

SMART POULTRY FARM INCORPORATING GSM AND IoT

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Abstract - The Chicken poultry industry is an important industry for sustainable food supply in our country. The development of an automatic chicken feeding machine can be very useful to the growth of the poultry industry. In existing system contains temperature and humidity detection and the chickens need a presence of manpower to manually give the food to the chickens. The use of proposed system can replace the worker for feeding the chicken thus overcome the labor problems in the industry and introduce a semi-automatic process in the poultry industry. The Proposed system can be applicable in Poultry Farm, in addition prevention against theft of chickens is equally important as it safeguards revenue losses. Considering the health of chickens gas sensor is placed to indicate the presence of harmful gasses like Ammonium. Fire accidents can be prevented with the help of fire sensor and alerts the user. Temperature and humidity is monitored and maintained in the poultry farm with the help of temperature sensor. The data obtained from sensor are updated in IoT cloud.

Key Words: Poultry Farm, Temperature, Humidity, Ammonia gasses, Fire, Theft, GSM, IoT.

1. INTRODUCTION

Poultry farming is the form of animal husbandary which raises domesticated birds such as chickens, ducks, turkeys and geese to produce meat or eggs for food. Poultry production is a very important source of livelihoods for most rural communities. Because it has good quality of protein and it increases profitability. In Poultry, there are three types of breeds. They are,

- Laying breeds – used for meat purposes
- Meat breeds – used for laying eggs
- Dual breeds – used for breeding purpose to obtain fertilized eggs.

Our project is based on poultry chickens. Smart poultry farm has a great impact on increasing growth of chicken in order to provide better quality food. In contemporary world automation plays a vital role. Automation of poultry farm by using Internet of Things and Global System for Mobile Communication. Chicken is the most favourite produce in today's world because it is a nutrient rich food with high protein, low fat and low

cholesterol than other poultries. Environmental parameters of a poultry farm such as temperature, humidity, ammonia gas and intensity of light are monitored and controlled automatically to increase the productivity of chicken. Food valve also controlled and monitored with the help of servo motor without human interference. By connecting all the sensor modules to the arduino all sensor values are acquired then using Wi-Fi module it will be uploaded to the web page. The person in-charge of the poultry farm can get the internal environmental situation of poultry farm through PC or mobile phone using internet. This system will control temperature, humidity, ammonia gas and intensity of light with the help of respectively cooling fan and light ON/OFF without human interference. Based on the threshold values it will switch ON/OFF the devices. System design provides automated poultry, reduces man power and increases production of healthy chicken.

From the last few decades, around the globe, there has been an increased level of awareness regarding the food safety and there has been a high demand for better quality food. This has forced many countries to adopt new protocols to change all manual farms into automated farm. In this way, smart poultry farm has a great impact on increasing productivity of chicken. This paper focused on modern technologies for a poultry farming to control all environmental parameters which effects on the growth of the chickens. If environmental condition is not up to the mark then there may be harmful for digestive, respiratory and behavioural change in the chickens. If chickens may get suitable atmosphere and proper water then it may grow rapidly and health of chickens will be good so the weight of the chickens will be increases. In the growth of the chicken climate plays a vital role. Smart poultry farm is designed in such a way that the climate can be changed by cooling fan and bulb. Environmental parameters are monitored and controlled with the help of arduino. Monitored sensor values can know the internal environment of poultry farm are stored in the cloud and the operation is either control or monitor by IoT.

1.1 OBJECTIVE

The main objective of this system is to provide a automated controlled poultry farm in order to maintain the healthy environment and increase the growth of the poultry, to monitor and control environmental parameters like

temperature, humidity and ammonia gas which affects the growth of the poultry and to provide the safety measures like fire detection and theft detection to safeguard the poultry birds. To atomize the poultry farm in aspect of feeding and watering.

2. LITERATURE SURVEY

[1] The system demonstrates the creation of innovative systems that facilitate control and supervision regardless of distance and time. In a poultry house, both temperature and humidity levels should be monitored regularly in ensuring the system runs smoothly. It needs to be monitored 24/7 to avoid incidents that caused the temperature rises too high. [2] The environmental parameters like temperature, light intensity and ammonia gas are monitored and controlled automatically. The person in-charge can able to get the knowledge regarding the interior atmosphere of poultry farm by receiving a message on his mobile number. Based on the message received the owner can take appropriate action to control the parameters. In addition we have also designed to control and monitor the food valve so that sufficient food is always available in the plate. [3]. this paper is highlighted the technology based solution for low cost, asset saving, quality oriented and productive management of chicken framing. This study intended to explore utilizing an Intelligent System which used an Embedded Framework and Smart Phone for monitoring chicken farm to control environmental parameters using smart devices and technologies. [4] This system will warn the person in-charge about the various environmental parameters like temperature, humidity, etc. by sending message to the registered mobile number. The person in-charge can initiate a required action by sending a message back and when the system doesn't receive a command in a particular time period it will initiate the action automatically. [6] The system could monitor surrounding weather conditions including humidity, temperature, climate quality, and also the filter fan switch control in the chicken farm. The system was found to be comfortable for farmers to use as they could effectively control the farm anywhere at anytime, resulting in cost reduction, asset saving, and productive management in chicken farming.

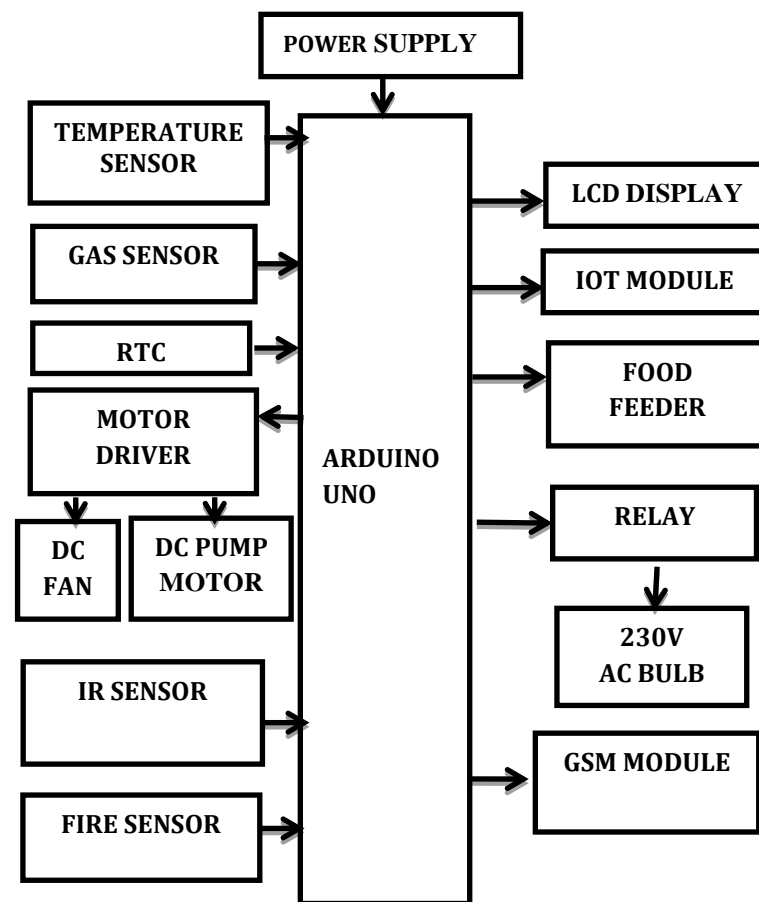
3. EXISTING SYSTEM

In the existing system, environmental parameters like temperature, humidity and harmful gas like Ammonia are monitored automatically and controlled manually. In this existing system, feeding is carried out manually and they found difficulties in feeding because they couldn't know when the food in the tray got over.

4. PROPOSED SYSTEM

In this proposed system we are monitoring temperature, humidity and harmful gas like Ammonia. If the temperature goes below the threshold value then bulb will turn ON. If temperature exceeds the threshold value then DC Fan will turn ON. If harmful gas is detected then cooling fan will turn ON. Also, the security measures like fire detection and theft are detected and the alert message is sent to the user via mobile phones using GSM Module. In addition to that automatic food feed and water feed is done with the help of servomotor and dc pump motor using RTC. All the data fetched from the sensor are updated to cloud therefore the operation are either control or monitor by IoT.

5. BLOCK DIAGRAM

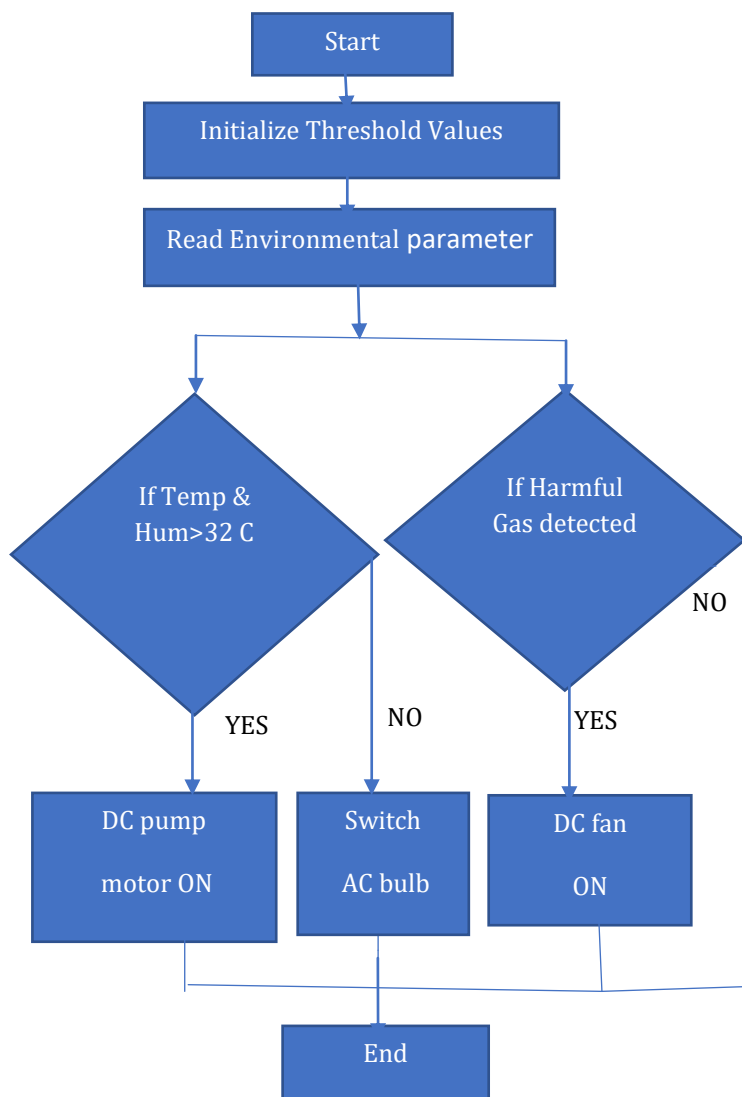


5.1. WORKING

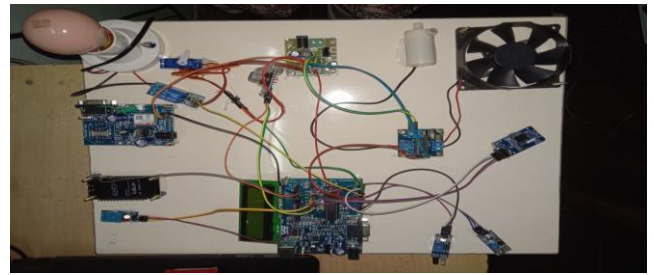
In this system, we use ARDUINO UNO (ATmega328P) microcontroller which acts as brain of the system, because the entire system program instruction stored in it. Here we have temperature sensor(DTH11) which whenever there is a high temperature and immediately start water sprinkling using DC pump motor as well with detection of low temperature on the 230 volt bulb to maintain the temperature. We know that humidity is depend on the

temperature. When the temperature is high, humidity is low and vice versa. As it is a farm, the chance of formation different types of gas from manure of chicken is comparatively more. So that gas sensor(MQ2) sense the presence of gas and immediate evacuation to be done using dc fan and we have automatic food feeder which feed food according to time with the help of servomotor and feed the water with pump motor by use of RTC. IR Sensor will detect the theft person and Fire sensor detects the flame which intimate to user by using GSM Module. All the data fetched from the sensor are updated to cloud therefore the operation are either control or monitor by IOT.

6. FLOW CHART



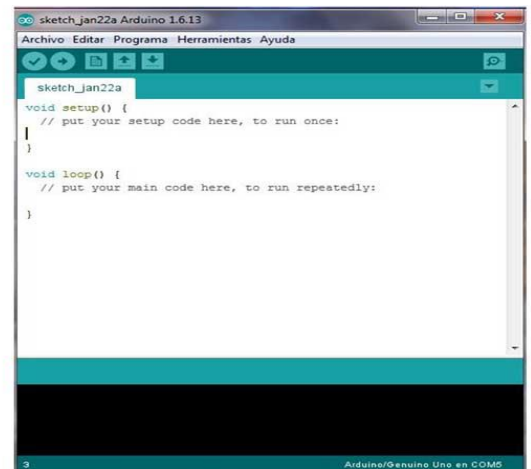
6.1. HARDWARE IMPLEMENTATION



Smart poultry farm incorporating GSM AND IoT

ARUDUINO UNO ATmega328p power supply,ESP-12E NODEMCU for updating farm information to the owner, GAS SENSOR MQ-2 to detect the presence of ammonia, TEMPERATURE SENSOR to detect the temperature and humidity of the farm, IR SENSOR to prevent theft with the help of transmitted and receiver IR radiation. FIRE SENSOR to detect the presence of fire accidents with the help of smoke.SERVO MOTOR it helps in automatic food and water feeding.

6.2. SOFTWARE IMPLEMENTATION



Arduino IDE

EMBEDDED C it is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software.

ARDUINO IDE The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them

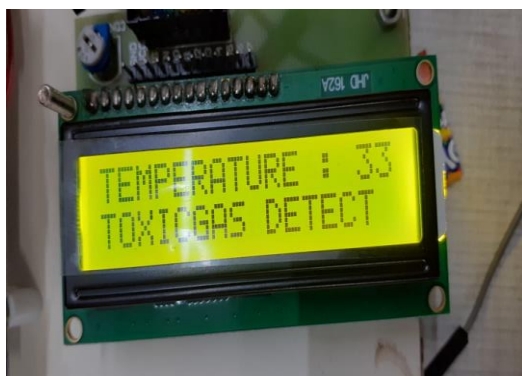
6.3. THRESHOLD VALUES

Environmental parameters	Target range
Temperature	28 - 32 °C
Humidity	60 - 80 %
Ammonia gas	More than 40 %

7. OUTPUT



LCD Displaying the Fire detected



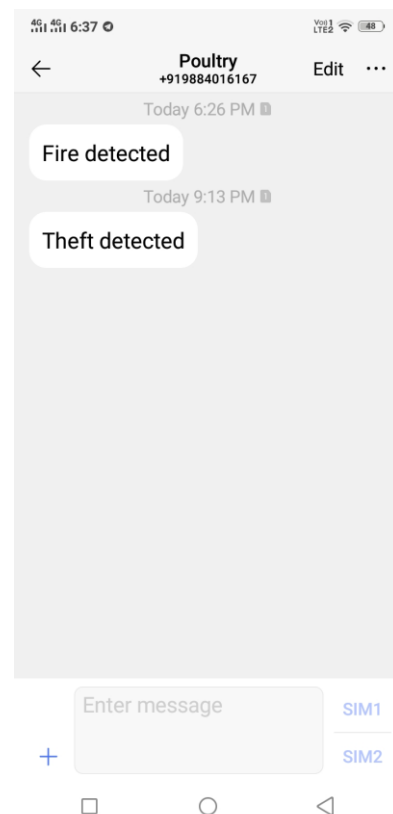
LCD Displaying the Temperature and toxic gas detected



LCD Displaying the theft detected



LCD Displaying the time for feeding Food and water by using RTC



Alert message sent to the user

7.1. APPLICATIONS

- This system can be used in both small scale and large scale poultry farm.
- Increase profitability and generating high revenue from poultry farm.
- To yield a good sources of food from their eggs and meat.
- Small investment and short time to income

[6] Siwakorn Jindarat, Pongpisitt Wuttidittachotti."Smart Farm Monitoring Using Raspberry Pi and Arduino".IEEE 2015 International conference on Computer, Communication and Control Technology (14CT 2015),April 21-23 in Imperial Kuching Hotel, Kuching, Sarawak, Malaysia 2015.

8. IoT CLOUD DATA MONITORING

LogID	DATA	DATE_TIME
1	TEMPERATURE_HIGH_	1/1/1970_ 5:30:36
2	TEMPERATURE_HIGH_	1/1/1970_ 5:30:38
3	TEMPERATURE_HIGH_	1/1/1970_ 5:30:40
4	TEMPERATURE_HIGH_	1/1/1970_ 5:30:41
5	TEMPERATURE_HIGH_	1/1/1970_ 5:30:43
6	TEMPERATURE_HIGH_	1/1/1970_ 5:30:44
7	TEMPERATURE_HIGH_	1/1/1970_ 5:30:46
8	TEMPERATURE_HIGH_	12/3/2021_ 11:47:59
9	TEMPERATURE_HIGH_	12/3/2021_ 11:48:5
10	TEMPERATURE_HIGH_	12/3/2021_ 11:48:10
11	TEMPERATURE_HIGH_	12/3/2021_ 11:48:14
12	TEMPERATURE_HIGH_	12/3/2021_ 11:48:20
13	TEMPERATURE_HIGH_	12/3/2021_ 11:48:25
14	TEMPERATURE_HIGH_	12/3/2021_ 11:48:30
15	TEMPERATURE_HIGH_	12/3/2021_ 11:48:35
16	TEMPERATURE_HIGH_	12/3/2021_ 11:48:40
17	TEMPERATURE_HIGH_	12/3/2021_ 11:48:45
18	TEMPERATURE_HIGH_	12/3/2021_ 11:48:50
19	TEMPERATURE_HIGH_	12/3/2021_ 11:48:55
20	TEMPERATURE HIGH	12/3/2021_ 11:49:0

9. REFERENCES

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