MICROCONTROLLER BASED SMART SECURITY, FOOD AND ENVIRONMENT MONITORING SYSTEM FOR COWS

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Abstract– In the environment, cattle play a vital role by turning the forages that human cannot eat into a nutrient – dense food. Several steps will decide the consistency of the foodstuffs. One such way of providing quality food is by offering reliable food. The calculation of food pH and food temperature. In preserving top soil, fostering biodiversity, protecting wildlife ecosystems, reducing the spread of wildfires, providing natural fertilizer, livestock play an irreplaceable position. The most useful domestic animals are cows or sheep. In several aspects that we fail to notice or understand, we support humans and the world. The climate in which the cows live has a significant influence on the cows' well-being. If the cow remains near their own dung for too long, foot diseases can occur. Unfortunately, during the distribution of the produce, no farm takes any measurements. Furthermore, farms do not monitor the environmental conditions or consistently manage them, by spraying water on the form at regular intervals, it keeps the air clean and safe is kept in check by detecting if the cows have crossed the farm fence. By using pH, temperature, RFID sensor, Arduino microcontroller, a water pump and a 9-volt battery to power the pump. The system automatically performs all these processes.

Keywords– **Arduino, Health, Security, Environment, pH, Temperature, RFID, Sensors, Water pump, Cows.**

I INTRODUCTION

Cow health has always been an important topic for farmers and is still a challenging problem that needs to be addressed. Our framework is the product of research to assist the farmers of every country dependent on agriculture. For quite a number of times since the original proposal, the framework has been extensively revised. Three distinct dimensions are included, including the food monitoring system, the environmental monitoring system, and the cow anti-theft system. It is important to have all these components within the farm. The food monitoring device monitors the cow's food pH and temperature and compares the data to a standard graph. If the values are within the chart range, then the food is marked as edible ad can be fed to the farm cows. The environmental monitoring system consists of a water pump that sprays water over time, normally at regular intervals. Hours to suck out all kinds of cow-produced dirt and waste. If this is not done, it can lead too extreme illnesses and risks to cows' welfare. The anti-theft device consists of RFID system will trigger ana alarm in the farm, letting all the farmers know that a cow has escaped from the boundaries of the farm. The system is built to do all the following things listed above and we believe that this will not only make the lives of farmers easier but also allow farmers to stay away from major losses such as the death of cows, escape of cows or the stealing of cows from farms.

II LITERATURE SURVEY

A. RFID based anti-theft

A lot of work has taken place on the issue of the automated anti-theft system based on RFID. Geetha jayendra, Sisil Kumarawadu and Lasantha Meegahapola have rigorously worked with an immobilizer on the subject of an anti-theft auto security device focused on RFID.

B. Livestock security

Researchers have continually concentrated on offering more that will be successful defence. We are now in an age of technology where livestock can be tracked by RFID systems. A paper on RFID being used as a security measure on livestock was written by Nabil Kannouf, Yousef Douzi, Mohammed Benabdellah, Abdelmalek Azizi.

C. Identification books and documents

Rand A. Mahmood also wrote about the use of RFID as a protection measure, ranging from livestock safety to library books and private identification documents.

D. pH and temperature of food

Trying to ensure the quality of food is very critical and many articles provide information about the quality of food supplied to cattle. It is very obvious that the enzymes can only work most effectively at an appropriate pH and temperature range during the time of digestion. M.B.de Ondarza added to its website that enzymes require a pH of 5.7-7.3 and an optimum temperature of 39 degrees to work properly during digestion.

E. Motor pump control

Eventually, because of various needs, we can frequently see the use of water pumps where microcontrollers have complete control. A system to turn on a water pump when the water level of a tank goes below a level was implemented by Madhurima Santra.

F. Level indication

Consequently, J. E. Okhaifoh, C. K. Igbinoba, and K.O. Eriaganoma also completed work on the topic of microcontroller based automatic control for water pumping machine with water level indicators using ultrasonic sensor.

G. Wastage of water control system

In addition, water waste from moror p umps is a major problem. F. Ehiagwina, O Bamigboye, E. O. Seluwa and K. O. Gbadamosi also collaborated to design a microcontroller-based system. Water pump that operates in a way that reduces the waste of water.

H. Health Monitoring

We can monitor a cow's health parameters every minute. Using the suggested method in this article. Thus, abrupt, in particular, transmutations in the milk yield can be noted and some abnormality in the parameters of health, namely the body relative humidity, temperature, heart rate. Thus, several other systems find a various act to get through the things which makes the cow suffer

III PROPOSED SYSTEM

The system is designed in such a way that it takes data as input from the sensors according to the environment that the cows are in and then passes the data to the Arduino. The Arduino then computes and converts these electrical readings to scaled values like pH and temperature, which are understandable by humans.

In order to determine whether the food is appropriate for the cattle, the interface software compares the computed values with a standard dataset. It the pH value is in the 5.7 – 7.3 range, then it is in the acceptable range. If the pH value is in the acceptable range. Likewise, if the temperature is between 38,5 – 39,5 degrees centigrade, then the temperature is also within the appropriate range. The food can be fed to the cows if and only if both the temperature and pH of the food are within the appropriate range. Finally, if the temperature and pH are within the standard range, then the green light will be turned on by the system. Otherwise, the red light will be turned on. Likewise, any RFID card/tag close to the receiver is detected by the antitheft system. Cows are wrapped around their necks with RFID tags. Any presence of the tag near the recipient would indicate that a cow is near the door and is about escape. The RFID receiver would then dump the device with tag detail, alarming the farmers about the escape.

IV FLOW CHART

The above flowchart reflects the overall processes and operations within the system. The scheme is mainly divided into three components. Firstly, there is a timer for the environmental management aspect that checks if the time the water pump was last switched on exceeds 4 hours. If the condition is true, to clean the surrounding area, the pump automatically turns on. Secondly, the temperature and pH of food is periodically reviewed. If the pH is within the standard 5.7 – range, to be considered natural, the temperature needs to be between 38.5 and 39.5 degrees centigrade, If they are both okay, then the food is fine for the cows to be fed and a green light is turned on. Otherwise, the red light will turn around, to warn the farmer that the food is not OK. Eventually, if the gap between the tag and the receiver is less than the threshold value, it is less than the threshold value for the anti-theft device. It is less than the threshold value for the anti theft device. It means the cow is about to flee and the red light or warning system is turned on to warn of the escape.

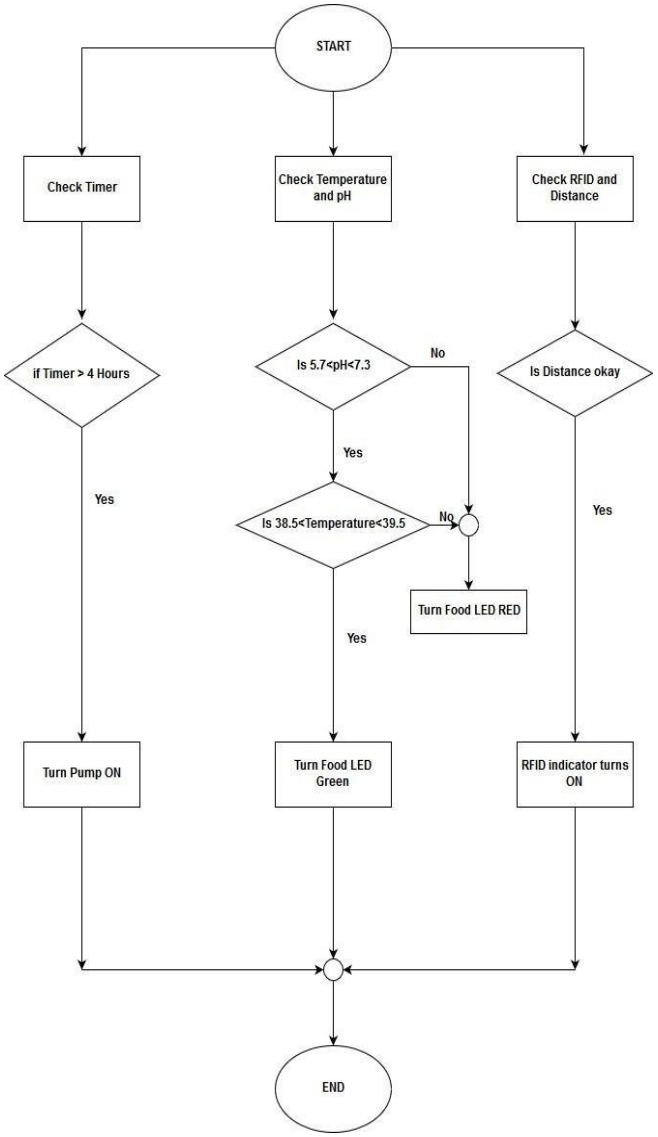

Fig. 4.1 Flowchart

V BLOCK DIAGRAM

In terms of blocks, the block diagram above describes our system's key functions. A told of two Arduinos and a 9V battery are in operation. The first Arduino is driven by inputs from the respective pH sensor, temperature sensor and RFID sensor. The inputs are mainly processed by the Arduino. Based on the rules set, it shows appropriate outputs that indicates the food quality and security status of the farm. The second Arduino's output is connected to a water pump which is further driven by a 9V battery. It primarily functions as a switch and is programmed in such a way that the output becomes high and the output becomes high when the time that the pump was last triggered is greater than 4 hours. For a fixed period of time, the 9V battery begins driving the water pump.

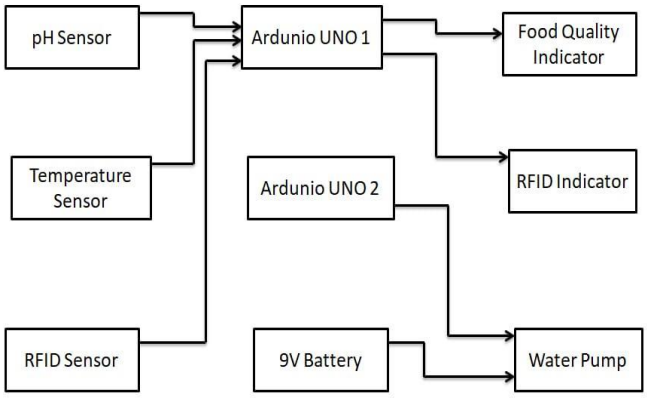

Fig.5.1 Block diagram.

VI CIRCUIT DIAGRAM

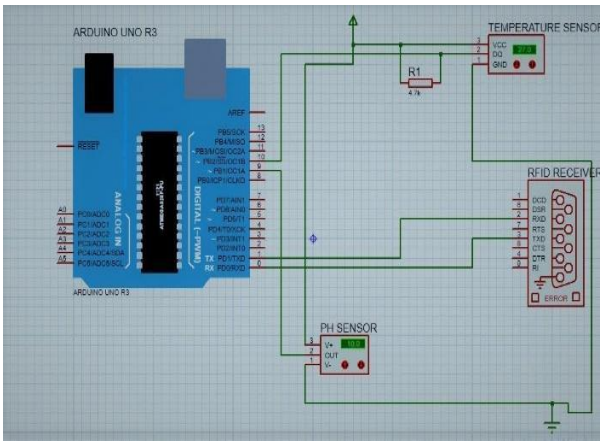

Fig. 6.1 Schematic diagram of Arduino 1 and corresponding connections

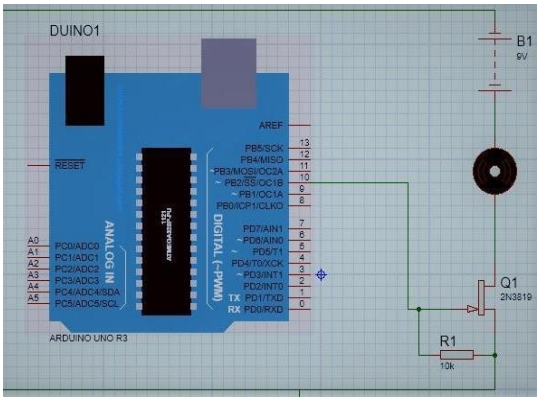

Fig. 6.2 Schematic diagram of Arduino 2 and corresponding connections

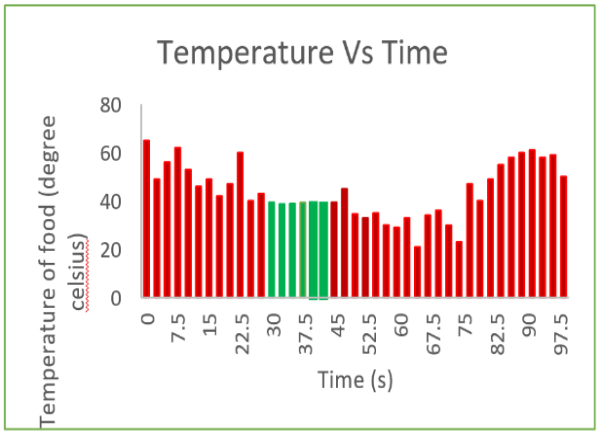

Fig. 6.3: Temperature vs Time graph

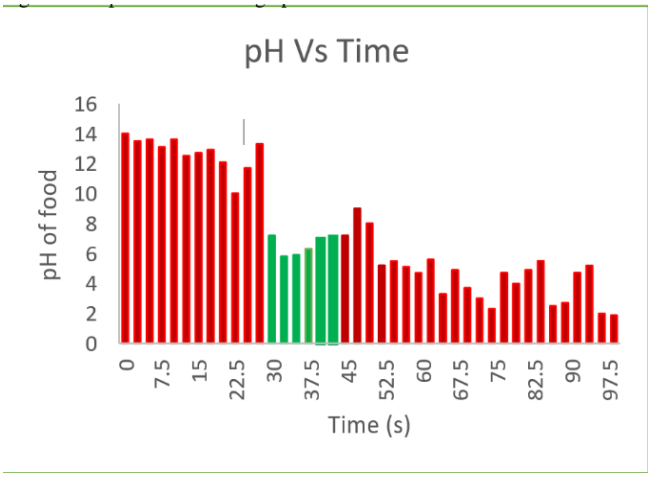

Fig. 6.4 pH vs Time graph

The two schematic diagrams above depict the elements which are linked to the two separate Arduino's in graphical formats Fig. 3 reflects Arduino's circuit diagram 1. This Arduino is connected to the respective pH sensor, temperature sensor and RFID receiver 5V and ground are connected to all the sensors. 5V and ground are connected to all the sensors. There is a resistor of 4.7 kilo ohms between the VCC and the temperature sensor output. In addition, in Fig.4 as a switch, the Arduino acts. The output is connected to the NMOS Q1 gate. The drain is connected to the negative pump terminal. A 9V battery powers the pump. Between the gate and the source of Q1, a resistor is present. All the components are constantly grounded.

VII RESULTS

Our system's design and architectural model are as follows. On either side of the main area, where the cows reside, there are two maintenance rooms. A water pump that is powered by a 9V battery is found in the room on the left. At regular intervals, the pump sprays water around the cows to clean any type of dirt and waste produced by the cow.s, maintaining a hygienic environment. The room on the right has three main sensors inside it, connected to the Arduino. They are 1) pH sensor 2) temperature sensor 3) RFID receiver. In order to ensure the correct quality, the temperature and pH sensors are both placed inside the food that will be served to the cow. To notify the owner about the escape of any cow from the farm, the RFID receiver is placed near the exit. A green light is shown to be turned on when the food that has been provided is within the pH and temperature range. This gives farmers the impression that the cows can continue to be fed.

A red light is turned on if the pH and temperature of the food is outside the standard range, meaning that the food cannot be fed to the cows. For example, if the temperature is above 39.5 or below 38.5, or the pH is above 7.3 or below 5.7, the red light automatically switches on to tell the farmer that it is necessary to change the food provided. If the cow trues to escape, under the "COW HAS ESCAPED" section, a red light will be turned on, alarming the farmers that the cow has been stolen or escaped and they should look for the cow in the nearby areas.

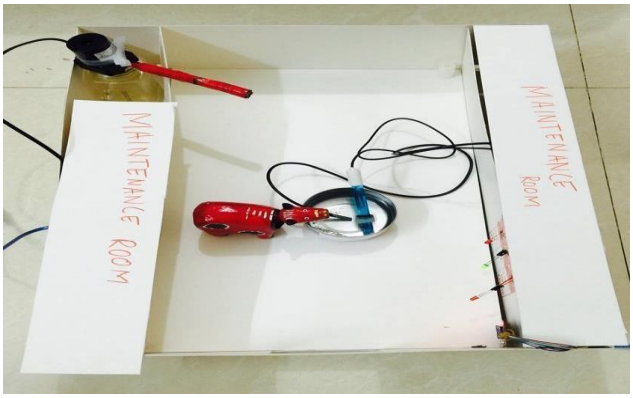

Fig. 7.1 Architecture of the System

Fig.7.2 Green Light Turned on, When the Food is okay

Fig. 7.3 Red Light Turned on, When the Food is not okay

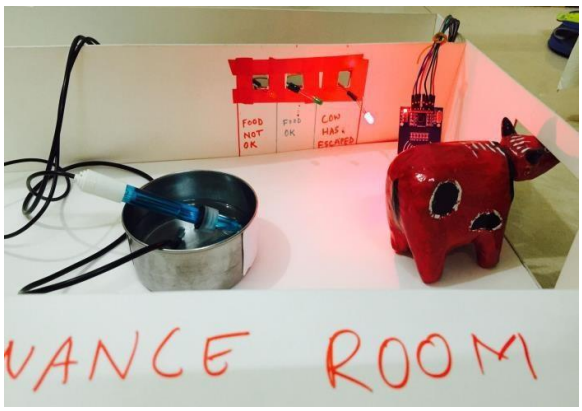

Fig. 7.4 Red Light Turned on, as cow tries to escape

VIII CONCLUSION

The design and implementation of an intelligent safety, food and environment monitoring system for cows using a microcintroller is discussed in this paper, there are some new innovations in our system, for example: perviously, there was very little work on how to verify the quality of the food to be served to the cows. In our system we recogined the parameters that can have an effect on the qulity of the food and automaticaaly checks whether the food being provided to the cow is healthy, maintains a clean environment around cows living vicinity and signals the farmer of any protection breach. Another gain that our machine has it that it minimizes large losses for farmers. Although there's preliminary set up value for farmers, the machine reduces general loss via prevention of dangerous increase and robbery of bcows. Furthermore, the cslae of our machine could be very small, that is a first-rate benefit. However, there's room for improvement. The system has used much less type of sensors and components in order to measure food quality. Different sensors can be used in order to get measurements that are more accurate and reliable. It also offers a deeper understanding of water quality [11]. In addition, we are not testing the consistency by calculating the vitamin and mineral content of the food. This is something for further analysis that can be looked after. In the device, a GPS system can also be used to keep track of all cows and to monitor each cow's position [12]. It will therefore not only help us warm farmers if a cow has been escaped or stolen, but also monitor the exact location of where the cows are housed. To measure the heart rate of all the cows, a heart rate monitor will come in handy. It is possible to maintain records in a database, this will serve as a predictor to predict, even beforehand, any expected illness or attack [13].

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