International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

Livestock Monitoring in Agriculture using IoT

Khushbu Shah[1], Kinjal Shah [2], Bhavin Thakkar[3], Mrs. Hetal Amrutia[4]

[1,2,3]Student, Department of Information Technology, Thakur college of Engineering and Technology, Mumbai, India
[4]Assistant Professor, Department of Information Technology, Thakur college of Engineering and Technology, Mumbai, India

---

Abstract:- *Agriculture is the major source of income in countryside areas. Animals like cow, buffalo, sheep, goat etc. play an important role in life of rural. They are used as a source of income. Hence animal husbandry becomes a most important concern. Lots of farmers are now torment from different killing diseases and increased breeding costs. It is therefore essential for farmers to adapt to efficient and technical methods to increase productivity and reduce diseases. In this paper, we illustrate Internet of Things technology for the farmers. We use sensors to collect and transmit the data using parameters, such as temperature, humidity and heartbeat and then transfer it to the Arduino Uno. The Arduino Uno receives the data from the sensor and transmits the content accordingly. Sim module from the gsm will transfer the data to the monitoring website. All the hardware components and sensors will read the results through the computer monitor which also tracks the current status and location of the livestock using the global positioning system.*

Key Words: *Internet of Things, Agriculture, Monitoring, Sensors.*

I. INTRODUCTION

The Internet of things (IOT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. It refers to growing network of physical devices and other internet-based items with electronics, software, sensors, monitors, transmitters, receivers and network connectivity which enable these objects to collect and store data [2]. Internet of Things technology has gone further in livestock management which allows farmers to embed internet connected sensors on their livestock that does not cause them discomfort. A primary advantage for monitoring livestock is to help farmers track their cattle, their temperature, humidity, heartbeat which will help to manage the livestock in an easier and efficient manner.

Table -1: Normal Range of Parameters

Parameters	Normal	Less	More
Temperature	38-42 ˚C	Indigestion, milk infection	Influenza, anthrax
Humidity	1-72%	-	>80% severe stress
Heartbeat	48-84	Low blood pressure	High blood pressure

Farming industry gives significant income to the Indian nation. But livestock in the farms are mostly affected by a number of diseases. The regular temperature of cow is 38-42 ◦C. When the temperature is below 38.5-39.5◦C the diseases arises are indigestion, milk infection etc. and when the temperature is above 42 ◦C the diseases arises are influenza and anthrax [5]. When the temperature of the animal is very high on that time it may die. When the humidity is between 1-72% (No stress), 72- 79% (Mild stress), 80-90% (Moderate stress), 91-99% (severe stress) [8]. Humidity can reduce heat exchange and have enervating impact on the cattle. The adult cow has a heart rate of between 48 and 84 beats per minute. An elevated heart rate may be a sign of pain, and is seen in conjunction with several diseases.

This Paper illustrates Wireless Sensor Network technology to the farmers. It proposes that a wireless sensor networks should be installed on farms to gather ecological data which shall then facilitate farmers not only in monitoring the livestock via the Web from outside the farm, but also help the control of farm environmental in remote locations. Electronic means of monitoring cattle health or animal health are developed. Using information from these sensors, farmers will be able to monitor the overall health of the livestock. In the absence of the use of monitoring technology and software, a problem with a particular livestock may not be noticed until it has reached an advanced stage and requires more considerable intervention which wouldn't have been necessary if the issue had been detected earlier.

2. BACKGROUND

Applications used do not provide the location of the Livestock [3]. Systems do not have a built in Wi-Fi module hence a separate module has been used [5]. The results that were generated are not efficient enough due to the loose connection of the sensors to the Arduino Uno [1]. From the literature survey conducted & resulting research gaps acquisition, the proposed paper aims to overcome most of the drawbacks and present a monitoring system that is user-friendly and guarantees to provide results for all livestock used for agriculture.

Table -2: Literature Survey

Reference No.	Year of Publication	Name of the Authors	Topic	Proposed Solution after key findings	Research Gaps
ISSN (Print): 2320 – 3765 ISSN (Online): 2278 – 8875	2016	Meenakshi .M, Snehal. S. Kharde	Advance Cattle Health Monitoring System Using IOT	Raspberry pi microcontroller is used and it has in built Wi-Fi module	We can use Arduino Uno with built in Wi-Fi module
ISSN: 2214-1804	2017	Suresh Neethirajan	Sensing and Bio-Sensing Research. Recent advances in wearable sensors for animal health management	Thermistors, thermocouples and infrared radiation sensors can be used for temperature detection	DHT11 Temperature and humidity sensor with ±2°C accuracy
E-ISSN 0976-3945	2016	S. Jegadeesan1, Dr. G. K. D. Prasanna Venkatesan	Smart cow health monitoring, farm environmental monitoring and control system using wireless sensor networks	Temperature Humidity Sensor (SHT-71) Humidity range: 0–100% RH Temperature Accuracy: ±0.4 °C @ 25 °C	EE461 Temperature sensor Good for 0-50°C temperature readings ±2°C accuracy
ISSN (e): 2321-7545	2015	Leena Narayanan1 , Dr.T.Muthumanickam2 , Dr.A.Nagappan3	Animal Health Monitoring System Using Raspberry Pi and Wireless Sensor	LM 35 is used as temperature sensor Raspberry Pi model B	DHT11 humidity sensor Good for 0-72 humidity readings ±2°C accuracy

Referring to the literature survey performed by us and the research gaps observed we found out that the accuracy of most of the systems was around 80%, because it was observed that there was lack of testing of the system and hence the overall efficiency turned out to be low. Another reason was that the data of the sensor was missing, the sensors were turned out to be corrupt or not recognized by the system. The location of livestock was troublesome incase if they wandered too far.

3. MATERIAL AND METHODS

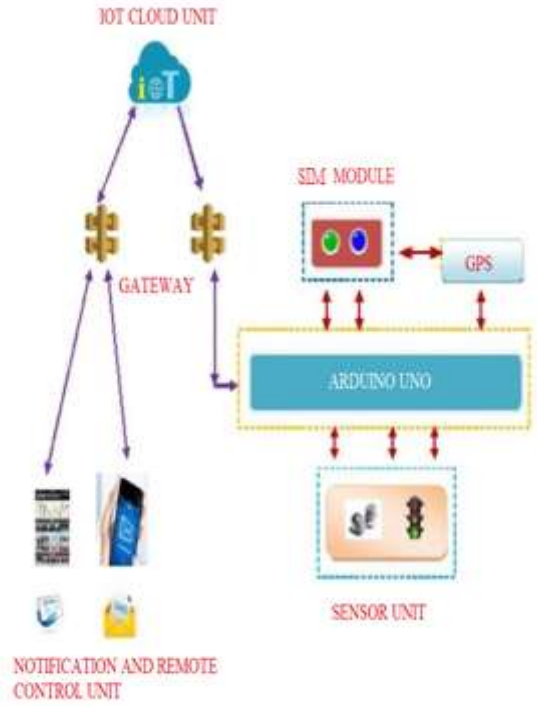

Fig -1: Block Diagram

Temperature sensor is used to sense the body temperature of the cattle. Numbers of infections are accompanied when the body temperature of the cattle changes. Humidity sensor is used to determine stress level of the animal. The adult cow has a heartbeat of between 48 and 84 beats per minute. And heartbeat sensor will give stress as well as animal anxiety. Using information from these sensors, farmers will be able to monitor the overall health of the animal. If any of these parameters where to veer outside of accepted ranges, farmers would be able to more quickly provide treatment to the animal. The Arduino Uno is flexible and readily available for a wide variety of applications. The Arduino Uno is used because of their flexibility, simple programming, and low cost, huge collection of application data and large availability of open source developer tool. The signals arriving from the sensors are sent to the GSM module through Arduino Uno. The GSM module can easily make communication with it among serial device, cellphone and network device providing a complete and self-controlled interacting solution. The GSM module are low cost, small and maintain Sim network connection and encryption in client mode and access point mode. Sim module communication is done through simple serial RX and TX lines using "AT" i.e. attention type commands and data. A GPS module is a

simple device which receives information from GPS satellites and then calculates the device's geographical position. It is used to provide suitable location of the livestock on the map.

3.1 Procedure methodology

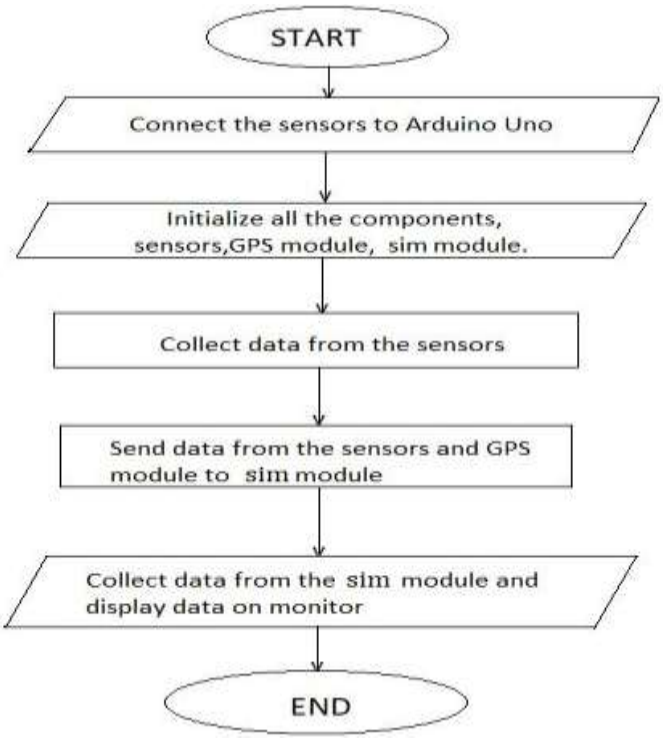

Fig -2: Flowchart of Livestock Monitoring using IOT

This flowchart describes the flow of the Livestock Monitoring in Agriculture using IOT. It represents the flow of the method from the connection of hardware to the collection and display of data.

4. RESULT

The proposed paper describes a website that will notify the farmer with an alert message regarding any fluctuation from the normal range provided for livestock through an email notification or a message. The website also keeps a track of the database and the interface is user friendly which can be used by any farmer who is unaware about the current technologies.

Fig -3: Login Page

Figure 3 shows the login page. We can access the system by entering the correct id and password. We have made the website using Microsoft Visual Studio in .NET framework. These are .NET pages and hence have .aspx extensions

Fig -4: Home page of website

Figure 4 shows the homepage of the website. After logging into the website this page is displayed. The buttons on right hand side display the Home, Status, Set Range and Logout.

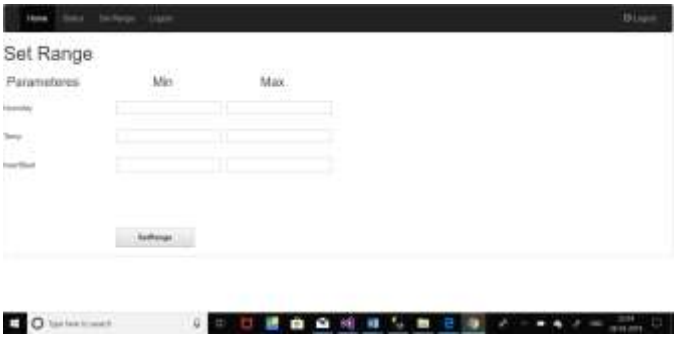

Fig -5: Set Range of Website

Figure 5 shows that the ranges of temperature, heartbeat and humidity can be set as follows:

Min Heartbeat, Max Heartbeat, Temperature Range, Humidity Range. Here we can set the range as and when required according to the values we want to enter. Thus, this is dynamic in nature and further used in future.

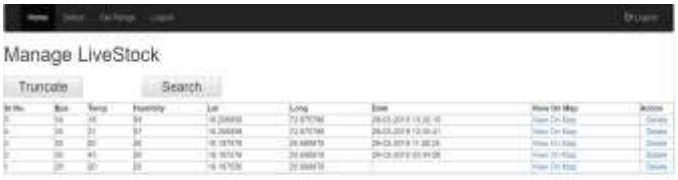

Fig -6: Results obtained using sensors

Figure 6 shows some of the results obtained from the sensors on our website. Heart rate, Temperature, Humidity, Location using Google Maps and the date and time of the data are available.

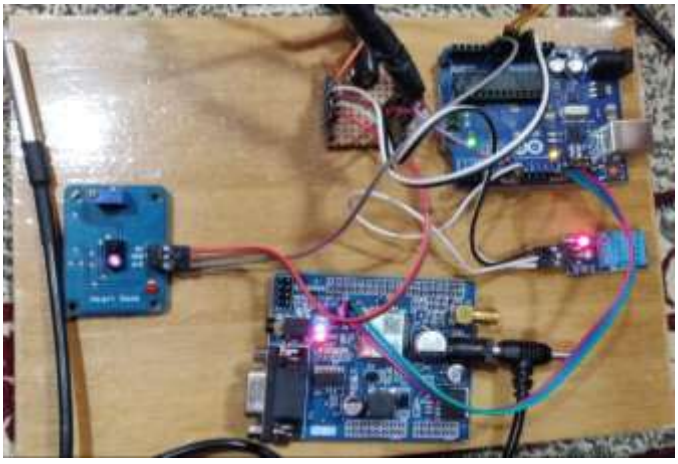

Fig -7: Hardware

Figure 7 shows the assembling of components. The Arduino, sensors, and the sim module are connected to each other.

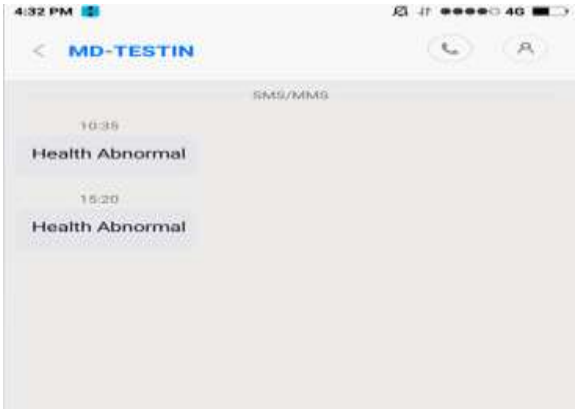

Fig -8: Notification on SMS

Figure 8 shows an SMS notification is also sent on the mobile number if the Readings are abnormal. Which indicates that the livestock health might be abnormal.

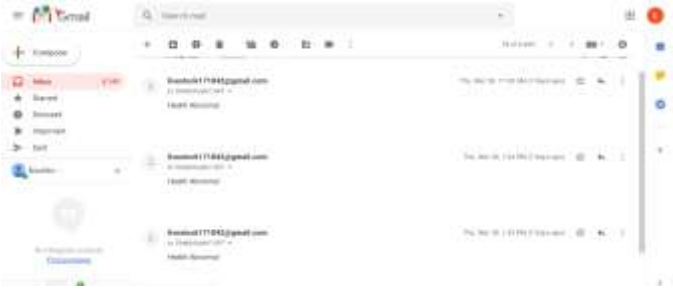

Fig -9: Notification on email

Figure 9 shows if the readings of the project exceed the range or the values are less than the range then notifications are sent to the user. An email is sent to the Gmail account which we have set for the project.

5.CONCLUSION

Using the website developed we can monitor the health of livestock to get accurate results and track the current location of the livestock. By this we will accurately track the changes in the environment of the Livestock.

6. REFERENCES

[1]. Advance Cattle Health Monitoring System Using Arduino and IOT. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 5, Issue 4, April 2016. e-ISSN; 2395-0056

[2]. Internet of Things: A Hands-On Approach- By Arshdeep Bahga, Vijay Madisetti
[3]. International Journal of Scientific Research and Education. Volume 3, Issue 5, Pages-3386-3392, May-2015, | ISSN (e): 2321-7545
[4]. Internet of Things: Principles and Paradigms -Amir Vahid Dastjerdi, RajkumarBuyya
[5]. Leena Narayanan et al IJSRE Volume 3 Issue 5 May 2015 Page 3386. Animal Health Monitoring System Using Raspberry Pi. (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 03 | Mar -2017
[6]. Chong, C.Y.; Kumar, S.P.; Hamilton, B.A. Sensor networks: Evolution, opportunities, and challenges. Proc. IEEE 2003, 91, 1247-1256.
[7]. K. Mayer and K. Taylor, "An Embedded Device Utilizing GPRS for Communications," presented at International Conference on Information Technology and Applications, Bathurst, Australia, 2002.
[8]. Zoetis, Dairy Zoetis Proud to Protect. Zoetis Blog, 2014. Available online: http://www.zoetis.ie/diseasesandconditions/dairy-cattle/index.aspx