

Cattle Health Monitoring System Using GSM

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Abstract- Now a day human cannot imagine his life without technology. The diverse technologies around us are helping people to live their lifestyles with more luxury. This period has transformed and developed many projects such as the sophisticated cattle health monitoring systems and GSM. In wireless sensor-based cattle health monitoring systems, important parameters affecting the health of cattle, including body temperature, respiration, humidity, heartbeat, are monitored. If an abnormal condition is detected, it means that the red color will be led. The common means of health of cattle will be indicated yellow. In this framework, the Arduino UNO microcontroller is used to understand the various activities of cattle such as body temperature, respiration, humidity, heartbeat, and rumor. And also, the cattle tracking system is based on the Global Positioning System (GPS) that receives signals from the GPS satellite. The fall down position is also monitored using the accelerometer sensor. If a fall is detected, an SMS alert will be sent using GSM communication and the location of the cattle will also be tracked with the help of GPS. If a simple prototype is developed for this goal due to which the data can be measured by the sensor then SMS can be sent to the corresponding number so that the location of the cattle can be determined.

I. INTRODUCTION

In a developing country, where people live in abundance in rural areas, people are still dependent on the source of income of cattle. Their way of living depends to a large extent on the health status of the cattle, as most of the people depend on dairy products for their livelihood and also for the farmers who cannot afford the advanced machinery for agricultural purpose and for this Still dependent on cattle. Due to the unavailability of veterinarians in rural areas, people travel far and wide with their cattle to veterinarians, costing them dearly. But such an action can be a double-edged sword as if the health condition of the cattle is really bad, they can get treatment, but if it does not, it will be a waste of total money on this journey. According to the survey, it can be noted that most of the people in rural areas get depressed from their rural life and leave their family member in the village and move to the urban area. Accordingly, there is heavy research on humans through which we are able to get valuable information about health parameters. But unfortunately, with

the help of advance technologies, only few research work is being done on monitoring the health of cattle. Some of the available systems that are used to monitor the health of cattle, which are used by electrocardiographic pill, cattle health monitoring system using Arduino and LabView. In this paper we are going to give a brief introduction of all such systems along with their advantages and disadvantages to summarize a best system for monitoring the health of cattle.

II. LITERATURE SURVEY

After the BSE was identified, 4.5 million cows were burnt and more than 4 million livestock were killed to prevent the spread of foot and mouth disease. Altogether, these diseases are estimated to cost the UK economy £ 13 billion. It is always desirable to implement programmed health monitoring to monitor the condition of animals as well as to prevent outbreaks of animal diseases. [1]. Various researchers have used wireless networks with a mounted sensory device (ie, collar) to monitor the activity of individual animals and monitor health conditions. [2]. Zebra-mounted devices regularly exchange data such as GPS positions with all other devices that fall within their transmission range. If enough memory space is available, a user can download historical position data of multiple animals by contacting a single zebra [3]. Radio performance needs to be improved by attenuation caused by the animal body. In cattle health monitoring applications, cattle are typically fed into the herd and this largely increases surface area, which will seriously affect radio performance. The reason for this is radio absorption in the body of the animal. Ideally, the communication hardware should be able to minimize the effects of body attenuation [4].

III. EXISTING AND PROPOSED METHOD.

EXISTING METHOD

For the first year, dairy farms and farmers used specialized technology to detect animal health-related diseases and this required constant or daily basis observation, considering the health monitoring of dairy dairy cattle Again excessive labor is required. Sometimes such a technique gives incorrect results that were different from the actual health status of the cattle. This can cause harmful effects on the

health of cattle. In addition, there should be a proposed automated health monitoring system that maintains record health parameters fast and accurate so that appropriate treatment is used.

PROPOSED METHOD.

The system consists of a GPS module, temperature sensor, humidity sensor, accelerometer sensor, heart rate sensor, respiratory sensor and GSM module, controlled and controlled by the ARDUINO UNO microcontroller. The project revolves around the basic concept of serial communication. The GSM modem has been interfaced with the microcontroller. A GPS module is used to detect the location of the cattle, a temperature sensor is used to sense the temperature of the cattle and an accelerometer is used to detect the orientation of the system in three different coordinates is done.

The heart rate of cattle can be monitored using a heart rate sensor. The respiratory rate of cattle is 26 and 50 breaths per minute. When the respiratory rate of cattle increases it represents tension or pain or may be a sign of respiratory disease.

If cattle become too hot they may be given panties to increase heat loss through evaporation. The cattle breathing above 100 per minute is under severe heat stress. Humidity sensors are used to monitor the moisture status of cattle. The health status of the cattle is continuously monitored using sensors.

If the health status of the cattle is normal, a yellow LED will be indicated. If the health status of the cattle is abnormal, a red LED will be indicated. If a fall is detected, an SMS alert is sent to the concerned person and the location of the cattle is also tracked using GPS communication.

IV. BLOCK DIAGRAM

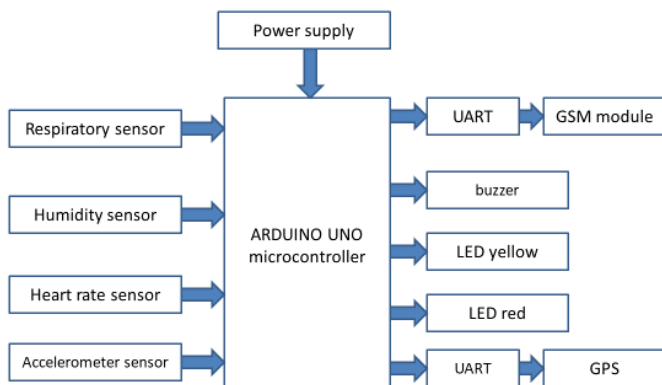


Fig no 1: Hardware block diagram

V. HARDWARE COMPONENTS

ARDUINO UNO MICROCONTROLLER

The Arduino processor basically uses Harvard architecture where program code and program data have a different memory. It includes two memory - program memory and data memory. Code is stored in flash program memory, while data is stored in data memory. The Atmega328 has 32 KB of flash memory for storage code (of which 0.5 KB is used for the bootloader), 2 KB of SRAM and 1 KB of EEPROM and operates with a clock frequency of 16MHz.

The most important advantage with Arduino is that the device can be loaded directly without the need of any hardware programmer to burn the program. This is done due to the presence of 0.5KB of the bootloader which allows the program to burn into the circuit.

HUMIDITY SENSOR

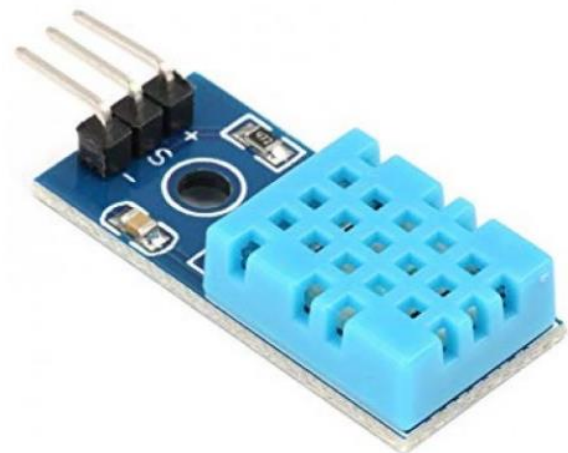


Fig no 2: Humidity sensor

Humidity sensor is a device that measures relative humidity in a given area. Humidity sensor can be used indoors and outdoors environment. Humidity sensors are available in both analog and digital models. This sensor module converts moisture associated with electrical energy and can be used in a weather monitoring system.

HEART RATE SENSOR



Fig no 3: Heart rate sensor

Heartbeat sensor is an electronic device used to measure heart rate, which means heart rate. Monitoring of body temperature, heart rate and blood pressure are the basic steps we take to keep us healthy.

To measure body temperature, we use a thermometer and to monitor arterial pressure or blood pressure. The heartbeat can be viewed in two ways: one by hand checking the beat of an object on the wrist or neck and the other by using the heartbeat sensor.

TEMPERATURE SENSOR

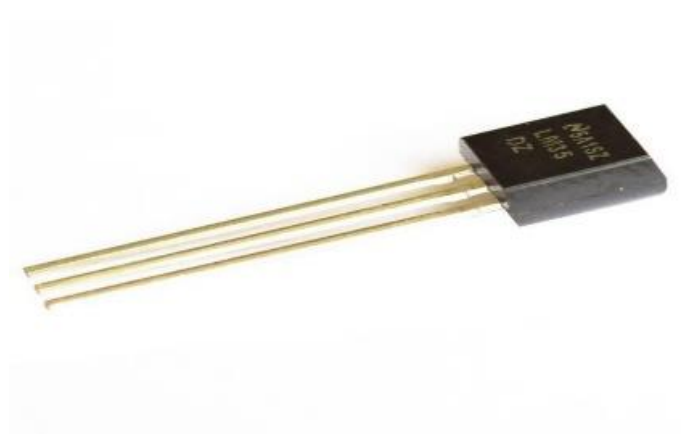


Fig no 4: Temperature sensor

The LM35 series is precisely integrated heating devices where the output voltage is equal to the temperature of the centigrade. The LM35 device has an advantage over Kelvin's average temperature sensors, as the user does not have to remove a large amount of power from the output to achieve a simple centigrade measurement. The LM35 device does not require external measurements or cuts to provide precise $^{\circ}\text{C}$ precision at room temperature and in the room cover $^{\circ}$ cover full range 55°C to 150°C . built-in LM35 device makes integration much easier to read or control the circuit.

ACCELEROMETER SENSOR

The Accelerometersensor is a device that measures the proper acceleration. For example, an accelerometer on the Earth's surface would measure speed due to gravity on Earth, directly) above (by definition) 9.81 m / s^2 . Conversely, an accelerometer at the last point (which falls to the center of the Earth at a rate of approximately 9.81 m / s^2) would measure zero. The most sophisticated accelerometers are used in roaming systems that are free of airplanes and arrows. Vibration is monitored in accelerating machines by accelerometers. They are used in tablet computers and digital cameras so that images on the screen always appear honest. In

unmanned aerial vehicles, accelerometers help stabilizesthe flight.



Fig no 5: Accelerometer sensor

GSM MODULE



Fig no 6: GSM module

GSM is a mobile communication modem is stands for Global System for Mobile Communications (GSM). The idea of GSM was invented in 1970 at Bell Laboratories.

GSM is an open and digital cellular technology that is used on the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands to run mobile voice and data services.

GPS MODULE

GPS represents the Global Positioning System and was developed by the US Department of Defense as a navigational area for military and civilian use. It is a space-based radio-navigation system with 24 satellites and ground support. GPS provides users with accurate information about their position and velocity, as well as time, land, and all-weather conditions.

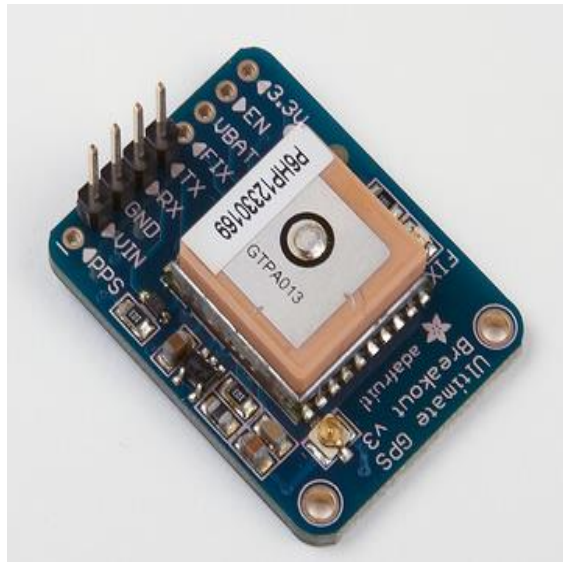


Fig no:7 GPS module

RESPIRATORY SENSOR

Breathing sensor is a circular sensor that is worn using a lightweight elastic band, adjusted with a webbing adjustable length. It expands / cuts the chest or abdomen and produces a respiratory wave. It has no latex, no magnet, and can be worn on clothing. Since respiratory sensors can be used with any sample size, it can be connected to any input of any encoder except Channel A.

VI. RESULTS

The prototype model of cattle health monitoring system is successfully implemented with various sensors and GSM communication. after connecting all the sensors on the cattle body, the health parameters of the cattle is monitored continuously such as, heart rate, temperature, humidity, respiration and the LED will be indicated the normal and abnormal health condition of the cattle. if the cattle fall down condition is detected and the SMS alert send to concern person and GPS location of the cattle is tracked successfully.

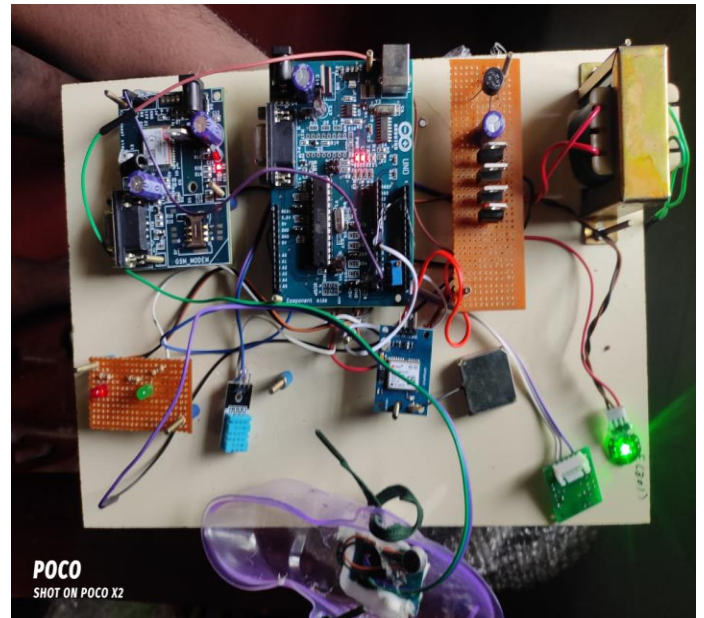


Fig no: 8 Hardware prototypes

Abnormal Cattle Health Parameters Detected!!!
Heart:85
Acceleration:309
Temperature:32
Lat:
Long:

Abnormal Cattle Health Parameters Detected!!!
Heart:88
Acceleration:307
Temperature:32
Lat:
Long:

Abnormal Cattle Health Parameters Detected!!!
Heart:82
Acceleration:314
Temperature:32
Lat:
Long:

Fig no 9: cattle health parameter SMS notification

VII. CONCLUSION

This research has been carried out to establish specific sensor technologies to monitor the health of cattle and

ensure the wellbeing of cattle in the rapidly changing conditions of automated farms. Due to the high demand and supply of dairy products, dairy cattle are in constant demand for high yield, requiring constant monitoring of their health to ensure their fitness as it directly affects the health of consumers. In addition, the overall economy in the dairy farming industry depends on herd health. Analysis of these conditions and location-related symptoms can also be tracked with the help of GPS and SMS alerts are sent using GSM communication.

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