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Smart Fish Feeder

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ABSTRACT

Nowadays, we are in lack of time even to take care of ourselves .Then how could we take care of our pets. Many people hesitate to keep fish tanks in their home as fishes need to be fed regularly which they aren't capable of it they were out of station. Some of us even maintain a fish tank as it gives us lot of happiness by handing it over to our neighbors to take care of it whenever we aren't available. Here we came up with a solution to this with our Smart Fish Feeder. Our Smart fish feeder is a simple system that works on our response to number of fishes, number of feeds & interval of time required between each feed. This thesis uses a GSM module that intimates the user to clean the tank once the water becomes dirty. These above details will be fed as input to the microprocessor by means of an LCD and a keyboard set up to set the values. Once these values are fetched by the microprocessor it fetches all the data and performs the action of opening the solenoid valve (food valve) in a manner that we would require it to operate. This system helps us to maintain our fishes with ease even without our physical presence.

Keywords: GSM module, Microprocessor, LCD, Solenoid valve

I. INTRODUCTION

The important elements for growth and production are food and feeding. One of the main challenge faced by aquaculture development is their management, survivability and maintenance. The life of fish is important for the fish owners, it depends on the adjustment of food delivery which ensures the survival of the fish. Focusing on economic aspect especially in aquaculture project, the survivor of the company involved is determined by the control of fish feeding. However we have focussed on the fish reared by the home owners.

There are several direct and indirect methods to solve this problem, for direct adjustment self-feeders may be used but for indirect adjustments automated device can be used to deliver the feed to the fish.

Nowadays there has been increase in number of people who keep fish as pet at their home as a hobby or for business purpose. There are many fish owners who leads a busy life who are away from home. So they feel difficult to maintain a regular feeding schedule. The fish requires a regular care to remain healthy. If they are not fed at regular intervals they can be loss of fish because of starvation. Therefore, aim of our project is to develop a feeder that can handle good control of feeding the fish twice a day or more according to the user interest every day. This system also sends a notification to the owner if the water in the tank becomes dirty using a sensor and the water has to be changed.

II. METHODS AND MATERIAL

A. Literature Survey

Smart fish feeder Concept

Various personalities have defined about automatic fish feeder to enhance the fish culture. From those designs, some of the designs were chosen and they were very interesting and also very useful. The existing design was capable of dispensing feed having various sizes of grains over a wide range of dispensing volumes with a

high degree of accuracy and it was performed by utilizing an adjustable counterbalance weight which the amount of water required are changeable in order to produce a dispensing action and simultaneously adjusts the vibration movement made by the fish feeder to differentiate the amount of food given out. Related work: From simple battery operation to the state of the art of electronic devices, automatic aquarium fish feeders come in an array of styles. The automatic fish feeders not only have the capability of releasing a variety of different feeds, but they can also release the feeds at specific times and intervals. There are some moisture controlled units designed to prevent flake, pellet and other dried foods from clumping. From small to large capacity feeders with single to many purpose functions are available in the market. Aqua Chef Smart Fish Feeders: These are moisture resistant, non-clump feeder dispenses flakes, pellets, or crumbled fish food. You set the portion size and feeding times minimum up to two times per day using the programmable timer. The automatic feeder dispenses single or double feeding (within 60 seconds of first feeding) that can holds up to 35 grams of food approximately. Nutrafin Profeed Automatic Feeder: This automatic fish feeder can be quickly programmed to automatically dispense up to two precise portions a day or it can be done for manual operation. Handles almost any type of flake, pellet, or freeze-dried food and prevents clogging due to aquarium moisture, 14-gram capacity. The two AA batteries used by these automatic feeders can be operated up to a year with proper maintenance. Temperature Sensor: The name temperature sensor implies that it is the sensor that measures temperature. For this paper, the temperature here will focus to measure the temperature in water, such as ponds, lake or ocean but in most of the cases this type of sensor is used to monitor the water condition for aquatic life. It has been stated that in moving a fish that are sensitive to temperature changes, a temperature sensor is used to monitor the temperature of the water as other devices are used to control or cool the water for fish transfer. Some studies have also stated that, the growth rate and development are heavily dependent on the temperature of the water in the case of a sea cucumber. From this it is very clear that the temperature of the water must be the most important consideration as it has a great potential to affect the aquatic life. Thus, the temperature consideration may be a major threat when the sensed temperature values go wrong. Aquaculture: Aquaculture means the farming of freshwater and marine plants and animals. The known fact is that all aquaculture is done in water because it is a farming activity. The vital focus for aqua cultural practice is on the fish feeder. Hence the key ideas must be explained clearly.

B. System Design – Proposed Smart Fish Feeder Concept

i) Mechanical Structure

The Smart fish feeder construction is so simple and it is made of plastic as it has to be highly stable to hold the electronic components. A lot of materials are available in the market to make this structure with their own advantages and disadvantages and the type of material used depends on the projects. As plastic is light weighted and readily available in the market, it has been selected. The feed from the storage tank is dropped into the tank through the open and closure of the valve. Figure 1. Shows the block diagram of smart fish feeder

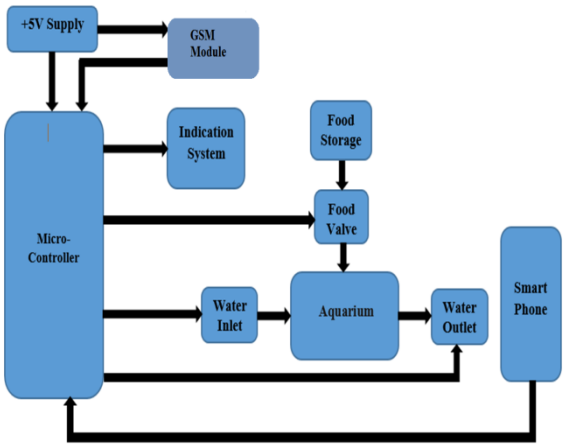

Figure 1. Block diagram of smart fish feeder

The above diagram shows the complete setup of the project.the GSM module is controlled by the controller. The push buttons are controlled by the MSP430 and the output is given to the arduino board the LCD is interfaced with the Arduino board.Thus the soleniod valve is operated according to the user timing input.

ii) Electronic Components

Arduino is used as an open source physical computing microcontroller board in the smart fish feeder. The working of this board is done by connecting it to the computer using a USB cable. Then the necessary

coding that has been written can be uploaded into the Arduino UNO.

As the Arduino is a new component and simple, it has been selected to be the microcontroller in Smart fish feeder. It includes other features like complex coding can be written in a very easier way for better understanding. Also, this microcontroller has its own USB connection, a reset button, a power jack and an ICSP header. It has high number of digital input/output pins. Figure 1 shows the Arduino which is used inthis project to support LCD

Figure 1. Arduino

Performing the coding for the software is also quite easier as it based on C++ language. Again it cheaper when compared to the other available microcontrollers in the market. The above stated facts are supported by the researches of Luiz, Osvaldo, Leonardo, Fatima, Marli and Paulo.

The European Telecommunications Standards Institute (ETSI) developed a standard known as GSM (Global System for Mobile Communication) to describe the protocols for second generation (2G) digital cellular networks used by mobile phones.

The actual reason for the development of GSM standard is to replace the first generation (1G) analog cellular networks and was described originally as a digital, circuit-switched network optimized for full duplex voice telephony. Later, this was expanded over time to include data communications, first by circuit-switched transport, then packet data transport through GPRS (General Packet Radio Service) and EDGE (Enhanced Data rates for GSM Evolution or EGPRS).

From the paper written by C. D. Oancea (2011) it has been known that GSM is able to operate in several frequencies. Using the SIM (Subscriber Identity Module), the known band it can operate are 900MHz, 1800MHz and 2100MHz. This module would provide the user and identity in the network with having a unique telephone number for each of them.

A paper written by Guifen & Guli (2010) has supported that usage of GSM for wireless communication especially for cellular phones as it has a lot of advantages and conveniences.

LCD (Liquid Crystal Display) screen is an electronic display module and has a wide variety of applications. The very basic module is 16x2 LCD display module and it is the very commonly module in various devices and circuits. These LCD modules are preferred over other multi segment LEDs and seven segment displays.

The 16x2 LCD can display 16 characters per line and there are 2 such lines. This LCD has two registers namely the Command and the Data. Each character is displayed in 5x7 pixel matrix. Such type of LCDs are economical, easily programmable, reliable and have no limitations of displaying special and even custom characters unlike the seven segment display and so on. Figure 2. Shows the LCD which displays the desired input value

Figure 2. LCD displays

The Architecture of MSP430 CPU has a 16 bit RISC-architecture. Its performance is directly realted to 16 bit databus and 7 addressing modes with reduced instruction set allowing for faster execution , The key features are its has ultra low power architecture with a an operating voltage of 1.8 volt to 3.6 volt and has

extended battery life. Figure 3. Shows the MSP430 that receives the input from the buttons. With the above mentions features we have interfaced all the components to get the required output. Figure 4. Shows the Smart fish feeder - Hardware Setup overview.

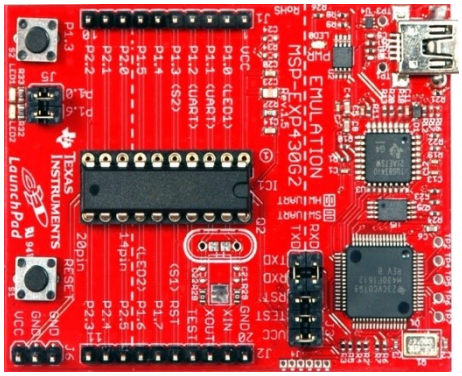

Figure 3. MSP 430

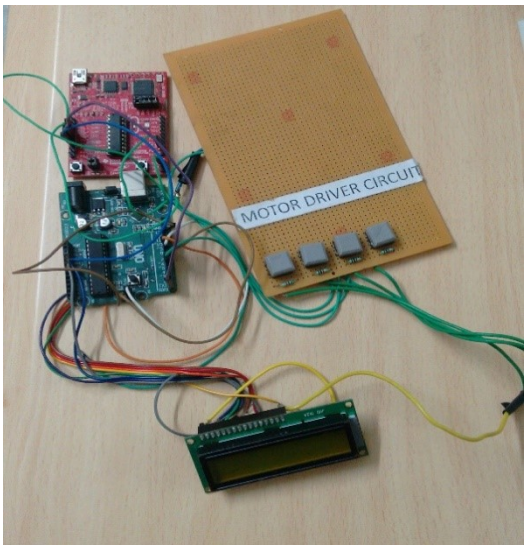

Figure 4: Smart fish feeder - Hardware Setup overview

III. RESULTS AND DISCUSSION

Hence the smart fish feeder has been successfully designed, evaluated, constructed and implemented. The main components of smart fish feeder are solenoid, LCD, MSP430, arduino board. The implementation of smart fish feeder would enhance the aqua cultural practice and also the personal happiness of growing the fishes.

When compared to the manual feeding system the feeding efficiency has been increased from 18.6% to 20.9%.

IV.CONCLUSION

Creating an automatic fish feeder is not a very simple task additional to it adding a sensor to monitor the water purity is quite difficult. As it requires a lot of reading and research. In terms of marketing, balancing the optimum cost is important as the buyers will not prefer an overpriced product. Thus our project is feasible and compact in size making it user friendly.

V. FUTURE SCOPE

Smart Fish Feeder can be implemented both at homes and at aquaculture. Human intervention is low thereby reducing the man power utilization. This system helps in controlling the death rate of the fishes due to starvation. The main drawback of this system is that wrong input values may drop out excess or little amount of feed into the tank, hence input values must be properly given by the user before feeding the fishes. In the next phase of development, we would enhance the project using IoT implementation. The modern aquariums nowadays have their own fish feeder which gives food to the fish by using timer. The problem in that feeder is they may forgot to refill the food dispenser once it is empty. In our project we will overcome this disadvantage by sending an alert message to the user when the food dispenser is empty so that they may refill it again.

VI. REFERENCES

[1]. Ahmed M.A, Haidar, Chellali B., M. Zahir (2013). Software Interfacing of Servo Motor with Microcontroller. J. Electrical Systems 9-1 (2013): 84-99

[2]. B.C Mohapatra, Bikash S., K.K. Sharma and D. Majhi. (2009). Development and testing of Demand Feeder for Carp Feeding in Outdoor Culture System. Agricultural Engineering International: the CIGR Ejournal. Manuscript No 1352. Vol. Xl

[3]. C.L Ku, Y.K. Tan, S.K. Panda. (2006). High – Precision position Control of Linear Permanent Magnet BLOG Servo Motor for Pick and Place Application. Pg2191-2924

[4]. Constantin D. O. (2011). GSM Infrastructure Used for Data Transmission. The 7th international symposium on advanced topics in electrical engineering.

[5]. Francisco A.A, Vignaud G.A. (2013). Using open-source platform for trajectory control of DC motors, IEEE.
[6]. Guifen G., Guili P. (2010). The Survey of GSM Wireless Communication System International Conference on computer and information Application (ICCA 2010). Pp121-124.
[7]. Hao Y. (2012). DSP-BASED Fuzzy Logic Servo Motor Control. International Conference on Control Engineering and Communication Technology.
[8]. John S., loannis K. (2010). Lab Kits Using the Arduino Prototyping Platform. 40th ASEE/IEEE Frontiers in Education Conference.
[9]. M. V. G. Aziz, Rifki W., Ary S. P., Diotra H. (2013). HASH MD5 Function Implememtation at 8 bit Microcontroller. Joint International Conference on Rural Information & Communication Technology and Electric-Vehicle Technology (Rict & ICev-T). IEEE.
[10]. M. F. Shaari, M. E. I. Zulkefly, M. S. Wahab, F. Esa (2011). Aerial Fish Feeding System. International Conference on Mechatronics and Automation, IEEE.
[11]. S. J. Yeoh, F. S. Taip, J. Endan, R, A, Talib and M.k. S. Mazlina (2009). Development of Automatic Feeding Machine for Aquaculture Industry Pertanika J. Sci. & Technol. 18 (1): 105-110(2010).
[12]. Stanley J. B., James D. I. (2006). Aquaculture Feed Buoy Control-Part 1: System, IEEE