

A witted Management of Poultry Farm using IoT

Prof. Shruthi B Gowda¹, Rashmitha K²,
Rakshitha K³, Vijaylaxmi⁴
Department of Computer Science and engineering
Vivekananda Institute Of Technology,
Bengaluru, India

Abstract— Poultry is one of the most important growing economic segments of agricultural sector in India today. Nowadays because of standardized farming management and good manufacturing practices, chicken production in the world has been increasing gradually. In contemporary world automation plays a vital role and concept of Internet of Things (IoT) is also emerging very fast, the re is an approach to convert traditional systems into automated systems. The project focuses on automation of poultry farm using IoT technology to perform various management related things. The environmental factors which affect the health of chicken such as temperature, humidity, light and Ammonia gas are monitored and the manual jobs like food feeding, water supply system, cleanliness are managed. Monitoring of chicks as per cycle is done hence giving an alert to the owner. Weight of the chicken is measured for quality production. If all these parameters are maintained, the production and quality of chicken increases0.

Keywords — environmental factors, Monitoring, Weight, cleanliness.

I. INTRODUCTION

From last few decades, there has been an increase in the chicken production across the world because of standardized farming management and good manufacturing practices and also there has been an increased level of awareness regarding the safety of food products like chickens and there has been a huge demand for good quality chicken food. According to world's agricultural produce survey, chicken is the most consumed produce, as it is a nutrient rich food providing high protein, low fat and low cholesterol. In the today's world, automation plays a very important role. This project focuses on an automation of poultry farm by using wireless sensor network and mobile communication system. Internet of Things (IoT) technology is used for automation.

A technology-based solution for low cost, asset saving, quality oriented and productive management of chicken framing is proposed. Poultry business is practiced on large as well as small scale. A long with this, an alert of monitoring the chicks as per the cycle is given to farmer and the rate of production is monitored. The management and monitoring of the farm can also be done through IoT based system. Which keeps track of the management of poultry farm from anywhere and at any time. Most of the businessmen and farmers use traditional poultry farming

methods. The traditional poultry farms lack proper and effective management to maintain health and growth of chicks.

Computer Engineering & Technology (IJARCET) Volume 5, Issue 6, June 2016. The new model by using advanced modern technology to make traditional chicken farming smarter. Smart farm gives the environmental parameter statistics like temperature, humidity, smoke, weather condition etc to the desktop computer through advanced sensors and microcontroller. The farm is connecting with smarter devices like application program, sensors, microcontroller which gives automation to the chicken poultry farming.

II. LITERATURE SURVEY

[1] Rupali B. Mahale, Dr. S. S. Sonavane, "Smart Poultry Farm: An Integrated solution using WSN and GPRS based network", International Journal of Advanced Research in

[2] Abdul Muiz Fathi Md. Abas, "Chicken farm monitoring system farm", International Conference on Computer & Communication Engineering, may 2016. This focuses on the collecting, storing, and controlling the information of the chicken farm so that the high quality and quantity of the meal production can be produced. This system is developed to solve several problems in the chicken farm which are many human workers is needed to control the farm, high cost in maintenance, and inaccurate data collected at one point. The proposed methodology really helps in finishing this project within the period given.

[3] Danar Wicaksono, Ratna Mayasari, "Design and Analysis Automatic Temperature control in the Broiler poultry farm based on wireless sensor network", 2nd International Conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), Nov 2017. Here wireless Sensor Network technology which can monitor and control the condition of temperature and humidity in the poultry cages. This system consists of 3 sensor nodes and coordinator node with a star topology.

[4] Geetanjali A. Choukidar, Prof. N.A. Dawande, "Smart poultry farm automation and monitoring system", IEEE, June 2017. Sensors are used to control temperature, water

level, smoke, gas and food dispensing. All these sensors are connected with the raspberry pi which can control and monitor all data. The data is transmitted using GPRS, and detailed record of poultry farm with status of environmental conditions is maintained at a webpage.

[5] Kadam Anaji Sitaram, "IoT Based Smart Management of Poultry Farm and Electricity Generation", IEEE, June 2018.

The paper focuses on automation of poultry farm using IoT technology to perform various management related things. The environmental factors which affect the health of chicken such as temperature, humidity, light and Ammonia gas are monitored and the manual jobs like food feeding, water supply system, cleanliness are managed. If all these parameters are maintained, the production and quality of chicken increases.

III. EXISTING SYSTEM

Most of the businessmen and farmers use traditional poultry farming methods. The traditional poultry farms lack proper and effective management to maintain health and growth of chicks. All the poultry activities like filling the water tank,

time to time feeding of chicks, cleaning the chick's waste and light control in the farm are done manually. Hence a large manpower is required. Some of the factors in the existing system are considered, which are as follows:

- Ammonia Gas: There is no proper system for management of ammonia gas. Ammonia gas is hazardous to the health of chicks. Hence due to excess of ammonia gas in poultry environment, diseases are caused. It is important to control the ammonia gas in farm.
- Temperature and Humidity: Temperature and humidity are controlled naturally. Special measures are not taken to control the temperature and humidity. Rise in environmental temperature and humidity is also dangerous for the chicks.

DISADVANTAGES

- 1) The system requires more of manpower.
- 2) The system does not support for the reduction of ammonia gases which is more hazardous.
- 3) No proper measurements are taken for the maintaining temperature and humidity.
- 4) Cleanliness is difficult for maintenance.
- 5) Due to man power and no proper maintenance it is more cost effective.

IV. PROPOSED SYSTEM

In the proposed system, almost all factors including environmental parameters such as temperature, humidity, ammonia gas, light and manual works like food feeding, water supply system are monitored and fully automated system is designed to perform these activities. This system reduces manpower, improves health and growth of chicks and increases eggs production also application is developed which is used for monitoring farm activities and internal environment. In addition to this, an alert of monitoring the chicks as per the cycle which is tracked by all these parameters is given to farmer and the rate of production is monitored. Such as:

A. Ammonia gas control System:

The ammonia gas in the poultry farm environment is sensed with sensor and the data is sent to Microcontroller. A threshold value is set. When the ammonia gas level crosses the threshold value, relay gets activated and exhaust fan is ON.

B. Temperature and Humidity control System:

The sensor is placed in the poultry farm to sense the temperature and humidity in the poultry farm. Exhaust fan and ventilation window will get ON when the temperature and humidity level crosses the threshold value.

C. Water supply System:

Water supply system is designed for cage system to supply water time to time. Ultrasonic sensor is used for this purpose. It will determine the water level. When the water level will decrease than the specified level, the water pump will start and fill water tank again. When the water tank is full it will stop automatically, thus water will not be wasted.

D. Food feeding System:

Large capacity storage bins are used to hold the food. Where the food is hold several days' worth of feed. Refilling of pans is done when low on feed and placed at back height. This helps in decrease in waste of feed and safer for birds while in use

E. Light System:

Research says that, for maximum egg production, enough light needs to be provided to the chicks i.e,16 hours of light is essential. Part of required light is obtained in the form of sunlight (approx.12hours) and remaining part of the light is provided by an electric bulb. Hence automation is done.

F. Notification Provider:

In this project, Blynk application is used for providing notification. Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

ADVANTAGES

- 1) The proposed system converts traditional farm into smart farm.
- 2) It provides quick and accurate information about different parameters to Poultry owner.
- 3) The System is less expensive and affordable for not only poultry owners but also all those who look up for poultry farming as their side business.
- 4) The smart monitoring of different parameters like temperature, light, humidity, gas etc. are done using wireless sensor network.
- 5) Production and health of poultry product improves.
- 6) Cleanliness of the farm becomes easier.
- 7) Monitoring of chicks as per cycle is done hence giving an alert to the owner.

V. SYSTEM ARCHITECTURE

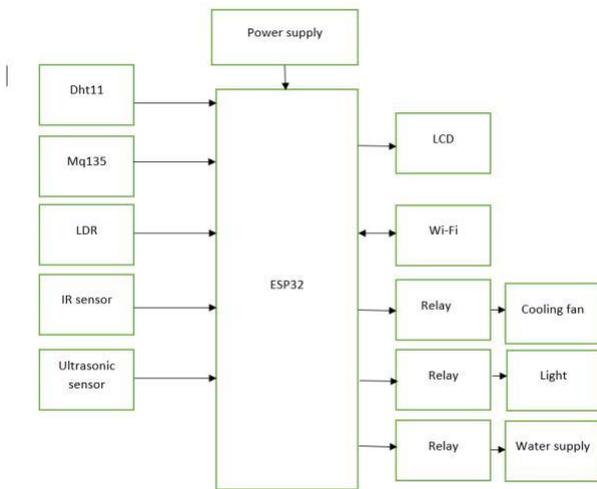


FIG. BLOCK DIAGRAM

- **Dht11**- It is the temperature and humidity sensor. This sensor is used to measure the temperature and humidity level in poultry farm.
- **Mq135**- Detects wide range of gases. It is used to detect ammonia level in a poultry farm.
- **LDR**- It is a light sensitive device. It is used when there is a need to sense the absence and presence of the light. It is used in light system in poultry farm only during critical conditions like darkness in the rainy season.
- **IR sensor**- It measures heat of object as well as detects the motion. It is used for feeding system which is placed on top of the poultry feeder. It detects whether the feed is present in the feeder or not.
- **Ultrasonic sensor**- Measure ultrasonic signals. It is used in the water supply system to check the water level in a water tank in a poultry farm. It is used for the measure distance in between sensor and object in front of the sensor.
- **Relay**- Acts as a switch. Therefore, here relay circuit is used which is capable of handling and switching high voltage circuits.

VI. RESULT AND DISCUSSION

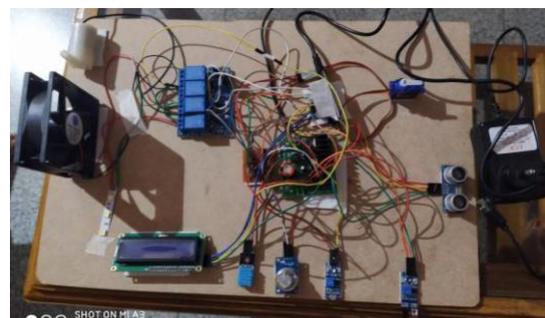
The system sensors read all environmental parameters in the poultry farm. Esp-32 microcontroller is used to monitor the values received from sensors and perform corresponding actions. If input value is greater than the threshold values, send high output to the port else if the input values are less than threshold values then again the parameters will be read. Four environmental parameters such as temperature, humidity, ammonia gas and light, and activities like water level system, food feeding system and cleanliness system are monitored. If humidity increases, the exhaust fan will be ON. If temperature crosses its threshold value, the cooling fan will be ON. If ammonia gas level increases, ventilation window will be ON and water sprinkler is ON when there are numerous hazardous

gases are produced. Similarly, if the water level decreases, and if the feeder gets empty, the water pump and relay will be ON respectively and it is filled automatically. In critical conditions, when darkness is detected by LDR, the bulb is ON, this helps in the maintenance of proper temperature and humidity around the farm. Monitoring of chicks as per cycle is done hence giving an alert to the owner, the alert message is sent to the mobile of the owner. Even this reduces the manual power like remembering and marking the cycle of the production. Weight of the chicken is measured for quality production, this is measured through the weight gauge and the production rate is notified through the graph which can be viewed by the owner through the mobile application. The current status such as environmental parameters like weight of the chicken and some important notifications are displayed on LCD and can also be sent to the owner through mobile application.

VII. CONCLUSION AND FUTURE ENHANCEMENT

The proposed system converts traditional farm into a smart farm. It provides quicker and accurate information about different parameters to Poultry owner. The System is less expensive and affordable for not only poultry owners but also all those who look up for poultry farming as their side business. The smart monitoring of different parameters like temperature, light, humidity, gas etc. by using wireless sensor network. Production and health of poultry product improves. Cleanliness of the farm becomes easier. Sufficient electricity is generated itself in the farm. Poultry farming is practiced from very long time not only in India but across whole world. But from last few years, it has been practiced in a scientific manner. The backyard poultry has turned in to commercial poultry farming and a gainful and dignified business enterprise in India and elsewhere in the world.

Since the poultry farming can be practiced as a supplementary or second income generating mechanism, the landless labours and small farmers find a support in this business. In fact, poultry farming has become an indispensable component of the agricultural industry in India. Thus the proposed project design provides an efficiently automated monitoring system. Traditional poultry farm can be converted into modern and automatic poultry farm using IoT. This automated poultry farm is used to improve the health and growth of the chicken. So poultry owner can make a huge profit and good earning from poultry farming business. In future, the fire alarm system can be added and automated fire extinguisher system can be designed and we can add more information about poultry farm like reminders for vaccination of the chicken, information about workers, etc. on the web page. The same system can be referred for Poly house and food preserver. And mini robots can be used for cleanliness purpose.



VIII. ACKNOWLEDGEMENT

We would like to thank the project guide Mrs. Shruthi B Gowda, Assistant Professor, Department of Computer Science and Engineering for her guidance, continuous support, Mr. Suresh Kumar S, Assistant Professor, Department of Computer Science and Engineering, for his guidance and the students who participated in the experiments, for their enthusiasm and reviews for their valuable feedback.

IX. REFERENCES

- [1] 1 Rupali B. Mahale, Dr. S. S. Sonavane, "Smart Poultry Farm: An Integrated solution using WSN and GPRS based network", International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5, Issue 6, June 2016.
- [2] 2 Abdul Muiz Fathi Md. Abas, "Chicken farm monitoring system farm", International Conference on Computer & Communication Engineering, may 2016.
- [3] 3 Danar Wicaksono, Ratna Mayasari, "Design and Analysis Automatic Temperature control in the Broiler poultry farm based on wireless sensor network", 2nd International Conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), Nov 2017.
- [4] 4 Geetanjali A. Choukidar, Prof. N.A. Dawande, "Smart poultry farm automation and monitoring system", IEEE, June 2017.
- [5] 5 Kadam Anaji Sitaram, "IoT Based Smart Management of Poultry Farm and Electricity Generation", IEEE, June 2018.
- [6] 6 Shubham Mitkari, Ashwini Pingle, "IoT Based Smart Poultry Farm", International Research Journal of Engineering and Technology, Vol. 6, Issue 3, Mar 2019.
- [7] 7 Archana M P1, Uma S K2, "Monitoring and controlling of poultry farm using IOT", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 6, Issue 4, April 2018.
- [8] 8 Eric Hitimana, Gaurav Bajpai, "Remote Mointoring and Control of Poultry Farm using IoT Techniques", International Journal of Latest Technology in Engineering, Management and Applied Sciences, Vol. 7, Issue 5, May 2018.
- [9] 9 Watcharin Sarachi, Parot Rathnapinda, "Smart Notification system for Detecting Fan Failure in Evaporative Cooling System of a Poultry Farm", 4th international conference.
- [10] 10 Md.Mahafujul Islam, Sourov Tommy, "Smart Poultry Farm Incorporating GSM and IoT", 2019 international conference.