Automatic Feeder for Poultry Farm

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Abstract
This project is to monitor the automatic feeder without the interruption of man power in the poultry sheds. In this project, we have PIC controller and GSM to monitor the system automatically by notifying the owner of poultry by sending a SMS which contains the information regarding the main feeder container. We have also used the ultrasonic sensors to measure the distance between the valve and grains in the feeder trays and the main tank, after measuring the distance it opens the outlet of feeder, if the grains are below the level and close the valve when it reaches to the level.

Keywords: Feeder Bowl, GSM, Motor Driver, PIC Controller, Outlet of feeder, Ultrasonic Sensor

INTRODUCTION

In India, the poultry farm is one of the major small scale businesses that are owned by many farmers. In the poultry, different kinds of poultry feeds are used to feed the birds. In many poultry farms the conventional method of filling the feeder trays manually is used for feeding the birds, in this process the feeder trays were filled two to three times in a day. And the wastage of poultry feed was approximately equal to twenty per cent in every month if we consider the poultry farm of 100 birds. If we calculate the total wastage per annum that value is equal to the investment of one month's poultry feed [1].

Grain feeders are used in feeding poultry birds. The grains fall in the feeder and the birds feed from it. The amount of feeders provided for a poultry farm should be according to amount of birds available [2]. There are many feeders available for large scale poultries. Automatic feeding machines are available for both layer breeding and broiler breeding. These systems are adoptable for large scale poultries but for small and medium poultries it's not worthy to adopt these automatic feeders to feed poultry birds. Small and medium scale poultries are normally found in rural areas owned by farmers. For them that equipment cost is itself the total investment of project [3].

In some poultry, they use the conventional method of feeding, i.e., filling the containers with the grains and foods manually. The problem encountered by this method was, the need to continuously provide the food, be alert and conscious of the food remaining in cages by the farmers. The sufficient amount of the food provided Also cannot be determined clearly [4]. There is much waste and is non-economical. Farmers face difficulties to manage their business effectively because they need to be around the cages every time to monitor the poultry.

OBJECTIVES

To develop a model of automatic feeder that is efficient and affordable to the poultry owners.
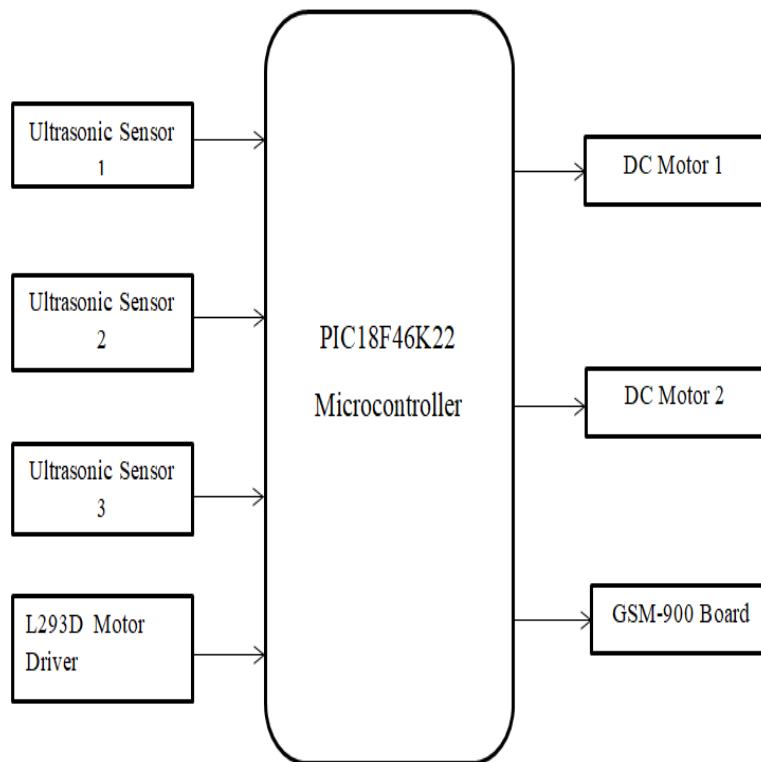
BLOCK DIAGRAM

Figure 1: Block diagram of model.

Fig. 1 shows the block diagram. In this project, we have used PIC18F46K22 microcontroller because it has high computational performance with addition of high endurance, flash program memory. This microcontroller is used for monitoring the real world applications. It has 36 input-output pins and high performance RISC CPU. It operates on 3.3V to 5.5V supply.

Ultrasonic sensor HC-SR04 uses sonar to determine the distance. The transmitter sends a signal and when it is stuck with an object the signal gets reflected back and received, the time between transmission and reception of signal is used to determine the distance. It operates on 5V DC. It has 3 pins the first is trigger that is input, second one is an echo which is output and the third one is ground.

L293D is a 16 pin IC. It is used because it allows controlling two DC motors simultaneously. It is a motor driver which allows DC motor to rotate in clockwise or anticlockwise directions with full speed or less speed.

DC gear motor operates on 5V−12V supply. In it. the current electrical energy is converted into the mechanical energy. Its speed can be controlled by variable supply voltage or by changing the current strength in the field windings.

GSM-900 Board operates on 4.5V−5V supply voltage. UART communication protocol is used in the GSM 900. It has three indicators that are PWR (displays status of SIM900), status LED (displays power status of GPRS module), net LED (after the GPRS module power on, you need to press the POWER button for a minute to make the SIM900 module to power on). It also consists of a reset button (resets the SIM900 module).
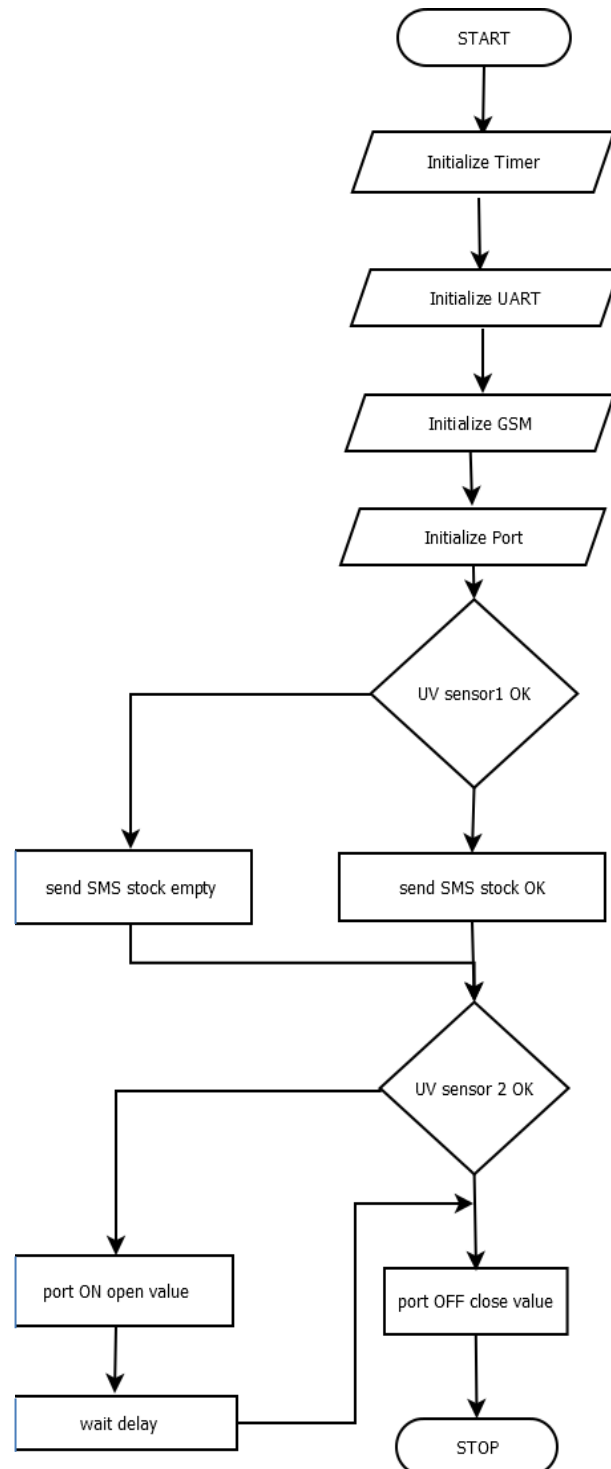
FLOWCHART

Figure 2: *Flow chart of automatic feeder for poultry farm*

WORKING MODEL

Figure 3: Front view of project model.

Figure 4: Behind view of project model.

This project model is used for feeding the birds in any type of poultry farms. In this project, we used two feeder trays and one main container with the full stock of grains and all these three containers have an ultrasonic sensor placed at the top of their openings. When we switch on the power supply all the components start working simultaneously. The ultrasonic sensors and motor drivers are interfaced to the controller as inputs. The ultrasonic sensor starts sending the signals into the feeder trays, and when the signal gets stuck by some layer of grains it reflects back to the transmitter. During this process of transmission and reception, it measures the distance between the outlet of the feeder and the quantity of grains present in feeder trays. If the grains are below the certain set level the outlet of the feeder starts to rotate with the help of the DC gear motors that are interfaced at the outlets. The motor driver drives the two DC motors alternately. This process of closing and opening the outlet of the feeder continues till the feeder trays get totally filled. On the other side the main container is also analysed by the ultrasonic sensor. In this also the same transmission and reception process is done. For this, we have used the

GSM module for sending the SMS to the owner of poultry farm. It notifies the owner every time the main container is empty, half and full.

RESULTS AND DISCUSSION

Figure 5: Container is fully filled.

The above Fig. 5 shows the image of the main container which is filled fully by the feed. The ultrasonic sensor senses the quantity of the feed and the SMS is received by the owner that notifies about the status of the container. Fig. 6 shows the image of the SMS received by the owner at the time of execution.
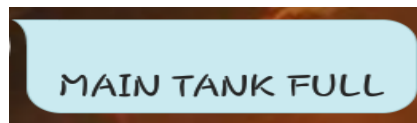

Figure 6: Message display.

Figure 7: Container is half filled.

The above Fig. 7 shows the image of the main container which is half filled by the feed. The ultrasonic sensor senses the quantity of the feed and the SMS is received by the owner that notifies about the status of the container. Fig. 8 shows the image of the SMS received by the owner at the time of execution.
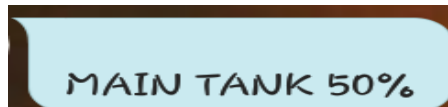
Figure 8: Message display.

Figure 9: Container is empty.

The above Fig. 9 shows the image of the main container which is empty. The ultrasonic sensor senses the quantity of the feed and the SMS is received by the owner that notifies about the status of the container. Fig. 10 shows the image of the SMS received by the owner at the time of execution.
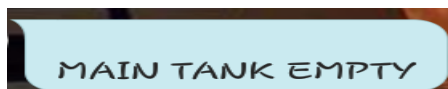

Figure 10: Message display.

Table 1: Observation table.

Sr.no	Height of Container(22cm)	Status
1	20cm - 11cm	Main container is full
2	11cm - 6cm	Main container is 50%
3	Below 6cm	Main container is Empty

CONCLUSION
The desired output has been achieved after the experiment of the project. The gear motor received the signals from the ultrasonic sensor and the opening and closing of the outlet of the feeder was controlled effectively.

After the execution of the project model, we observed that the wastage of the grains is reduced to sixty per cent from the each feeder tray. By this reduction of the wastage of grains the owner will be able to save the investment of whole one month's poultry feed in a year. This can be used to provide hygienic food and some disease can be decreased and can be used for multiple purpose.

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