

IOT BASED INTELLIGENT FARMING

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Abstract— From the world's horticultural produce, chicken is known to be the most supported produce due to its supplement rich sustenance that gives more protein, minimum fat and cholesterol, and lesser vitality than different sorts of poultries. Additionally, it is not easier to take care of and generate its species. For a long time, the chicken creation has been expanding on a normal of 4.63% yearly as a result of institutionalized cultivating the board and great assembling works on, prompting increasingly chicken utilization and an expanded fare number of both household and worldwide goals. Then again, a lacking of work in chicken generation forms has influenced crisp chicken fare, which is observed to be the primary issue. Another huge snag cannot be right information sharing and people shrewdness in chicken cultivating which impacts proficiency. This examination expected to explore a foundation utilizing an automatic system which uses an Embedded System and Smart Phone for chicken cultivating the board and critical thinking utilizing an Arduino Uno. A trial and relative investigation of the savvy framework was connected in an example chicken ranch in this examination. The discoveries of this investigation found that the framework could screen encompassing climate conditions including stickiness, temperature, atmosphere quality, and furthermore the channel fan switch control in the chicken ranch. The framework was observed to be agreeable for ranchers to use as they could viably control the homestead anyplace whenever, bringing about cost decrease, resource sparing, and gainful administration in chicken cultivating .

Index Terms— Arduino Uno, Embedded System, Automatic System

I. INTRODUCTION

Poultry ranches, predominantly chicken homesteads delivering meat or eggs, can be exceedingly particular activities. To expand benefits and plan future undertaking exercises, a practicality investigation preceding venture and legitimate administration amid the task are required. Appropriate administration guarantees proficient creation and great quality items (meat or eggs). This is practiced by controlling maladies, keeping up feed effectiveness, appropriate treatment of squanders, and legitimate disinfecting of the poultry house. Because of short turnover rates of poultry runs and solid market request, the poultry business could possibly be a productive venture.

Thailand was considered as a farming rich nation as far as nourishment and ecological assets. By and by, such flourishing was bit by bit relapsed legitimately adding to a low rural efficiency and rancher salaries. The ranchers moreover needed bits of knowledge in rural promoting systems and Fantastic generation arranging.

For quite a while, the chicken age in Thailand has been developing a typical of 4.63% yearly in perspective on standardized developing the board and incredible gathering

deals with, provoking logically chicken usage and an extended passage number of both private and all inclusive objectives. Then again, a lacking of work in chicken creation forms has influenced crisp chicken fare, which is observed to be the central issue. Another critical impediment cannot be right learning sharing and people knowledge in chicken cultivating which impacts proficiency.

This examination intends to set up another model by utilizing a cutting edge innovation connected to chicken cultivating known as a "Savvy Farm" or "Wise Farm", which is required to clear up the cultivating issues. Brilliant Farm could see any changed data got from a self-loader microchip, disturbing all warning to an associated PC. The homestead observing could be led by means of use programs on PDAs for comfort use, efficient, and expanding work lessens.

The real equipment segments used to plan and build up this task are Arduino Uno which is an ATMEGA328P microcontroller, printed circuit board, Ethernet Shield to associate with the web, a LED, a CPU fan and a few sensors like the DHT22 module which is a temperature and mugginess sensor, MQ2 gas sensor and LDR module. Inserted C is the language used to compose the code and programming used to do that is Arduino IDE .

II. LITERATURE REVIEW

Intarakamhaeng et al. [1] worked on the model of managing the farm which contains technology based on automation with radio-frequency identification of objects (RFID). Use of RFID resulted in identifying five kinds of animals like cattle, buffalo, sheep, pigs and rabbits which were recorded automatically too.

Bahrudin et al. [2] worked on a system which contains fire alarm that uses real-time monitoring module which detects the appearance of smoke which is mixed in the air and captured images from a camera within a room when fire occurs. The inserted frameworks used to build up this fire caution framework in that Raspberry Pi as well as Arduino Uno were used. The key component of the framework is the ability to send remotely ready when system recognizes a fire. Right when the proximity of smoke is perceived, the system will demonstrate an image of the room state in a site page. The system will require the customer confirmation to report the event to the Firefighter using a Short Message Service (SMS). The advantage of using this system is that it will reduce the probability of false mindful uncovered of the Firefighter. The camera will simply get an image, so this structure will eat up only a touch of amassing and power.

Kumar et al. [3] proposed a creature wellbeing observing model (AHMS) for restrain the physiological parameters, for example, rumination, temperature of body, and pulse with temperature encompassing and stickiness. The framework created could likewise look at the anxiety comparing to warm

stickiness file. The IEEE802.15.4 also IEEE1451.2 norms based sensor module was additionally grown effectively. The ZigBee gadget and PIC18F4550 microcontroller were utilized in the usage of sensor module. The graphical UI is actualized in Lab VIEW 9.0 as described by the IEEE1451.1 standard. The ongoing observing of physiological and social parameters can be available on the GUI PC. The gadget is extremely useful and a reasonable medicinal services of domesticated animals. A model was made and attempted with high accuracy results.

In the administration of poultry ranches, likely a standout amongst the most troublesome stages is the administration of the recently presented group. For the task to be productive, a great malady anticipation program ought to be accessible for the recently acquainted chicks with keep away from any future misfortunes. Sickesses can be transmitted by means of people, different winged creatures, recently presented chicks, or defiled hardware. Controlling illnesses from the earliest starting point is critical for the achievement of the task [4].

Smith et al. [5] proposed a cattle health monitoring system and they are focused on head motion, core body temperature, and heart rate. The center of the framework is an AMD186 processor on a turn microcontroller board.

Mottram et al. [6] proposed a measurement of the acceleration for the dairy cattle. They are give the portability of the dairy bovines and furthermore increasing speed associated to the versatility of the cows.

M. Janzekovic et al. [7] proposed a heart rate monitoring method based on polar sport tester (PST) for cattle. The body temperature and heart rate parameters are also used as a disease scrutinize for different animal.

III. OBJECTIVES

The main concern of this project is to manage chicken farming and resolve problems by using an Intelligent Embedded system that uses an embedded system including Arduino Uno Microcontroller Unit (MCU) and smart phone .A smart system experiment and comparative analysis was applied in this study on a sample chicken farm. The experimental result of this approach will continuously monitor temperature, humidity, climate quality so as to control the switching of filter fan located in the chicken homestead.

This system will be comfortable for ranchers to use as they could effectively control the chicken homestead from anyplace whenever, bringing about cost decrease, resource sparing, and gainful administration in chicken cultivating.

IV. METHODOLOGY

The three sensors are interfaced to the Arduino Uno as in the proposed system of block diagram in Figure 1. The values from the sensors are passed on to the controller and then given to the database server. We can monitor and also control the real time environmental variations such as light, humidity, temperature, weather and quality of environment through smart phone application from the data accessed by the three sensors used in the system.

The major hardware components used to design and develop this project are Arduino Uno which is an ATMEGA328P, Humidity and Temperature sensor module, MQ2 gas sensor module and LDR module, Ethernet Shield to connect to the internet, LED and a CPU fan to use as a filter fan control. Power of 5V is applied to the controller.

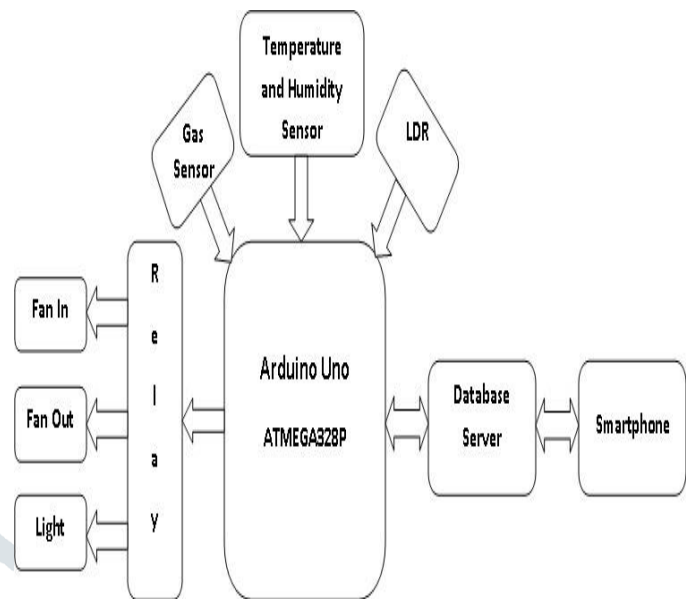


Figure 1. Block Diagram

V. COMPONENTS

A. Arduino

Arduino microcontroller is perfect with created stages. It's an open-source controller which has an operating voltage of 5.5 volts, appears not be expensive and consumes less power. C/C++ codes were used for this headway. Arduino can interface with a PC by methods for the Universal Serial Bus (USB) and perform with great related ruffle in both basic banner and propelled banner. The Arduino is a microcontroller stage, placed on a board that connects viably to for the most part PCs. It empowers the client to program the introduced Atmega chip to do diverse things with programming language, in ventures called diagrams.

B. DHT 22 Sensor Module

Natural conditions straightforwardly influence creature occupation adding to some constant scourges, for example, winged creature flu, hand foot and mouth disease. Hence, DHT 22 is use as a blue pencil for estimating temperature (both Fahrenheit and Celsius esteem) and dampness. The estimation unit will be exhibited in an advanced flag structure .

C. MQ-2 Sensor Module

The module fills in as an Air Quality Detection Gas Sensor, this is sensitive to gas perilous to human, associated with measure, oxides of nitrogen, Alcohol, Benzene, NH₃, CO and CO₂. The module is furthermore used for controlling atmosphere conditions and air cleaners in structures. The estimation unit is presented in basic banner. The sensor used in our assignment is MQ-2 .

D. LDR module

A light sensor was utilized for estimation of light power particularly for uncovered eye light, its unit is called Lux. Light Dependent Resistor (LDR) is a light delicate check changing electronic limitation when there is a light occasion, called Photo Resistor or Photo Conductor. The resistor was conveyed using Semiconductor, Cadmium Selenide (CdSe), Cadmium Sulfide (CdS). These two substances are semiconductors covered in an ended sheet as a base .

E. Ethernet Shield

The Ethernet Shield permits an Arduino board to associate with the web. It depends on the Wiznet W5100 Ethernet chip. The Wiznet W5100 gives a system (IP) stack equipped for both TCP and UDP. It underpins up to four concurrent attachment associations. Utilize the Ethernet library to compose draws which interface with the web utilizing the shield. The Ethernet shield interfaces with an Arduino board utilizing long wire-wrap headers which stretch out through the shield. This keeps the stick format flawless and enables another shield to be stacked on top.

F. DC Axial Fan

The fan utilized in this undertaking is a CPU fan to show the utilization of a real fan in a chicken ranch. A PC fan is any fan inside, or joined to, a PC case utilized for dynamic cooling, and may allude to fans that draw cooler air into the case all things considered, oust warm air from inside, or move air over a warmth sink to cool a specific segment. By and large these are found in hub and here and there diffusive structures. The previous is in some cases called a "biscuit" fan, while the last might be known as a "bread blower" in some item writing. Used to cool the CPU (focal handling unit) heat sink. Viable cooling of a concentrated warmth source, for example, a huge scale incorporated circuit requires a heat sink, which might be cooled by a fan; utilization of a fan alone won't forestall overheating of the little chip.

G. LED

A light-discharging diode (LED) is a two lead semiconductor light source. It is a pn junction diode, which emanates light when initiated. At the point when an appropriate voltage is connected to the leads, electrons can recombine with electron gaps inside the gadget, discharging vitality as photons. This impact is called electroluminescence, and the shade of the light (comparing to the vitality of the photon) is dictated by the vitality band hole of the semiconductor.

H. Relay

Hand-off is an electromagnetic gadget which is utilized to seclude two circuits electrically and associate them attractively. They are helpful gadgets and enable one circuit to switch another while they are totally independent. They are frequently used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at high voltage.

I. Database Server

A database server is a PC program that gives database administrations to other PC projects or PCs, as characterized by the client-server display. The term may likewise allude to a PC committed to running such a program. Database the board frameworks as often as possible give database server usefulness, and some DBMSs (e.g., MySQL) depend solely on the client-server display for database get to. Such a server is gotten to either through a "front end" running on the user's PC which shows mentioned information or the "back end" which keeps running on the server and handles undertakings, for example, information examination and capacity. The vast majority of the Database servers works with the base of Query language. Every Database comprehends its inquiry language and changes over it to Server coherent structure and executes it to recover the outcomes. Here in this we

utilize the Ethernet Shield to get to the database separate locally by utilizing a neighborhood Wi-Fi.

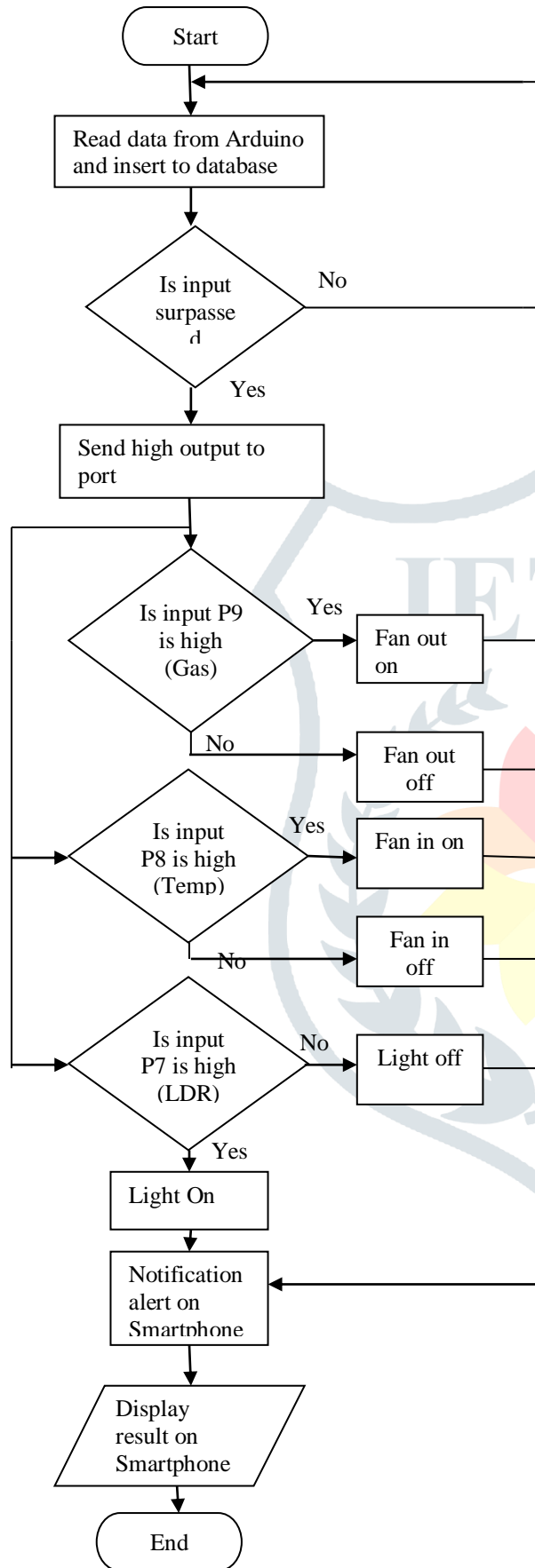
J. Wireless Router

A remote switch is a gadget that plays out the elements of a switch and furthermore incorporates the elements of a remote passageway. It is utilized to give access to the Internet or a private PC arrange. It can work in a wired LAN (neighborhood), in a remote just LAN (WLAN), or in a blended wired/remote system, contingent upon the producer and model.

K. Smartphone

A cell phone is a cell phone with a propelled portable working framework which consolidates highlights of a PC working framework with different highlights helpful for versatile or handheld use. It commonly joins the highlights of a wireless with those of other prominent cell phones, for example, individual computerized partner (PDA), media player, GPS route unit and advanced camera. Most cell phones can get to the Internet and can run outsider applications. They have a touch screen UI, with LCD, OLED, AMOLED, LED or comparable screen. In our undertaking we have utilized an advanced mobile phone to screen and control the ranch.

VI. FLOWCHART



VII. RESULTS AND DISCUSSION

A. Control Switches

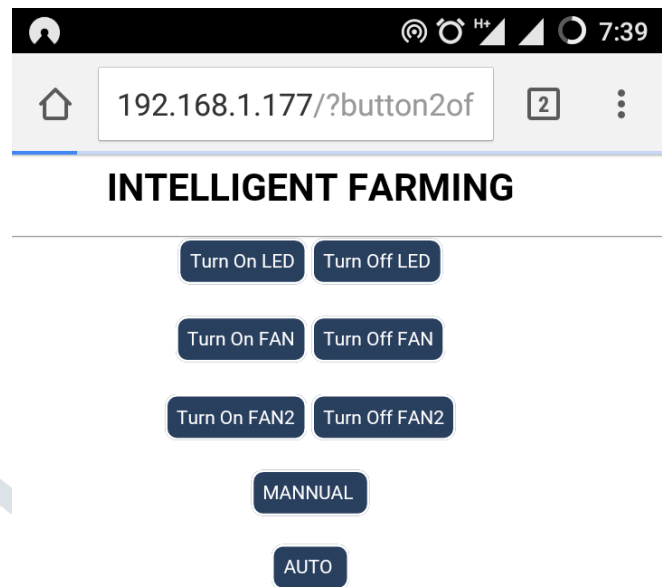


Figure 2. Web page showing the control switches

The system can run on both Manual mode and Auto mode. If the system is in manual mode we can control the appliances in farm by toggling the switches. If it is in Auto mode the system just Automate the process.

B. Sensor Values under Normal Condition

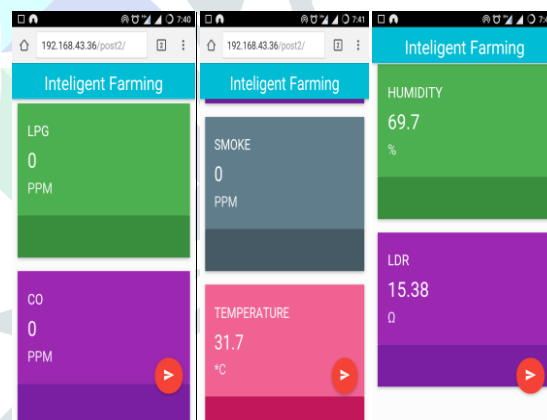


Figure 3. Web page showing the sensor values under normal condition
All outputs are being displayed appropriately corresponding to their respective sensors i.e Gas Sensor, Temperature and Humidity Sensor and LDR under Normal condition.

C. Notifications When Sensor Value Crosses Threshold Value

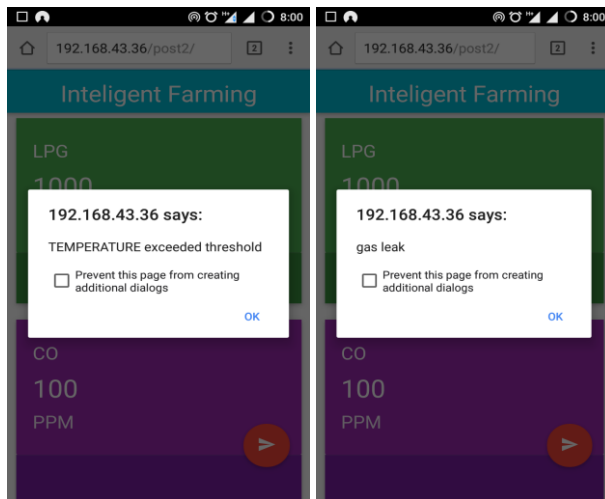


Figure 4. Web page showing notifications when the sensor values crosses threshold value

The image displays a notification during any threshold Crossover.

VIII. ADVANTAGES AND APPLICATIONS

A. Advantages

- The framework could take a shot at utilizations of PDAs helping the ranchers to control and screen constant Natural settings, for example, temperature, climate Conditions and quality, mugginess, light and channel fan Switches.
- Less cost.
- Less time.
- Reduces labour.
- It is very easy to understand for ranchers.

B. Applications

- Intensive and elective poultry cultivating.
- Egg-laying chickens-farming frameworks.
- Meat-delivering chickens-cultivation frameworks.

IX. CONCLUSION

The installed framework is an innovative chicken farming, transforming a traditional farm to a "Smart Farm" or "Intelligent Farm". In addition, the system could work on applications of smart phones helping the ranchers to monitor and control real time environmental variations such as temperature, weather conditions, quality of environment, humidity and light. The intelligent system can reduce cost, time, and labour and is highly user friendly for ranchers .

X. FUTURE SCOPE

In the coming future, arduino ought to be changed into Raspberry Pi as a result of its more viability and server working decrease. All gathered cultivating data ought to be sent from the server and put away in another framework. In addition, an animal's encouraging framework ought to be likewise created to make this a progressively total framework .

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