



Food and Water Level Control Mechanism for Smart Chicken Poultry Farming

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ABSTRACT: Now a days automation plays very important role in our life. Here focus on the integration of wireless sensors and mobile system network to control and remotely monitor environmental parameters in a poultry farm. The environmental parameters like temperature, humidity, ammonia gas control etc. The person in-charge can able to get the information about the internal environment of poultry farm by receiving a message on his mobile number. So owner will able to monitor the suitable environment for the growth of chickens in poultry farm. This system design Water level control and food control mechanism with the help of sensors. It has given better quality food to chickens which in directly help to improve the quality and growth of the chicken. The detail record of poultry farm will able to view on a webpage with all environmental condition.

KEYWORDS– Poultry Farming, ATMEGA324 Micro-Controller, Wireless sensors, Remote Monitoring

I. INTRODUCTION

The ability to monitor environmental conditions is crucial and it demands a good level of research in fields ranging from the change in climate conditions in agriculture. This research focuses on the wireless sensor and GPRS network with a well known sensor integration platform using automatic sensing. Smart Sensing Platform is used to monitor the environmental Parameters in poultry farm. This will make work easier and efficient in poultry farm management. On the climate of poultry houses the health of chickens is totally dependent. If climate conditions are not up to the mark then there may be a danger of digestive, respiratory, and behavioral disorders causes to the chickens. Healthy chicken take more feed and grew rapidly. Poultry houses designed in such way that the climate can be altered by ventilation, cooling, and lighting insulation of roof, walls and floor. The birds are directly surrounded by the micro-climate. Micro-climate is the most important for health of birds. Shed's climate may be good but it may not be suitable for bird's surroundings. Take an example CO₂ is a heavy gas and its level is higher near the ground near the birds micro climate. Chickens usually have a long life animal which accepts light stimulation to continue the spawning process. The direct effects of light to chickens stimulate endocrine organs to either delay or boost maturity during the brooding period.

Most important part in chicken farming is feed. Feeding high quality, fresh and nutritious food always ensures good health, proper growth and high production. So, it is important to feed chickens healthy and nutritious feeds. It is necessary to add required vitamins and minerals to their feed. Different types of Commercial poultry feeds are easily available in the market. You can easily feed it to your birds. Along with feeding your birds high quality and nutritious feeds, always serve them sufficient amount of fresh and clean water according to their demand. The nutrient intake of birds may vary from place to place according to the seasons and climatic changes. Whenever chickens are restricted from consuming the amount of feed they desire, egg production will cease. An average laying hen will require ¼ pound of feed per day, depending on factors such as size of the chicken, weather conditions, and level of productivity. Now day's modern technologies overcome on the traditional method which is very suitable for the chicken growth. Using Wireless sensor network and DC motor system has design a food control modem for chicken. So food should not get waste and man power has reduced.

Water management for poultry farm operations is a subject of much conversation between veterinarians and live production personnel. The usage of water acidification as a preventive or treatment for disease of chickens or to improve chickens performance is probably one of the most poorly understood areas of poultry. Water acidification



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protocols for the prevention or management of certain bacterial diseases had been developed. Drinking water pH at bird level is 4.0 or below it. Poultry farm water treatment through acidification of the drinking water acidifies the crop. Water quality management in poultry farm is very important for chicken's performance. Constant and continuous monitoring of poultry is required not necessary when problems are observed but for checking regular activities inside the poultry farm. Water nutrient have not received attention until a problem arises. Owners of poultry make an effort to provide clean and adequate water quantity to the chickens in farm. Owners should also know details about the water that will be flowing through the water pipe lines.

Water and feed having strong relationship therefore, to monitor flock performance water can be used. In poultry farm the electronic controllers have the ability to monitor the daily consumption of water and gives inputs to multiple water meters. Water meter has been installed separately on the water supply pipe lines of poultry farm. When chickens in the farm are not distributed according to the sections it may increases the competition for feed and water in the poultry farm. Here we have designed a container which can be monitor and controlled by wireless sensors. Fuel sensor has been used to measure the level of water. It connects to microcontroller to perform an operation according to the requirement of water in farm. Relays have been used for indication of action performed. Once the fuel sensor indicator goes below threshold value, the DC motor will get ON by L239D that is nothing but the motor driver IC and container will be filling by water up to the certain value of that container.

II. RELATED WORK

Siwakorn Jindarat et. al. has investigate an Intelligent System which employed an Embedded System and Smart Phone for chicken farming management and problem solving using Raspberry Pi and Arduino Uno. A comparative analysis of the smart system was applied in a chicken farm. The system could monitor surrounding weather conditions like humidity, temperature, quality of climate. Filter fan switch control the environment in the chicken farm. The system has found suitable and easy for farmers to use. [1] K. Sravanth Goud et. al. has focused on the wireless sensors and mobile system network to control and remotely monitor the poultry farm. The poultry holder can able to received information about the climatic condition of poultry on his mobile number. The person can perform an action by resending the message to the system when the system failed to perform its task. Water plays an important role for cooling poultry farm. Remote sensors passing the value to the server which can be later viewed on Google spreadsheets. [2]

Muhammad Ammad-Uddin, et. al. has established, A Solution for Poultry Farming. Chicken is a high source of proteins. To control and monitor the poultry diseases author has been designed a modern chicken farm by using wireless sensors network. It helps to improve the quality and quantity of chicken. Chicken farming has two categories (1) Egg Production poultry farm and (2) Meat production Poultry farm. This proposed system will improve the productivity of chickens, quality as well as economy. [3] Islam MS, et al. has elaborated, an idea of biogas plant in poultry farm instead of diesel or natural gas generators as backup support in Bangladesh. Poultry farm required continuous power supply for monitoring and taking care of chickens. Cost of diesel and natural gas is too high. Chickens in farm can able to produce their own power from poultry wastage. The aim of this system is innovation of a biogas power plant in poultry by utilizing the poultry wastage. [4]

Fangwu Dong, et al. has designed equipment for monitoring an environment in Fowl Farm. This system monitor the environment parameters like CO₂ in air, temperature and humidity. CC2430 has been used as a data processing chip. ZigBee protocol has used for transmission and communication of the system. [5] O. M. Olaniyi, et al. has studied an Intelligent Poultry Feed and Water Dispensing System Using Fuzzy Logic Control Techniquel. Fuzzy logic system able to provide feed and water for birds during specific interval of time. System reduces workload of poultry workers, cost benefits has increased. [6]

Boopathy. S et al. has elaborated the performance of poultry farm using an embedded automation. This system discussed the measurement of different environmental parameters of the poultry farm such as temperature, humidity, level of water and valve control. [7] Drishti Kanjilal, et al. has implemented Smart Farm with advance technology. Automation systems are energy efficient and minimize the need for tedious manual labor. Agriculture is primary economic sector of India. In this system author has implemented an automatic lighting system, auto-sprinkler system, in-house temperature control and security for poultry. The paper also presents features to enhance the security of the farm. [8]

Rupali Mahale, et al. has studied application of IOT and wireless sensor network in a smart poultry farm monitoring to improve the quality of the chicken as well as farm production. Level of awareness regarding the safety of

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food products like chickens and there has been a high demand for good quality chicken food. The system high light the technology based solution for low cost, asset saving, quality oriented and productive management of poultry farming. This system intended to explore utilizing an intelligent system used an embedded framework for design a smart farm. [9] Rupali Mahale, et al. has implemented an advanced system for poultry farm automation using wireless sensor and GPRS network to control and monitor the environmental parameters of poultry without human interference. Parameters like temperature, humidity and ammonia gas. Person in charge can able to get the information of poultry climate on his mobile number and maintained the record of poultry data on webpage. [10]

III. SYSTEM DESIGN

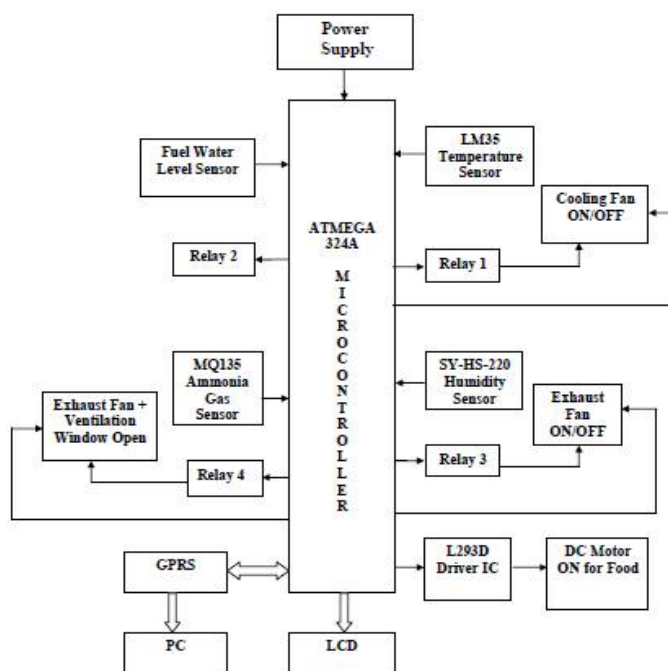


Fig 1: Block Diagram

As shown in Fig 1, all the components of the automatic farming system are demonstrated on Atmega324A. The system can able to monitor real-time data monitoring of environmental parameters like highest or lowest temperature, humidity, climate quality of surrounding farm, water level, percentage of ammonia gas etc. Food supply and Water supply control and monitor using the advanced technology of wireless sensor without human interference. System sends current information of all parameters through message on register mobile number. Daily record of poultry has maintained on a webpage.

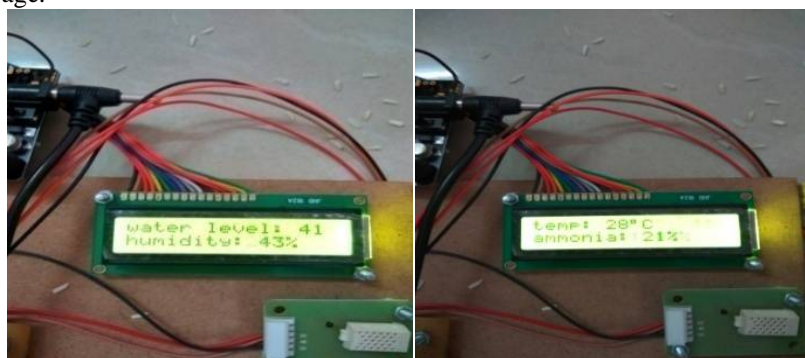


Fig 2: Details of Environmental parameters and water level display on LCD

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Fig 5: Dropping Food in Below Container

According to Fig 3, 4 and 5, when system receive a command for giving feed to the chickens as per the requirement then the action perform for a specific time duration as per the setup time. Once the interval time is over then food should be dropped out in below container.



Fig 6: Level Sensor Plotted in a Bowl

Water plays very important role in poultry, chickens daily required clean and sufficient amount of water. Water quality management has designed to improve the performance of the chickens in poultry; it also helps to monitor health of the chickens. In Fig 6, level sensor has been fixed to the water container, so whenever the level of water goes down below the threshold value of water, it gives indication on screen as well as on register mobile number.

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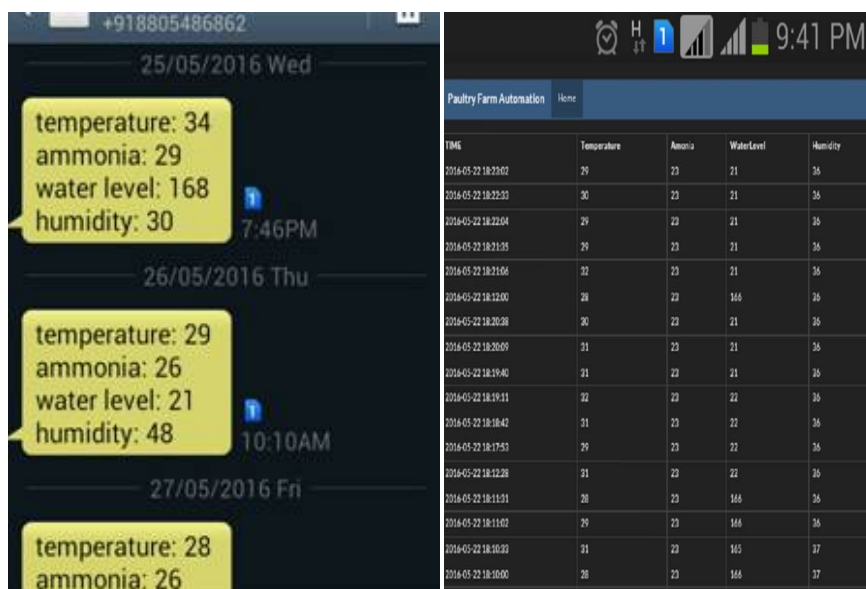


Fig 7: Display Message on Environment of Poultry, Fig 8: Poultry Data Updated on Web Portal

In Fig 7, we are able to receive information of the change in environment of chicken poultry farm on our mobile number. Similarly, we are able to maintain the record of poultry environmental parameters on web portal for a study and guideline purpose for future, as shown in Fig 8.

IV. ADVANTAGES

1. This system replaces traditional farm into an intelligent farm.
2. It Provide quicker and accurate information about different parameters to farmers.
3. System Required Low cost, asset saving and productive management in chicken farm.
4. The smart monitoring of different parameter like temperature, light, humidity, gas etc by using wireless sensor network.
5. Quality of chicken will be improved.
6. Man power gets reduced.
7. All internal information of poultry will be available on web portal.
8. Poultry owner can able to monitor internal structure of poultry by sitting in a room.
9. Wastage of food and water has been avoided.

V. CONCLUSION

The embedded system is innovative for chicken farming, which changes a traditional farm to a “Smart Farm” or “Intelligent Farm”. In addition, the system could work on the application of the smart phones helping the owner to monitor real time environmental contexts such as temperature, humidity, ammonia gas, water level etc. In this system describes an Integrated Solution for Smart Poultry Monitoring Using WSN (wireless Sensor Network) and GPRS Network. Monitoring environmental parameters in a real time industry are crucial. Various environmental parameters for effective growth of chickens have been identified and defined. It also explains the method of Water Level Control Mechanism and Food Control Mechanism for a poultry farm. Threshold values of temperature, humidity, ammonia gas and water level are monitor and control by the microcontroller. As well as remote monitoring is done and with the help of this facility, the person in-charge can observe the situation of internal structure of poultry by sitting in a one room as data will be display on a web portal. The intelligent system can reduce cost, time, and labor is highly user friendly to the farmers. This ideal system will improve the human food requirements by improving quality and quantity of chicken. This system will also help in decreasing environment pollution and improving health of poultry labor and chicken consumer.



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VI. FUTURE SCOPE

All the collected information of poultry farm has been send to the web server n stored it. Now we are only monitoring the parameters of poultry by sitting in a room but, In future it may possible to monitor and control the environmental parameters through the internet. Also poultry farm usually provided a lots of poultry waste. Chickens in farm can able to produce their own power from poultry wastage. Using that waste Goober Gas can be developed for daily requirement of power energy in poultry farming.

REFERENCES

- [1] Siwakorn Jindarat, Pongpisitt Wuttidittachotti. Smart Farm Monitoring Using Raspberry Pi And Arduino. IEEE 2015 International Conference On Computer, Communication, And Control Technology (I4ct 2015), April 21 - 23 In Imperial Kuching Hotel, Kuching, Sarawak, Malaysia, 2015.
- [2] K. Sravanth Goud* And Abraham Sudharson, Internet Based Smart Poultry Farm, Indian Journal Of Science And Technology, Vol (19), Ipl101, August 2015.
- [3] Muhammad Ammad-Uddin, Muhammad Ayaz, El-Hadi-Aggoune, Muhammad Sajjad. Wireless Sensor Network: A Complete Solution for Poultry Farming. IEEE 2nd International Symposium On Telecommunication Technologies (Istt), Langkawi, Malasia (24-26 Nov 2014)
- [4] Islam Ms, Islam A, Islam Mz, Basher E. Stability Analysis Of Standalone Biogas Power Plants In Poultry Farms Of Bangladesh. IEEE Transaction On Power System. 2014 Aug.
- [5] Fangwu Dong, Naiqing Zhang, "Wireless Sensor Networks Applied On Environmental Monitoring In Fowl Farm," Hal Id: Hal-01055409 <https://Hal.Inria.Fr/Hal-01055409> Submitted On 12 Aug 2014.
- [6] O M Olaniyi*, A. F. Salami*, O. O. Adewumi, O. S. Ajibola, "Design Of An Intelligent Poultry Feed And Water Dispensing System Using Fuzzy Logic Control Technique," Control Theory And Informatics www.iiste.org ISSN 2224-5774 (Paper) ISSN 2225-0492 (Online) Vol.4, No.9, 2014.
- [7] Boopathy.S 1, Satheesh Kumar.M 2, Mohamed Feroz.A 3, Dinesh.R 4 Pg Student, Department Of Embedded System Technologiesm Anna University, Regional Centre, Coimbatore, India1, 2 ,3, 4, "Performance Optimization Of Poultry Farm By Using Instrumentation With Help Of Embedded Automation," International Journal Of Innovative Research In Science, Engineering And Technology An ISO. 3297: 2007 Certified Organization, Volume 3, Special Issue 1, February 2014 International Conference on Engineering Technology And Science-(Icets'14)
- [8] Drishti Kanjilal, Divyata Singh, Rakhi Reddy, Prof Jimmy Mathew, "Smart Farm: Extending Automation To The Farm Level," International Journal Of Scientific & Technology Research Volume 3, Issue 7, July 2014, ISSN 2277-8616
- [9] Rupali B. Mahale, Dr. S. S. Sonavane, "Smart Poultry Farm Monitoring Using IOT And Wireless Sensor Networks", International Journal of Advance Research In Computer Science, Volume-7, No. 3, May-June 2016. ISSN No. 0976-5697
- [10] Rupal B. Mahale, Dr. S. S. Sonavane, "Smart Poultry Farm: An Integrated Solution Using WSN and GPRS Based Network", International Journal Of Advanced Research In Comuter Engineering And Technology (Ijarcet), Volume 5, Issue 6, June 2016. ISSN: 2278-1323