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Design of an Automatic Shrimps Feeder Using GSM

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ABSTRACT: shrimps cultivation has become a worthwhile business activity, as it promotes food security. Shrimps farming is one of the most important aqua cultural activity, where automatic feeder and feeding system plays a major role in the success of aqua culture farms globally. Farmers are facing many problems like shrimps diseases and shrimps are not constantly feed at regular intervals, there can be significant loss of shrimps due to starvation. Therefore, to solve the problem an automated shrimp feeder was designed, fabricated and tested that automatically feed the shrimps at predetermined time.

KEY WORDS: Automatic feeder, Shrimp farming.

I.INTRODUCTION

Several automatic shrimp feeders have been developed in the past few years to ease the work requirements in shrimp production by using Arduino Uno in the design of an automatic shrimp feeder system. The device is able to provide shrimps food at different time intervals. Also these device can be programmed to guarantee that the feeding plan is followed accordingly. While these programmable shrimp feeders are easily available for shrimp farmers in developed countries. Automatic feeders are found to be suitable for P. vannamei culture owing to its feeding behaviour. At present, 90% of the shrimp farming in the country is contributed by P. vannamei with the maximum allowed stocking density of60 nos. m^{-2}.

Shrimp farming is a business that exists in either a marine or freshwater environment, producing shrimp. The automatic feeders are designed to be as bendy as viable so you can use them as stand-alone gadgets or as a part of a totally included packaging machine. Many models are available in Asian countries like Thailand, China, Malaysia and Vietnam and mixed opinion exists about their application and performance.

The pre dominant task in shrimp farming is to provide feed in proper amount on the proper time as in line with requirement. it's miles a truth that the primary running value in aquaculture, is the value of feed which might also account for 50% or more. Development of a high quality feed as well as the method of feeding are important since these will effect overall quantity of feed consumption.

A. Liquid crystal display(16x2)

A liquid crystal display (LCD) is a thin, flat display device made up of numbers of colour or monochrome pixels arrayed in front of a light source or Reflector. Liquid crystal screen display contains different control lines like EN (Enable) it is used to tell the LCD that you are sending data, RS (Register Select), R/W (Read/Write). And the logical status on control lines are like when EN (enable) is 0 it access to LCD disabled, if EN (enable) is 1 it access to LCD enabled. When R/W is 0 then it writes data to LCD, if R/W is 1 then it reads data from LCD. When RS (register select) is 0 is used for instructions, if RS (register select) is l is used for character. LCD is shown in Figure 1.

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Fig 1. liquid crystal display(16x2)

B. **Real Time Clock (RTC)**

A real-time clock (RTC) is most often in the form of an integrated circuit that provides current time and date. The time values are for the year, month, date, hours, minutes, and seconds. The DS1307 works in either the 24-hour or 12-hour arrangement and it has a worked in power-sense circuit that recognizes power disappointments and consequently changes to the reinforcement supply. When the computer is turned on, the Basic Input- Output Operating System (BIOS) that is stored in the computer's read-only memory (ROM) microchip reads the current time from the memory. real time clock consists of serial clock (SCL) and serial data (SDA) pins as shown in figure2.

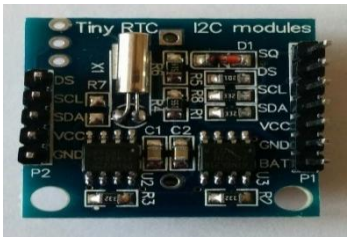

Fig 2.Real time clock

C. Keypad 4x4

4x4 keypad will have eight terminals out of eight first four are rows of matrix and next four are columns of matrix. keypad can be used as switch and also as a calculator. Generally the usage of keypad in these design is to set next time, to enter quantity and to enter into various modes like mode1 and mode2. 4x4 keypad as shown in figure 3.

Fig 3. 4x4 keypad

D. Arduino UNO

Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE and it consists of both a physical programmable circuit board anda piece of software, or IDE and it uses a simplified version of C++. Arduino UNO is the most popular boards in the Arduino family. Arduino board can be powered through AC-to-DC adapter or a battery. Arduino UNO has 6 analog pins and 14 digital pins out of these 14 digital pins 6 pins can be used as PWM (pulse-width modulation) pins that are indicated with tilde symbol. microcontroller used on UNO board is ATMEGA 328 shown in figure 4.

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Fig 4. Arduino UNO

E.AC Motor

AC motor that converts the alternating current into mechanical power by using an electromagnetic induction shown in figure 5. This motor is driven by an alternating current. Stator and the rotor are the two important parts of the AC motors. The stator is the stationary part of the motor, and the rotor is the rotating part of the motor. AC motors are classified into two types they are synchronous motor and induction motor. induction motor is again classified into two types they are single phase and three phase. The three phase AC motors are mostly applied in the industry for bulk power conversion from electrical to mechanical and for small power conversion, the single phase AC motors are mostly used.

Fig 5. AC motor

F.GSM Modem

Global system for mobile communication is a communication module that supports 2G,3G,4G networks. GSM modem will send out an SMS to the user using AT commands. It provides a real-time notification. It increases the response time of the user. The GSM Modem shown in Figure 6 is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface.

Fig 6. GSM modem

II. LITERATURE SURVEY

Tadayoshi developed an automatic prawns feeder which had the capability of sensing uneaten feed. Noor et al.,designed an automatic prawns feeder using PIC microcontroller. The basic components of the feeder are pellet storage, former, stand, DC motor and microcontroller. While several automatic prawns feeders are available in developed nations, they are scarce in Nigeria and other developing countries, mainly attributable to the cost of importation.

Mohapatra et al., developed and tested a demand prawns feeder, fabricated with Fibre Reinforced Plastic (FRP) material. The feeder was specifically for carp, and was tested in outdoor culture systems. Demand feeders, controlled by the prawns needs, could be bait- rod (pendulum)- type or submerged plate-type.

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In their design, Anyadike et al.,utilized a plastic hopper, with a galvanized- metal discharge chute and a valve attached. The device is capable of discharging 240 g of pelleted feed in 120 seconds. The objective of this work was to develop and evaluate the performance of an automatic prawns feeder- to enhance aquacultural practice.

III. METHODOLOGY

The design of these automatic shrimps feeder comprised of main parts namely micro controller, real time clock. The controller of this system, a 4x4 keypad used as input device which provides the user ability to set timer and motor speed. Apart from that, LCD display played a major role in illustrating the idea entered by the user before AC motor start operate. AT Mega 328 micro controller was employed as main controller output of AC motor. As for the software design, programming of AT Mega 328 was done with the aid of embedded C language. The block diagram as shown in figure 7.

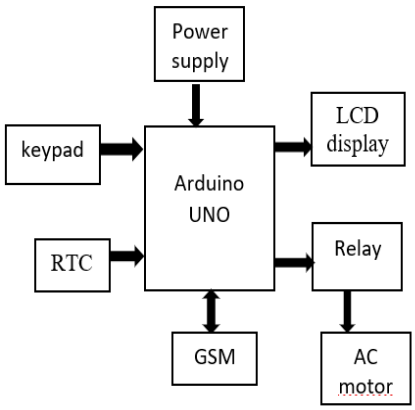

Fig.7 Block diagram

Automatic shrimps feeder is designed such a way that when program is executed it displays two different modes they are mode 1 and mode 2.
flow chart of mode1 as shown in figure 8. When we set the program to mode1 it displays to set the next feed if present time is equal to the next time if the condition is satisfied then automatically motor comes to on state if no then we read time. But initial set time will be not equal to present time to overcome that problem we are using flag if set flag is equal to zero then we set next time if no then check the timings.

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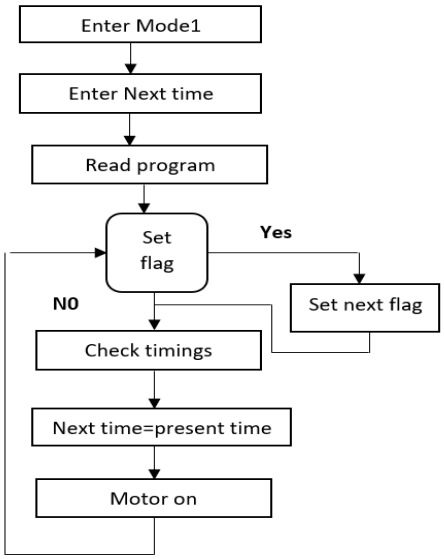

Fig 8. flow chart of mode 1

Flowchart of mode2 as shown in figure 9. flowchart shows the flow of P2 program next read the program if the present time is equal to the next time, if that condition is satisfied motor on and feed is spread if the condition is not satisfied again the program is Read.

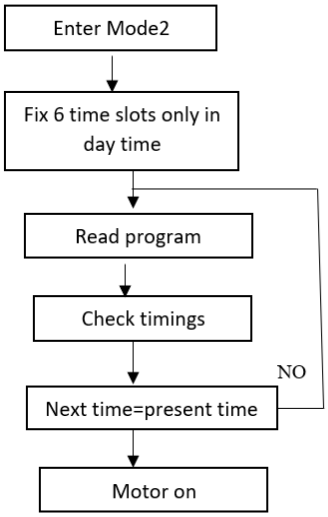

Fig 9. flow chart of mode 2

First the connections have to be made accordingly block diagram and a connector is used to connect the Arduino and pc as shown in Figure 10.
Real time clock, keypad, GSM and LCD are interfaced to the Arduino board. Enter next time with the help of keypad, if current time is equal to next time then according to the programme the microcontroller sends information to the owner that feeder is on for program1 using GSM. The output obtained as follows as Figure 11. Here connect one end of the wire to AC motor and another to power supply. whenever switch on the power supply it reads the Mode (1 or 2) if the program is set to mode1 it checks the present time and next time. If present time is equal to the next time then motor on and food will be spreaded. If the program is set to Mode2 then in program P2 time is fixed so feed is spreaded through the fixed time.

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Fig10. Hardware setup

IV. RESULTS

LCD display When the menu is set to mode1, the motor will be on when current time is equal to next time the feed will be dispensed through the food dispenser 1 minute in 1 minute it rotates for every 20 seconds. LCD displays feeder is on for p1 motor on as shown in figure 11 and sends SMS to particular person that feeder is on for p1 mode through GSM shown in figure 12.

Fig11. LCD display the status of mode 1

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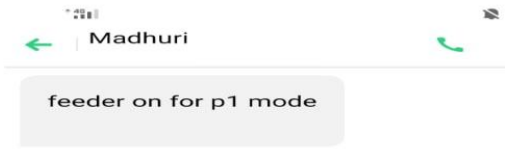

Fig12. Mobile phone SMS display the status of mode 1

LCD display When the menu is set to mode2, for every two hours in the day time the feed will be provided i.e.,6,8,10,12:8,14 respectively. when the shrimps grow larger the number of times to feed should be less but the quantity to be fed is needed to be increased. When current time is equal to next time. LCD displays MOTOR ON 1Kg as shown in figure 13, motor on and sends SMS to particular person that feeder is on for p2 mode through GSM shown in figure 14.

Fig13. LCD display the status of mode 2

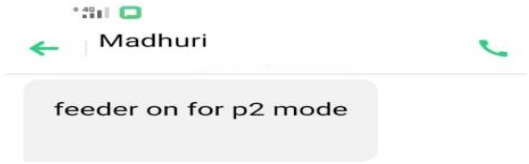

Fig14. Mobile phone SMS display the status of mode 2

V. CONCLUSION AND FUTURE WORK

It is necessary to have a clear knowledge to culture shrimps, without clear knowledge no person can use it successfully. We can earn more foreign exchange by doing shrimps culture intensively.Unlike manual feeding, automatic feeding helps not only manage feeding more efficiently reducing left over feed but also saves labour costs.
In future, the dimension and material of an automatic feeder can be improved and by adding other modules we can increase the water quality. And further a mobile based app will be added which can update the information of the feeder remotely through a mobile network. And in further we can also add different type of sensors like temperature sensor, PH sensor.

REFERENCES

[1] Avnimelech and Yoram, Shrimp and Prawns Pond Soils: Processes andManagement, Elsevier Science, 2003.
[2] D. S. Lesmana, Kualitas Air untukIkanHias Air Tawar, PenebarSwadaya, Jakarta, 2001.

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[3] G. L. Ethan and T. L. Ku, "Oxygen and Carbon Isotope Fractionationin Biogenic Aragonite: Temperature Effects,"Elsevier, vol. 59, pp.59 74,1986.
[4] WWF Indonesia: Budidayaudangvannamei, Seri Panduan PerikananSkala Kecil, WWW-Indonesia, 2014.
[5] Andriyanto et al., "Analisis faktor-faktor produksi usaha pembesaran udang vanname (litopenaeus vannamei) dikecamatan paciran kabupaten lamongan jawa timur; Pendekatan fungsi cobb-douglass," Jurnal ECSOFiM, vol. 1, no. 1, 2013.
[6] E. Kaligis, "Growth response of white shrimp (LitopenaeusVannamei) reared in low salinity medium, fed differentprotein and calcium levels," JurnalIlmu dan TeknologiKelautanTropis, vol. 7, no. 1, pp. 225-234, 2015.
[7] Baniqued et al., Microcontroller Based Prawns Feeder, Mapua InstituteTech, 2009.
[8] S. J. Yeoh, F. S. Taip, J. Endan, R. A. Talib, and M. K. S. Mazlina, "Development of automatic feeding machine foraquaculture industry," Pertanika J. Sci. & Technol., vol. 18, no. 1, pp. 105-110, 2010.
[9] B. M. Jamal and and M. Faiz, "Control system of fish feeding devices in actual pond," Applied Mechanics andMaterials, vol. 554, pp. 2-14, 2014.
[10] Ogunlela and Adebayo, "Development and performance evaluation of an automatic fish feeder," Journal ofAquaculture Research & Development, 2016.
[11] P. Jiang, H. Xia et al., "Design of a water environment monitoring system based on wireless sensor networks,"Sensors, vol. 9, pp. 6411-6434, 2009.
[12] B. A. Md Zain et al., "Modelling and control of fish feeder system," Applied Mechanics and Materials, vols. 465466, pp 1314-1318, 2014.
[13] E. Ozigbo, C.Anyadike et al., "Development of an automatic fish feeder," AJRTC, vol. 10, no. 1, pp. 27-32,2016.