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Automated Control System for Poultry Farm Based On Embedded System

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Abstract - *This project presents a flexible answer in a trial of up the accuracy in observation the environmental conditions like temperature, water level, food feeding and reducing work force for industrial households poultry farm. A wireless sensor network (WSN) was accustomed monitor the essential environmental conditions and every one the management processes square measure finished the assistance of a Aurdino ATmega2560 microcontroller. this method is capable of collection, analyzing and presenting knowledge on a Graphical interface (GUI). It conjointly permits the user to urge the updated detector data at any time through the SMS entryway service and sends alert message promptly sanctioning user interventions once required. Thereby the system minimizes the consequences of environmental fluctuations caused by unforeseen changes and reduces the gone labour power of farms. this method saves the price of hiring labour. the planning promotes a flexible, inexpensive and business version which is able to perform best for tiny to medium sized farming operations.*

***Key Words*: wireless sensor network (WSN), Aurdino ATmega2560, Graphical interface (GUI),LABVIEW, SMS service**

1.INTRODUCTION

Poultry farming is that the raising of domesticated birds like chickens, ducks, turkeys and geese for the aim of farming meat or eggs for food. Quite fifty billion chickens are raised annually as a supply of food, for each their meat and their eggs. industrial hens typically begin birth eggs at 16-20 weeks aged, though production bit by bit declines presently once from some twenty five weeks aged. this implies that in several countries, by some seventy two weeks aged, flocks are thought of economically not feasible and are slaughtered once some twelve months of egg production, though chickens can naturally live for six or a lot of years. In some countries, hens are force to re-invigorate egg-laying. Environmental conditions are usually mechanically controlled in egg-laying system.

Currently, farmers monitor the environmental conditions within the farm manually and on an irregular basis, largely consistent with the farmers expertise that is long and expensive in terms of workforce. the most downside within the poultry farm is brooding temperature. A hatched chick cannot maintain a correct temperature. Exposing a chick to chill temperatures within the initial 3 weeks of life makes the bird comfy and fewer possible to eat the feed and drink the water required for an honest begin In meat -type chickens , cool temperature cause permanent heart harm . Exposing the offspring to cool(20˚C or seventy˚C) for the primary or second day on the farm will cause the bird to die from heart issues later.

Water could be a crucial, however usually unnoticed nutrient. Animals will survive longer while not food than they'll while not water. Water is concerned in each side of animal metabolism. It plays a vital role in regulation temperature, digesting food and eliminating wastes. At traditional temperatures, chickens usually consumes double the maximum amount water as feed. in periods of warmth, water consumption will double or quadruple. to stay healthy, poultry flocks need water of adequate quality and amount. Over-involvement of humans within the feeding system of poultry may lead to malady happening, undue fatigue and deficiency disease of birds. These flaws within the poor feeding system of birds resulted within the automation of the system that minimizes the roles of the poultry attendants in delivering water for birds at such time intervals. Water level within the tank would be detected by the designed system and dispense showing intelligence with reference to the variations within the water level as birds consume the water. this method reduces work

of the poultry attendants, will increase value edges and generates higher come back on investment during a deep litter poultry farming system.

Poultry feed is food for farm poultry, as well as chickens, ducks, geese and different domestic birds. Before the 20 th century, poultry were largely unbroken on general farms, and foraged for a lot of of their feed, feeding insects, grain spilled by Bos taurus and horses, and plants round the farm. This was usually supplemented by grain, unit scraps, metal supplements like shell, and garden waste. Healthy poultry need a adequate quantity of macromolecule and carbohydrates, beside the required vitamins, dietary minerals, associate degree an adequate provide of water. Lacto-fermentation of feed will aid in supply. Grit aids in digestion by grinding food because it passes through the pocket. Grit isn't required if industrial feed is employed. The feed should stay clean and dry; contaminated feed will infect poultry. Damp feed encourages plant growth. Diseases may be avoided with correct maintenance of the feed and feeder. A feeder is that the device that provides the feed to the poultry. For in private raised chickens, or chickens as pets, feed may be delivered through jar, trough or tube feeders. the employment of poultry feed can even be supplemented with food found through search. In industrial agriculture, machinery is employed to modify the feeding method, reducing the value and increasing the dimensions of farming. For industrial poultry farming, feed is the most important value of the operation.

SYSTEM DEVELOPMENTS

In accordance with the overall system architecture analysis, the implementation of the system consisted of protocol, hardware and software development.

1. ROUTING PROTOCOL DESIGN

A routing protocol specifies however routers communicate with one another, distributive info that permits them to pick routes between any 2 nodes on a network. Routing algorithms confirm the precise selection of route. every router features a priori information solely of networks connected thereto directly. A routing protocol shares this info 1st among immediate neighbors, so throughout the network. This way, routers gain information of the topology of the network. Some network distinguishes between routing protocols and routed protocols. A routed protocol is employed to deliver application traffic. It provides acceptable addressing info in its web Layer (Network Layer) addressing to permit a packet to be forwarded from one network to a different. samples of routed protocols ar the net Protocol (IP) and Internetwork Packet Exchange (IPX). The topology used here is topology. the benefits of topology is once associate degree intermediate device fails, or goes offline, or is busy, the knowledge will still be

2. HARDWARE DESIGN

2.1 WATER LEVEL INDICATOR

The simplest sort of solid or liquid level mensuration is with a float. the automated methodology while not human intervention is controlled victimization the operational electronic equipment circuit. This methodology mechanically lowers the float right down to the water surface and measures the water level within the tank. The amplifier's differential inputs encompass a non-inverting input (+) with voltage V+ ANd an inverting input (–) with voltage V–; ideally the op-amp amplifies solely the distinction in voltage between the 2, that is named the differential input voltage. The output voltage is given by the equation:

$$V_{\text{out}} = A_{\text{OL}} (V_+ - V_-)$$

where AOL is that the open-loop gain of the electronic equipment (the term "open-loop" refers to the absence of a electric circuit from the output to the input). The water level indicator consists of two LM741 IC's. The LM741 series are general purpose operational amplifiers. It is intended for a wide range of analog applications. It has excellent temperature stability. The simplest form of solid or liquid level measurement is with a float. The automatic method without human intervention is controlled using the operational amplifier circuit. This method automatically lowers the float down to the water surface and measures the water level in the tank. If the float reaches the minimum water level the buzzer sounds and water is automatically filled in the tank with the help of the pump.

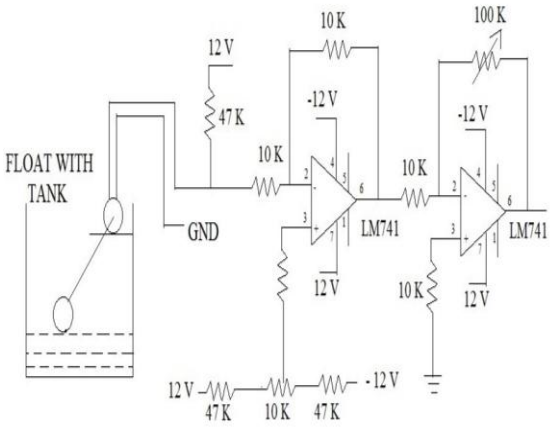

FIG.2.1 CIRCUIT DIAGRAM FOR WATER LEVEL INDICATOR

2.2 TEMPERATUREMEASUREMENT

LM35 may be a exactitude IC temperature sensing element with its output proportional to the temperature (in oC). The sensing element electronic equipment is sealed and thus it's not subjected to oxidisation and alternative processes. With LM35, temperature will be measured additional accurately than with a semiconductor unit. It conjointly possess low self heating and doesn't cause over zero.1 oC temperature rise in still air.The operational temperature vary is from -55°C to150°C. The output voltage varies by 10mV in response to each oC rise/fall in close temperature, i.e., its multiplier is zero.01V/ oC.

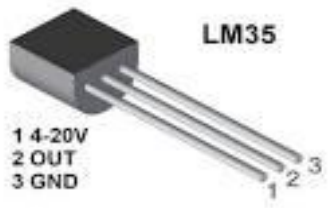

FIG 2.2 TEMPERATURE SENSOR

2.3 FOOD FEEDING

Food feeding is machine-controlled by activity the burden of the food within the instrumentation. the burden is measured exploitation the load cell. A load cell is usually associate degree device (transducer) that's accustomed convert a force into associate degree electrical signal. Through a mechanical arrangement, the force to be perceived is deforming a strain gage. The strain gage converts the deformation (strain) to electrical signals. Normally, a load cell consists of 4 strain gauges in a very Wheatstone bridge configuration, however are out there with one or 2 strain gauges. The electrical signal output is often within the order of many millivolts associate degreed needs amplification by an instrumentation electronic equipment before it are often used. The output of the electrical device is obstructed into associate degree rule to calculate the force applied to the electrical device.

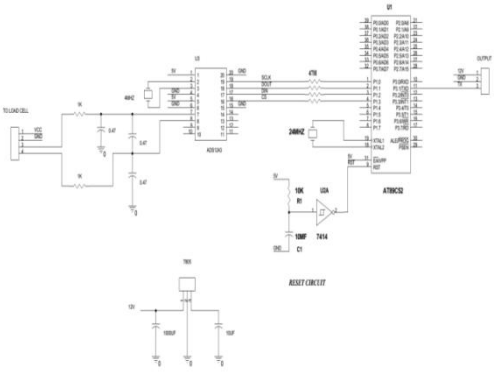

FIG 2.3 CIRCUIT DIAGRAM FOR LOAD CELL.

3. SOFTWARE DESIGN

LabVIEW is Laboratory Virtual Instrument Engineering Workbench. It is a system-design platform and development setting for a visible programing language from National Instruments. LabVIEW includes intensive support for interfacing to devices, instruments, cameras, and alternative devices. Users interface to hardware by either writing direct bus commands (USB, GPIB, Serial) or exploitation high-level, device-specific, drivers that give native LabVIEW perform nodes for dominant the device. In terms of performance, LabVIEW includes a compiler that produces native code for the processor platform. The graphical code is translated into feasible machine language by deciphering the syntax and by requested to run or upon saving. several libraries with an outsized range of functions for knowledge acquisition, signal generation, arithmetic, statistics, signal learning, analysis, etc., together.

4.OVERALL ARCHITECTURE

Wireless sensor network is used to collect information in the poultry farm.Temperature

measurement and water level indicator is controlled using the microcontroller. The data isanalyzed and presented on a graphical user interface,programmed by LabVIEW. It allows the user to retrieve up-to-date information about the environmental factors in the poultry farm and control equipment easily through the SMS gateway.It provides great utility for the user as they can access the information or receive warnings at any location where GSM services exist.

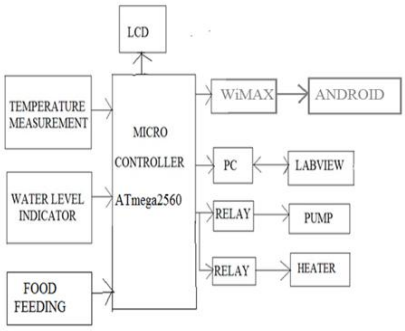

FIG .4 OVERALL ARCHITECTURE

5. CONCLUSION AND FUTURE WORK

This project can be adapted to requests formed in the design process, updating the sensor information and reflecting the real factors of environmental poultry farming. Each node has been set to receive the environmental factors (temperature, water level and food level). If any of these observing conditions drops below the predefined threshold, the sensor node will intimate the farmer and automating heating method, filling of water and filling of food takes place. This system will be labour- saving for the farmer and report environmental changes immediately, thereby enabling the farmer to prevent adverse strictly implemented throughout the redaction method and compiled into the feasible machine language once. consequences. This is a low cost system as it reduces the cost of hiring labours. Since all the operations are automated it is a easy to use the system. It is also a flexible system as it can be integrated into small and medium sized poultry farms with minimal modifications. Currently this system also provides many options which are user friendly enabling the farmer to manage all the necessary farming factors resulting in increased number of population and food. This system has a distance coverage of 30 miles.

In most of the cases longer the distance slower the speed, but this system is still faster and has a longer range. Ideally, speeds around 10mbps is achieved with a range of 1-6 miles. The spectral efficiency of the designed system is 3.7 bits/Hz. This system has data rate that varies from 30 to 40 Mbits/s. This system is designed to operate in the licensed spectrum of 3.3GHz. The system also has high scalability for households or farming businesses on a larger scale. This system minimizes the effects of environmental fluctuations caused by sudden changes and reduces expended labour power of farms. This system is fully an automatic system to monitor and control the environmental changes such as temperature, water level and food feeding with less 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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