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Monitoring and Controlling Of Poultry Farm Using IOT

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ABSTRACT: The chicken production in the world has been increasing gradually because of standardized farming management and good manufacturing practices. According to world's agricultural produce survey, chicken is the most favourite produce, since it is a nutrient rich food providing high protein, low fat and low cholesterol, and lower energy than other kinds of poultries. Nowadays automation plays very important role in our life. Here we concentrate on the combination of wireless sensors and mobile system network to manage and remotely monitor environmental parameters in poultry farm. 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.

KEYWORDS: R5F100LE Microcontroller, Sensors, GSM, WSN.

I. INTRODUCTION

Internet of Things (IoT) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves. Building IoT has advanced considerably within the last number of years since it's additional a replacement dimension to the planet of data and communication technologies. The web has returned a protracted excess of the last thirty years. Old-fashioned IPv4 is giving way to IPv6 in order each device on the net will have its own IP address. Machine-to-machine (M2M) communication is on the increase, facultative devices to exchange and influence data while not someone ever being concerned. The scope and scale of the internet have modified as well business leaders predict the quantity of connected devices can surpass fifteen billion nodes by 2015 and reach over fifty billion by 2020. The challenge for the embedded trade is to unlock the worth of this growing interconnected internet of devices, typically spoken because the net of Things (IoT), describing it because the final tool in our future police investigation. This network has the power to reshape our cities. At the edge of the IoT are the appliances and equipment we use every day. These "things" are interconnected across an infrastructure or backbone using combinations of ZigBee, sub-GHz, Wi-Fi or transmission line communications (PLC) property to supply a strong bi-directional communications link with comparatively long vary, low latency for quick responsiveness, low power and ample rate to mixture data from several connected devices. This infrastructure conjointly is the entree to the web and permits remote observance and management of devices by different networks, utility firms and finish users.



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In contemporary world automation plays a vital role. Automation of poultry farm by using wireless sensor network and mobile communication system. 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, 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 DC motor without human interference. By connecting all the sensor modules to the microcontroller 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, ammonia gas and intensity of light with the help of respectively cooling fan, ventilation window and light ON/OFF without human interference. Based on the threshold values it will switch on 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 ventilation, cooling fan and exhaust fan. Environmental parameters are monitored and controlled with the help of microcontroller. Monitored sensor values can know the internal environment of poultry farm through mobile.

II. RELATED WORKS

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 contemporary farm by victimization wireless sensors network. It helps to boost the standard and amount of chicken. Chicken farming has two classes are Egg Production poultry farm and Meat production poultry farm. This proposed system will improve the productivity of chickens, quality as well as economy [1]. Internet based Smart Poultry Farm method proposed by K. SravanthGoud, et. al. has focused remote sensor system and portable system to control and naturally screen ecological parameters of poultry. Individual can ready to screen natural parameters by sending SMS back to the framework. Parameters like temperature and humidity [2]. SiwakornJindarat, et.al. If framework doesn't get charge from enrol portable number, at that point it will naturally play out its activity. Thus by utilizing this cutting edge method framework can give an advanced procedure to cultivate computerization. To solve the problem author as utilized Raspberry Pi and Arduino Uno. This framework should screen the encompassing parameters of poultry condition counting moistness, temperature, atmosphere quality and the channel fan switches. This framework is discovered exceptionally basic and valuable for formers, as they can successfully control the poultry cultivate whenever and from anywhere [3]. RupeshI.Muttha, et.al. It is observed that present chicken farming is all the more simple and valuable as contrast with customary chicken cultivating. With the assistance of present day strategy it is additionally conceivable to screen the ecological conditions like moistness and temperature. For an entire care of chicken it is essential to screen and control the earth of poultry for the better development of chickens [4]. The Poultry sheds can be controlled 24 hours via mechanization. It is helps to give an ideal yield by decreasing manual control in poultry. 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 [5]. Rupali B. 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 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 using embedded framework for design of smart farm [6].

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O. M. Olaniyi, et al. has studied Associate in Nursing Intelligent Poultry Feed and Water Dispensing System victimization mathematical logic management Technique. 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 [7].

III. EXISTING SYSTEM

Inprevious work environmental parameters are monitored automatically and controlled manually. The owner is far away from the farm couldn't reach in time then problem occurred in these methods. Most important part in poultry farming is feeding the chickens. In this 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. More than the required amount of food in the tray cause poison to chicken.

IV. PROPOSED SYSTEM

The objective of proposed system is designed for monitor and control the ecological parameters of poultry farm through the internet. The model is designed and implemented using the components as LM35 temperature sensor, MQ2 gas sensors, light dependent register (LDR), Food valve (it depends on motors) and GSM. These components are integrated with R5F1001LE microcontroller.

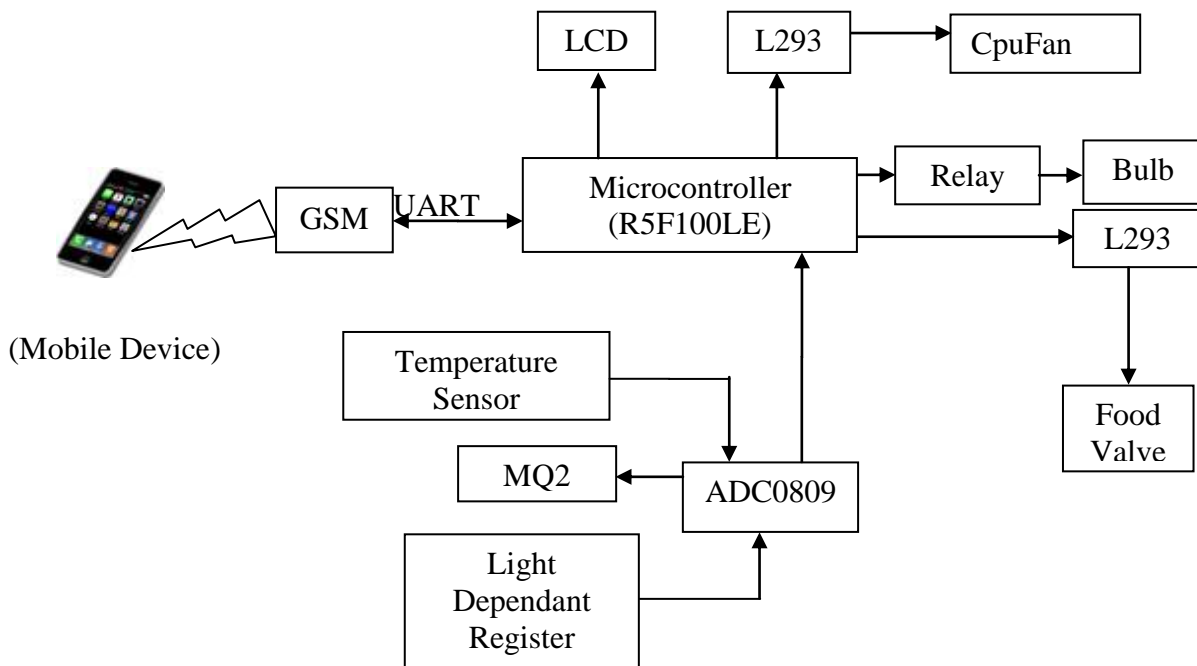


Figure 1: Proposed block diagram of Poultry farming.

The block diagram of the proposed system is shown in the figure1; LM35 temperature sensor reads and maintains the temperature according to the atmospheric of poultry farm. MQ2 gas sensor used to detect the harmful or poisonous gas inside farm. Light Dependant Register (LDR) sense the intensity of light. Based on the climatic condition bulb will be ON or OFF by using Relay. Whenever food valve received a command by the system the food will drop on to tray as per requirement with the help of DC motors. Controlling of food valve by smart phone and GSM component is used to intimate the person in-charge of poultry farm by sending message.

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V. IMPLIMENTATION

The proposed system includes remote sensors and microcontroller. The system can generate real time data based on environmental based notification to the remote server such as daily maximum or minimum temperature, ammonia gas and intensity of the light. User controls the filter fan to reduce the effect of temperature and ammonia gas. Systems also control the Food valve for chickens remotely without human interference.



Figure 2: Top view of the integrated device.

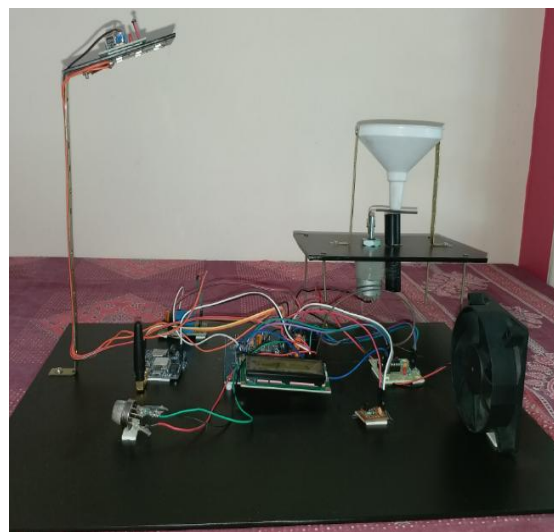


Figure 3: Side view of the integrated device.

Figure 2 and figure 3 shows the top view and side view of the integrated system. The System is able to monitor and control real-time data of environmental parameters and checks whether the valves above or below the threshold temperature, percentage of ammonia gas, luminescence etc. Wireless sensor network (WNS) technology is used monitors and controlling food supply. Whenever the environmental parameters valves go below or above the threshold, notification will be intimated to person in-charge on his smart phone.

The LM35 is an integrated-circuit temperature sensor that can be used to measure temperature with an electrical output proportional to the temperature (in Celsius). LM35 is a basic temperature sensor that can be used for experimental purpose. The MQ-2 is a Gas Sensor (in Parts per million) which detects gas leakage at home and industry. It is suitable for detecting H₂, LPG, CH₄, CO, Alcohol and Smoke or Propane. Sensors continuously read the environmental parameters values inside poultry farm whenever values go below or above the threshold notification will be intimated to person in-charge and fan will be ON without human interference. Smart phone uses android application to display information. Light Dependent Resistor changes with the light intensity that fall upon it. When intensity of light is more than 50% of the climatic condition bulb will be ON. If intensity is more than 50% bulb will be ON and display Night mode on LCD or less than that light will off and display Day mode. A container with food, whenever food valve received a command by the system the food will drop on to tray as per requirement with the help of DC motors. Using sarmt phone user can control open and close of valve. Smart phone uses android application to operate this commands.

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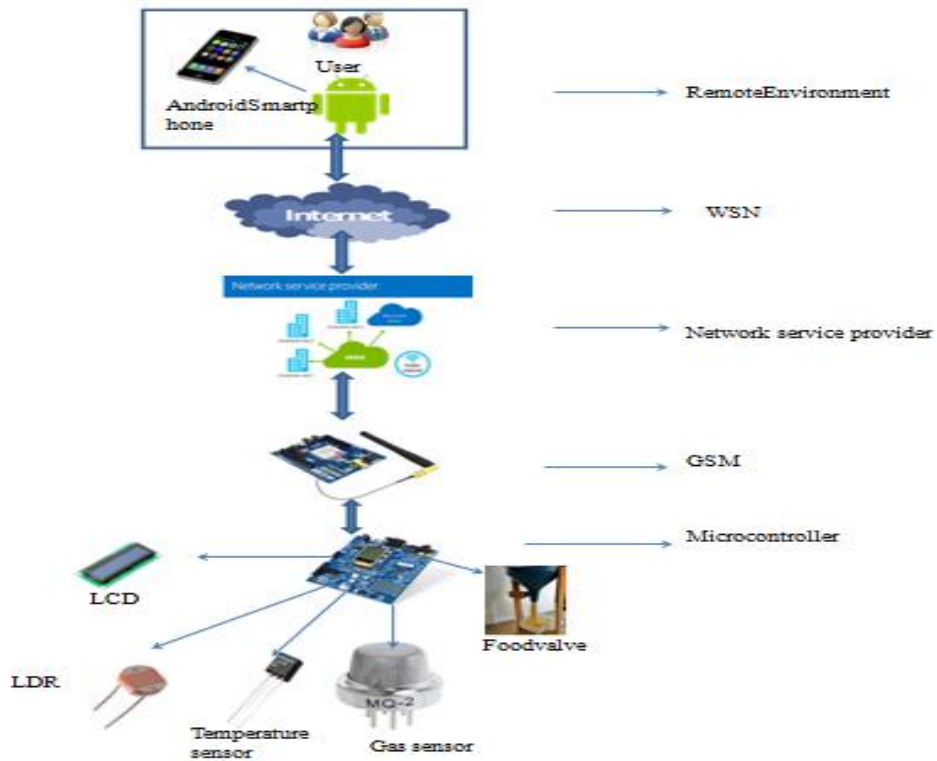


Figure 4: Connectivity between hardware components.

Above Figure 4, shows the hardware component used to build the poultry farm module. All the components of the automatic farming system are demonstrated on microcontroller. User can access the information where GSM service used. Wireless sensor network is used to collect information in the poultry farm of environmental parameters and user will be intimated.

VI. RESULTS

Automated poultry farm has a great impact on increasing the productivity of chicken by monitoring and controlling of all ecological parameters systems also control the Food valve which effects on the growth chicken.

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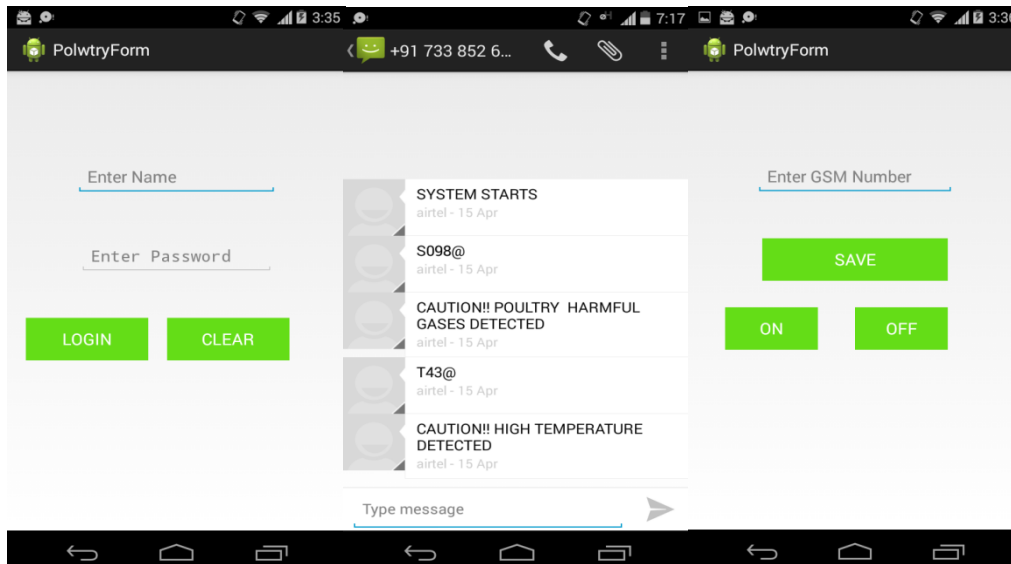


Figure 5: Sample result of food valve control and intimation of environmental parameters.

As shown in Figure 5, Login page of the poultry farm and the person in-charge of farm able to receive information of the change in environment of chicken poultry farm on his mobile number. As well as figure shows ON/OFF of valve for food valve control through android app.

VII. CONCLUSION

The embedded system is an innovative technology 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, light instance etc. It describes an Integrated Solution for Smart Poultry Monitoring Using WSN (wireless Sensor 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 Food Control Mechanism for a poultry farm. Threshold values of temperature, lighting, ammonia gas and food 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 labour 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 labour and chicken consumer.

VIII. FUTURE WORKS

The system is fully an automatic system to monitor and control the environmental changes such as temperature, ammonia gas, intensity of light and food feeding without human intervention. This paper can be extended by automating the disposal of waste and automatically detecting the diseases of birds by monitoring the weight of the bird.



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