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SMART POULTRY FARM INCORPORATING GSM AND IOT

D.Pravalika
Dept. Of Electronics and Comm. Engineering,
Guru Nanak Institute Of Technology,Hyberabad

B.Nikhil Sai
Dept.Of Electronics and Comm.. Engineering,
Guru Nanak Institute Of Technology,Hyderabad

B.Abhishek
Dept Of Electronics and Comm. Engineering,
Guru Nanak Institute Of Technology,hyderabad

Abstract: Advancement in technology has made regular life more easy and convenient. In every aspect of life, it is essential to be updated that ensures that progress of mass interest. With the growing demand, automated poultry farming has become eminent that contributes enormously in economic growth. Smart poultry farms can emancipate the farmers from the traditionally tedious procedures which were outdated and time consuming. In preliminary stage, a smart poultry farm shows many distinctive features such as, automated food and water supply, egg collection, maintaining precise environmental factors etc. In this paper, Safety measures such as fire protection, anti-thief features which ensures an overall surveillance of the farm has being corporated. Data storage through IoT is another enticing trait of this work which enables the users to figure out the required presets to adopt before any endangerments can occur.

The GSM module can also provide a real time protection of the farm by notifying the farmer through an SMS at any alarming situations. All these distinguished features have been realized and observed with very perfection and it can be concluded, with the integration of GSM and IoT the proposed project work has taken the poultry farming into next level of advancement. The paper reduce labour's manual work with labour's cost. It improves the meal production in poultry farm.

INTRODUCTION:

Advancement in technology has made regular life more easy and convenient. In every aspect of life, it is essential to be updated that ensures that progress of mass interest. With the growing demand, automated poultry farming has become eminent that contributes enormously in economic growth.Smart poultry farms can emancipate the farmers from the traditionally tedious procedures which were outdated and time consuming. In preliminary stage, a smart poultry farm shows many distinctive features such as, automated food and water supply, egg collection, maintaining precise environmental factors etc.

In this paper, Safety measures such as fire protection, anti-thief features which ensures an overall surveillance of the farm has been incorporated. Data storage through IoT is another enticing trait of this work which enables the users to figure out the required presets to adopt before any endangerments can occur. The GSM module can also provide a real time protection of the farm by notifying the farmer through an SMS at any alarming situations. All these distinguished features have been realized and observed with very perfection and it can be concluded, with the integration of GSM and IoT the proposed project work has taken the poultry farming into next level of advancement.

LITERATURE SURVEY:

1.TITLE: Effect of temperature-humidity index on live performance in broiler chickens grown from 49 to 63 days of age:

The thermal environment in poultry housing is a primary influence on production efficiency and live performance. Heavy broilers (body weight > 3.2 kg) typically require high ventilation rates to maintain thermal comfort and production efficiency.However, large birds are observed to pant in mild to moderate thermal conditions, indicating that upper critical temperatures may be lower at larger body weights.Thermal comfort indices such as the temperature-humidity index (THI) integrate the effects of temperature and humidity and may offer a means to predict the effects of thermal conditions on performance.The objective of this study was to determine live performance of heavy broilers over a range of dry-bulb temperature (15°C, 21°C, and 27°C) and relative humidity (50%, 65%, and 80%), hence THI (14.8°C to 26.9°C).

2.TITLE: Remote monitoring and control of poultry farm using iot techniques:

The environmental conditions monitoring and control's ability is crucial and demands a good level of research in fields ranging from the change in climatic conditions in agriculture and zoology.

According to world's agricultural produce survey, chicken is among the most favorite produce,since it is a nutrient rich food providing high protein, low fat, low cholesterol, and low energy than other kinds of poultries.

From last few years worldwide, there has been an increased level of awareness regarding the safety of food products like chickens and there has been a high demand for good quality and quantity chicken food. This research focuses on the integration of wireless sensors and mobile network with a well known sensors integration platform using remote sensing.

EXISTING SYSTEM:

Sensor data is sent using GSM technology.The GSM module can also provide a real time protection of the farm by notifying the farmer through an SMS at any alarming situations. A GSM modem accepts a Subscriber Identity Module (SIM) card, and basically acts like a mobile phone for a computer.Such a modem can even be a dedicated mobile phone that the computer uses for GSM network capabilities.In preliminary stage, a smart poultry farm shows many distinctive features such as, automated food and water supply, egg collection, maintaining precise environmental factors etc.

The GSM module can also provide a real time protection of the farm by notifying the farmer through an SMS at any alarming situations.GSM networks operate in a number of different carrier frequency ranges (separated into GSM frequency ranges for 2G and UMTS frequency bands for 3G), with most 2G GSM networks operating in the 900 MHz or 1800 MHz bands.

Where these bands were already allocated, the 850 MHz and 1900 MHz bands were used instead (for example in Canada and the United States).In rare cases the 400 and 450 MHz frequency bands are assigned in some countries because they were previously used for first-generation systems.

For comparison, most 3G networks in Europe operate in the 2100 MHz frequency band. For more information on worldwide GSM frequency usage, see GSM frequency bands.

PROPOSED SYSTEM:

In proposed system we can send the data in IoT. A wireless Sensor Network (WSN) is a wireless network consisting of spatially distributed autonomous devices using sensors to cooperatively monitor physical or environmental conditions, such as temperature, humidity, at different locations. In the temperature sensor is used to measure the temperature around environment.The humidity sensor is calculate the temperature in the surrounding air and the Gas sensor is used to measure Gas level. This all data are updated to the IOT. The nodes in the network are connected via wireless communication channels. Each node has capability to sense data, process the data and send it to restate nodes or to base station. LCD is used to print the current status from the controller. In thispaper, Safety measures such as fire protection, anti-thief featureswhich ensures an overall surveillance of the farm has beenincorporated.Data storage through IoT is another enticing trait of this work which enables the users to Fig. out the required presetsto adopt before any endangerments can occur.

HARDWARE DESCRIPTION:

ARDUINO: Arduino (Figure) is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE(Integrated Development Environment), which is used to write and upload the computer code to the physical board. Arduino board designs use a variety of microprocessors and controllers.

The key features are:

Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.Various kinds of Arduino boards are available depending on different microcontrollers used. However, all

Arduino boards have one thing in common: they are programed through the Arduino IDE (fig 2.2). The differences are based on the number of inputs and outputs (the number of sensors, LEDs, and buttons you can use on a single board), speed, operating voltage, form factor etc.Some boards are designed to be embedded and have no programming interface (hardware), which you would need to buy separately.

Fig: Arduino

Figure:shows Arduino IDE for coding

Fig: Arduino IDE

LIQUID CRYSTAL DISPLAY:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

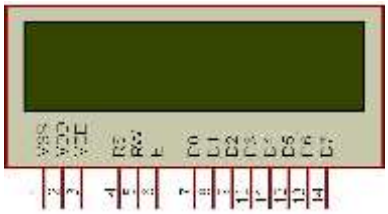

Fig: 16x2 LCD

TEMPERATURE SENSOR:

Temperature is the most-measured process variable in industrial automation.Most commonly, a temperature sensor is used to convert temperature value to an electrical value. Temperature Sensors are the key to read temperatures correctly and to control temperature in industrials applications.A large distinction can be made between temperature sensor types. Sensors differ a lot in properties such as contact-way, temperature range, calibrating method and sensing element. The temperature sensors contain a sensing element enclosed in housings of plastic or metal. With the help of conditioning circuits, the sensor will reflect the change of environmental temperature.

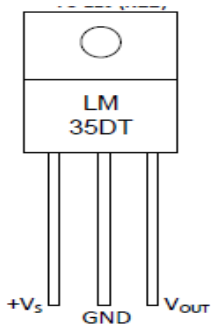

Fig: Temperature Sensor

HUMIDITY SENSOR:

Humidity sensor is an instrument used for measuring the moisture content in the environment. Humidity measurement instruments usually rely on measurements of some other quantity such as temperature, pressure, mass or a mechanical or electrical change in a substance as moisture is absorbed. By calibration and calculation, these measured quantities can lead to a measurement of humidity.

GAS SENSOR:

A gas detector is a device which detects the presence of various gases within an area, usually as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. A gas detector can also sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave the area. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals.

Fig: Gas Sensor

FIRE SENSOR

The Fire sensor, as the name suggests, is used as a simple and compact device for protection against fire. The module makes use of IR sensor and comparator to detect fire up to a range of 1-2 meters.The device, weighing about 5 grams, can be easily mounted on the device body. It gives a high output on detecting fire. This output can then be used to take the requisite action. An on-board LED is also provided for visual indication.

Fig: Fire Sensor

WATER LEVEL SENSOR:

Level sensors detect the level of substances that flow, including liquids, slurries, granular materials, and powders. All such substances flow to become essentially level in their containers (or other physical boundaries) because of gravity. The substance to be measured can be inside a container or can be in its natural form (e.g. a river or a lake). The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point-level sensors only indicate whether the substance is above or below the sensing point. Generally the latter detect levels that are excessively high or low.

LIGHT DEPENDENT RESISTOR SYMBOL:

The circuit symbol used for the light dependent resistor or photo-resistor combines its resistor action while indicating that it is sensitive to light. The basic light dependent resistor symbol has the rectangle used to indicate its resistor action, and then has two incoming arrows - the same as those used for photodiodes and phototransistors to indicate its light sensitivity.

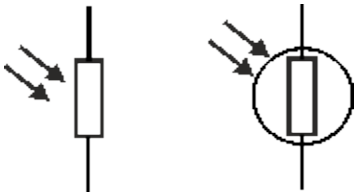

Fig: Light Dependent Resistor Symbol Used In Circuit Diagrams

GLOBAL SYSTEM FOR MOBILE:

Global System for Mobile Communications (GSM) modems are specialized types of modems that operate over subscription based wireless networks, similar to a mobile phone. A GSM modem accepts a Subscriber Identity Module (SIM) card, and basically acts like a mobile phone for a computer. Such a modem can even be a dedicated mobile phone that the computer uses for GSM network capabilities.

Traditional modems are attached to computers to allow dial-up connections to other computer systems. A GSM modem operates in a similar fashion, except that it sends and receives data through radio waves rather than a telephone line. This type of modem may be an external device connected via a Universal Serial Bus (USB) cable or a serial cable. More commonly, however, it is a small device that plugs directly into the USB port or card slot on a computer or laptop.

Fig:GSM

BUZZER:

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, house hold appliances such as a microwave oven, or game shows.It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder like a Sonalert which makes a high-pitched tone. Usually these were hooked up to “driver” circuits which varied the pitch of the sound or pulsed the sound on and off.

Fig: Buzzer

INTERNET OF THINGS (IOT):

Internet of things (IoT), is another advance technology in IT sector, provides internetworking for numerous of devices such as sensors, actuators, PLCs and other electronic embedded smart devices and controls, and various software’s’ and provides systems network configuration and connectivity, which enables communication between these numerous devices for information exchanging.

In 1995, “thing to thing” was coined by BILL GATES. In 1999, IoT (Internet of Things) was come up by EPC global. IOT interconnects human to thing, thing to thing and human to human. The goal of IoT is bring out a huge network by combining different

types connected devices. IoT targets three aspects Communication, automation, cost saving in a system. IOT empowers people to carry out routine activities using internet and thus saves time and cost making them more productive. IOT enables the objects to be sensed and/or controlled remotely across existing network model. IOT in environmental monitoring helps to know about the air and water quality, temperature and conditions of the soil, and also monitor the intrusion of animals in to the field. IOT can also play a significant role in precision farming to enhance the productivity of the farm.

SOFTWARE DESCRIPTION

The Arduino Integrated Development Environment:

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.

WRITING SKETCHES:

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.NB: Versions of the Arduino Software (IDE) prior to 1.0 saved sketches with the extension .pde. It is possible to open these files with version 1.0, you will be prompted to save the sketch with the .ino extension on save.

FLOW CHART:

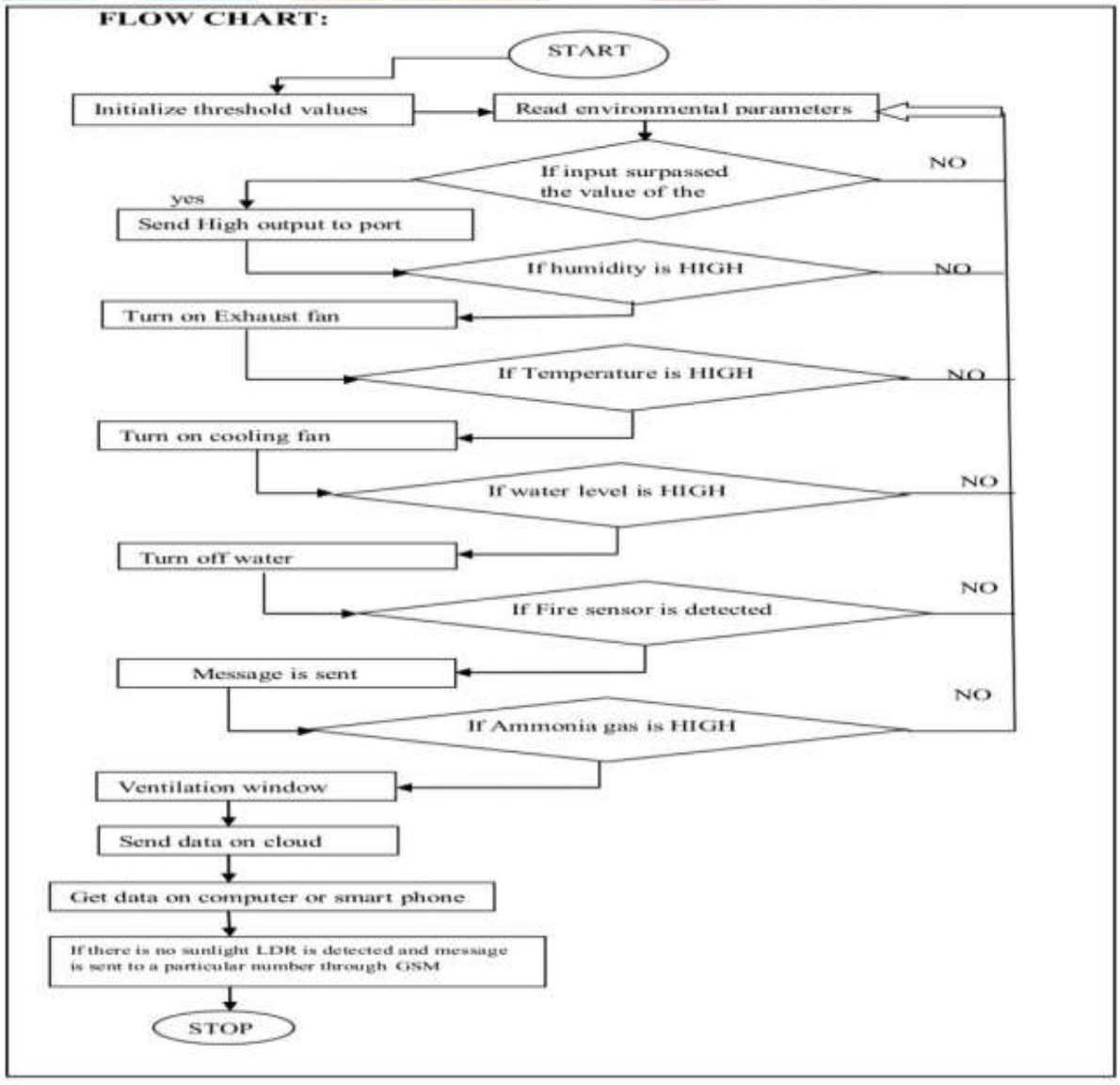

Fig:flow chart

RESULT:

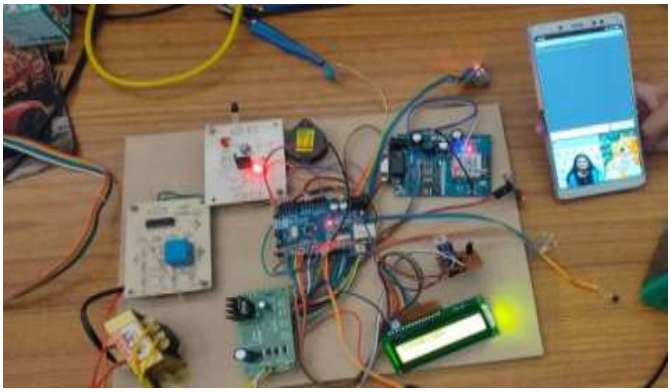

Fig: Smart Poultry Farm Incorporating GSM And IOT Kit

As shown in fig LCD displaying that kit is connected to mobile using IOT.

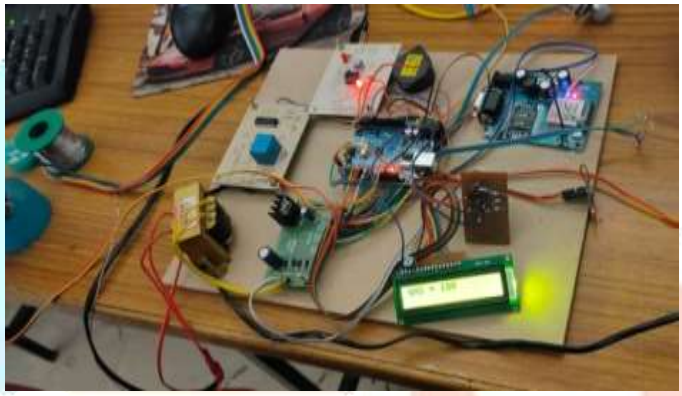

Fig: LCD Displaying The Detected Gas

As shown in fig the gas sensor detects the gas and the information is displayed on the LCD. The readings which are displayed on LCD are also displayed in Mobile.

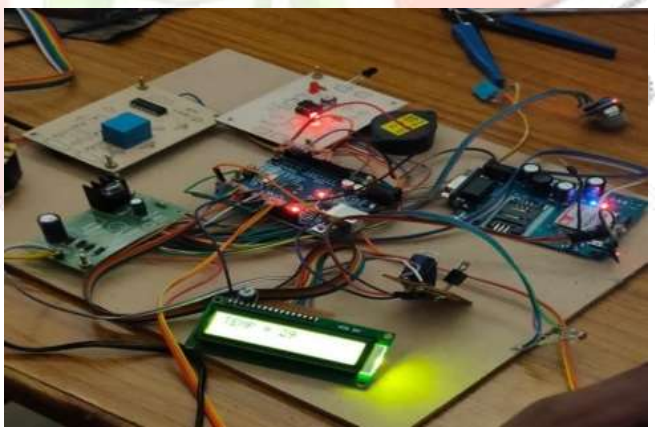

Fig:LCD Displaying The Temperature

As shown in fig If any abnormality in temperature then temperature sensor detects and it is displayed on LCD

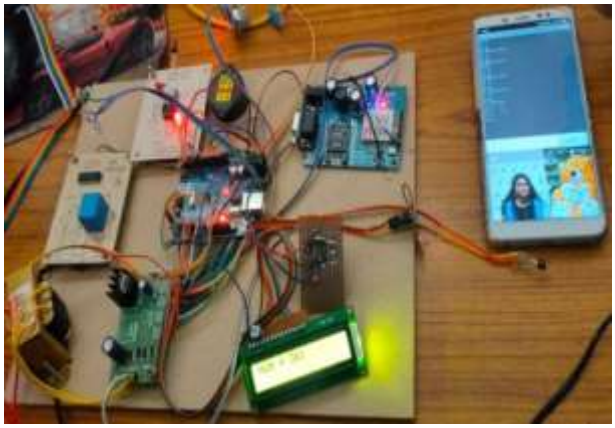

Fig: LCD Displaying The Humidity

As shown in fig if any changes occur in humidity then humidity sensor will detect and gives the information to mobile through IOT.

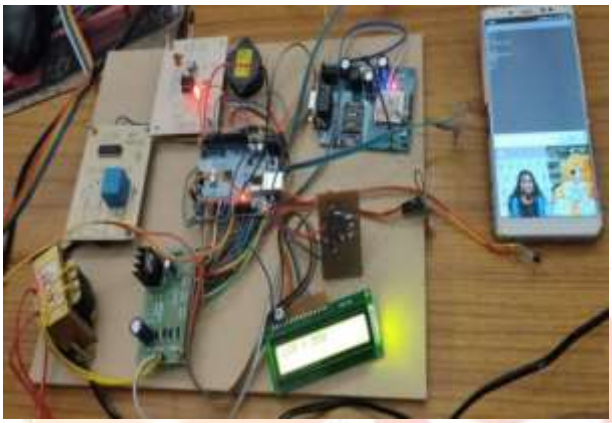

Fig: LCD Displaying The LDR

As shown in fig if any changes occur in LDR it detects and gives information to mobile using IOT and it also displays in LCD.

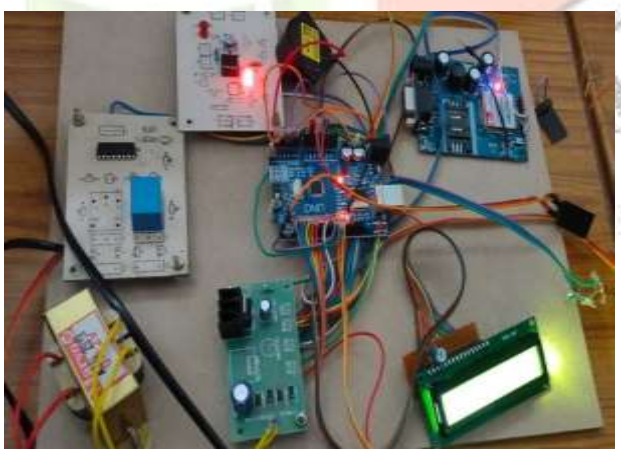

Fig: LCD Displaying The Fire

As shown in fig when unexpected fire occurs in poultry form then fire sensor activates the buzzer and information is passed to mobile using IOT.

CONCLUSION:

- The embedded system is an innovative technology for chicken farming, which changes a traditional farm into a modern automated poultry farm.
- In addition, the system could work on the application of the smart phones helping the owner to monitor real time environmwntal contexts.
- Various environmental parameters have been continuously monitored to improve health and growth of the chicken.
- Application of inter of things helps the farmer to monitor the internal environment of poultry farm.
- Hence owner can able to get all details of the poultry at anytime and anywhere.
- 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 chicen consumer.

FUTURE SCOPE:

- The system is fully an automatic system to monitor and control the environmental changes such as temperature, harmful gases,intensity of light and food feeding without human intervention.
- This paper can be extended by automating the disposal of waste.
- Automatically detecting the diseases of birds by monitoring the weight of the bird.
- By using nano size materials, the kit size gets reduced.
- This system can also interfaced with several other applications.
- Connecting more devices.

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