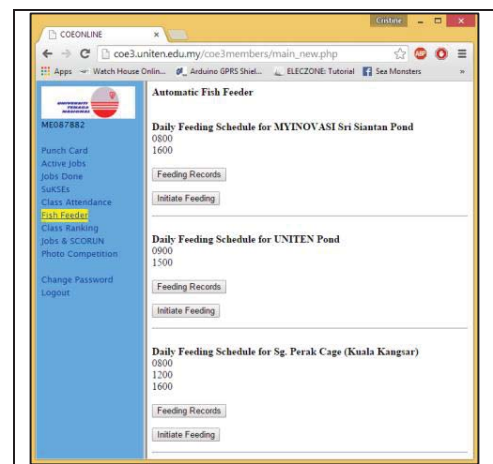


Figure 7. Website page initiation.

4.2 Website

The steps are as below:

1. Visit website: coe3.uniten.edu.my/coe3members/ from any device with internet access.
2. Login by entering username and provided.
3. Search for Fish feeder at the list on the left section of the page.
4. Choose which pond and click on the INITIATE FEEDING button to start the feeding process.
5. Receive an SMS indicating that the feeding is complete.

5. Conclusion

The device comes in three main sections, namely: mobile phone, controller and action unit. The system is set to STANDBY mode and can be triggered by a missed call and received SMS. Any number can be used to make this call. Once the system receive more than three ringing, the blower will start first and work for

about 5 seconds. This is to clear what ever there might be in the channel. After the initial blow, fish pallets will be released and blow out for about 10 seconds. Another 5 seconds blow is allowed to clear the pipe hole. The completed prototype consists of the frame, Arduino, mechanical components and electronic components. All these are interconnected but electrical wiring. The Arduino act as the ‘brain’ of the system and will trigger the system of the aquafeeder. Currently, the prototype is located at Electrical Engineering Lab, COE (BH, UNITEN).

6. References

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