IOT Based Cattle Health Monitoring System

Vaishnavi Shinde
Atharva College of Engineering
Mumbai, India

Prof. Sweta Jha
Assistant Professor
Atharva College of Engineering
Mumbai, India

Amruta Taral
Atharva College of Engineering
Mumbai, India

Komal Salgaonkar
Atharva College of Engineering
Mumbai, India

Shraddha Salgaonkar
Atharva College of Engineering
Mumbai, India

Abstract— **Nowadays, farm productivity increases in large amount because of farm automation and advanced technological techniques. The current research area in farm automation is cattle health monitoring system. Mobile, wireless sensor networks are able to bring a new level of monitoring into many industries. The proposed monitoring system includes the infrastructure, hardware, software and representative physiological instruments.**

The key point to increase the farm productivity is health of cattle. Many dairies contain large number of cattle's. Therefore it is too difficult to take care of them and to monitor routinely the health of dairy cattle. So this work is very adamantine to the owner of dairy and regional authorities. The main aspect of health monitoring system is to check continuously the health of individual of cattle, easily diagnosis and treatment of sick cattle as early as possible. In that system we use sensor technology which maps the special aspects of animal behavior like temperature, heart rate etc. this data is aggregating and reporting to the health care center. This reduces the minimal health inspection and long term animal healthcare cost.

Keywords— *Biomedical Appliance,Wearable Sensors Techology, Embedded System, RFID System,Animal Health Monitoring System, IOT ,Cloud Computation.*

I. INTRODUCTION

For any progressive as well as progress countries Agriculture play crucial role or we can say that it's act like backbone of such countries. At present agriculture besides farming includes forestry, fruit cultivation, dairy, poultry , Bee keeping etc. today, all accepted as part of modern agriculture.

Out of this scale of dairy farming has been changed worldwide over recent year with a move toward larger, more intensive, profit driven enterprises, primarily due to market pressure and demanding of milk products. This has been leads in demand for technologies such things can be achieve by using farm automation and advanced technology.

In last two decades an important aspect of farm automation that is being researched is area of automated animal health monitoring system. In this paper we will be focus on monitoring the health of cattle's by using non-invasive, low cost sensors technology that detect sudden change in body parameter like temperature, blood pressure etc. The parameter that is taken by sensors are access by using wireless technology collect data use for early detection of disease this things are going to develops by using IOT.

II. LITERATURE SURVEY

In recent times, animal welfare had become an increasing concern due to a shift from small sized labor based farms to much larger autonomous and industrialized farms.

In 2001,A system was invented in which data was manually entered in to the integrated electronic data base system. The prior objective of the system was that it could allow the persons to identify their animals with the help of electronic identification units. They were mainly of the form of collars, ears tags and bolus in the stomach [1].

In 2003,The bovine mobile observation operation unit was designed to communicate with a variety of sensors. It used Bluetooth links to send the data back to a farmer, a veterinarian etc. microchip PIC micro-controller is the important components of BMOO. For this purpose the animals should be within 10 meters range which is used to prevent the spread of disease [2].

In 2012,A system was invented to monitor the health of cattle using a wireless sensor mote. It used in-network processing algorithm to monitor the data [3].

III. PROBLEM MOTIVATION

For earlier year, dairy farm and farmers used the special technique for detection of animal health related diseases and it require the continuous or daily to daily base observation which again require the excessive labor if we consider the dairy farm cattle's health monitoring. sometime such technique gives the wrong result which was different from the actual health status of cattle's. This can cause the harmful effect on the cattle health .so there must be the proposed automatic health monitoring system which keep the record health parameter fast and accurate so that proper treatment use.

IV. PROPOSED SYSTEM

Sensors base technology use for biomedical application, size is the one of the important constraint. The sensors base device must be moderate in size and weight. However the sensors use in such device must able to detect body temperature and heart beats which is play important role in medical treatment and diagnosis. Another constraint is such device shall be controller and access remotely. Basically our

project is divided into three domains (sensors technology, communication and software)

    A.   Sensor Technology

    B.   Communication

    C.   Software

*A.Sensor Technology :*The sensors are used for automatic measurement of various health factors. Such type of sensors would be mounted on the cattle's body, which continuously observe the body issues of the cattle like heartbeat rate, body temperature etc. and delivers output in the type of electrical signs. These signs are then compared to a standard limit of normal values. The Sensors such as respiration sensor, humidity sensor and rumination sensor are used in the advanced cattle health monitoring system .These sensors are connected to the Arduino uno(controller).

    a)Body temperature Sensor

Fig 1: Body Temperature measurement in olden days using Thermometer [4]
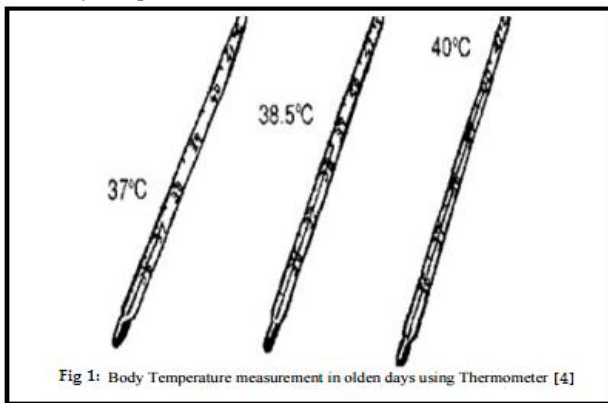
In sensor technology, sensors are used to sense the body temperature of the cattle. LM35 is used as the body temperature sensor. The normal body temperature of the cattle is 38.5-39.5 degree Celsius. If the temperature of the cattle is less than the normal temperature the cattle may suffer from diseases like milk fever, indigestion and poisoning. If the temperature of the cattle is more than the normal temperature the cattle may suffer from diseases like anthrax, influenza, foot and mouth diseases etc.
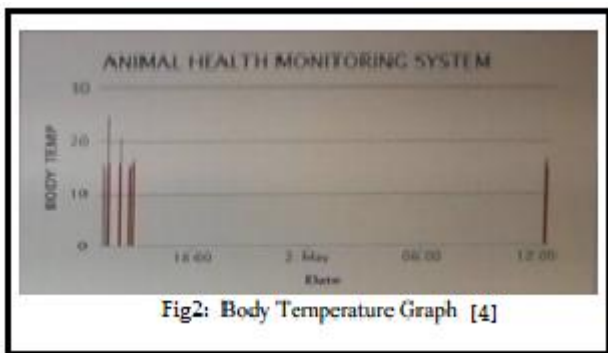

Fig2: Body Temperature Graph [4]

b) Heart Beat Sensor

The normal heartbeat of an adult cattle is between 48 and 84 beats per minute. This sensor will detect stress as well as animal's anxiety. The heartbeat sensor generally used is a stethoscope. It is kept behind cow's elbow to listen over the left side of the cow's chest. The elevation of the heart rate can lead to a sign of pain

Fig3: Normal heart rate pulses of normal cattle [4]
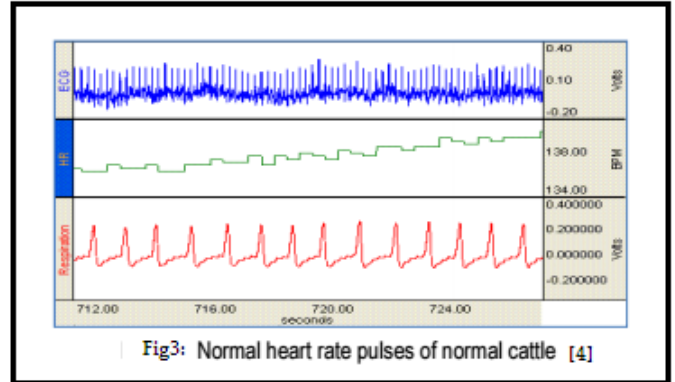
c) Motion sensor

Motion sensors use electronic accelerometers to record the lying, walking and standing behavior of animals. These sensors are used with aim of monitoring the movement behavior of cattle for improving animal's health and production. If the data is automatically collected on large numbers and in continuous period of time then the health of the cattle can be improved to a large extent. This data can be used by the stakeholders for management and disease control decision.

B.Communication:

We can send the animal health graph to the doctor's mobile using ESP8266 WIFI module. This WIFI module sends the signals through the IOT technology. So by observing this graph doctor can tell about the animal health. Arduino UNO has enough memory to transform the signs arriving from the data gaining unit through sensors into a ESP8266 WIFI module for communication and then the signals are given to the software for examining and displaying the data. The main function is when the animal will suffer from disease people use to take that animal to the doctor for diagnosis but sometimes doctors will not be available in hospitals so using this advance monitoring system we can sense the various activities of animals like body temperature, respiration , heartbeat, motions etc. and send the animal health graph to the doctor mobile using ESP8266 WIFI module. So by observing these graphs doctor can tell about the animal's health.
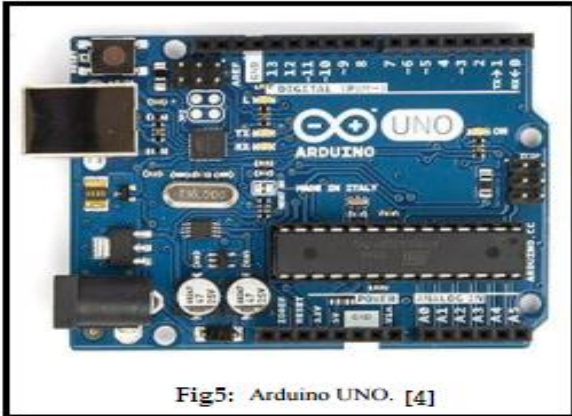
Arduino UNO

Fig5: Arduino UNO. [4]

The Arduino UNO micro controllers are readily available for a wide variety of applications. The Arduino UNO microcontroller cost is low. Now a days instead of PIC microcontroller Arduino UNO is used because it is more flexible. The signals arriving from the sensors are finally sent to the WIFI module through Arduino and from the WIFI module to health monitoring app.

ESP8266 WIFI module

Fig6: ESP8266 WIFI module [4]

The ESP8266 Wi-Fi module are low cost, small and maintain Wi-Fi connection and encryption in client mode and access point mode. Wi-Fi module communication is done through simple serial RX and TX lines using "AT" i.e. attention type commands and data.
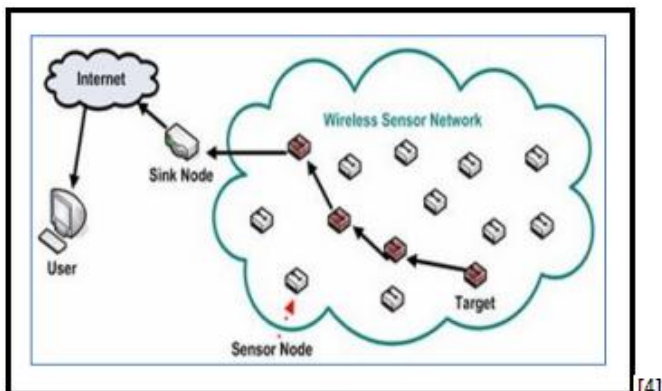
C.Software:

Fig7

A web page is created wherein the cattle's data is being stored using cloud computation. This web page can be accessed from anywhere. In cloud computation the data is scalable and there is no need of backups. If the count of cattle's is increased then due to cloud computation the space for data is also increased. Once the normalized values of the health parameters of cattle is stored , this sensors sense the information and is compared to the normalized values and the graph is created which is sent to the doctor. The doctor will analyze the graph and take immediate action for the same and provide a proper treatment for the disease.

V.METHODOLOGY

The Architecture of E-Cattles health monitoring system using IOT consists of three significant units that are namely:

1. Data Gaining Unit.
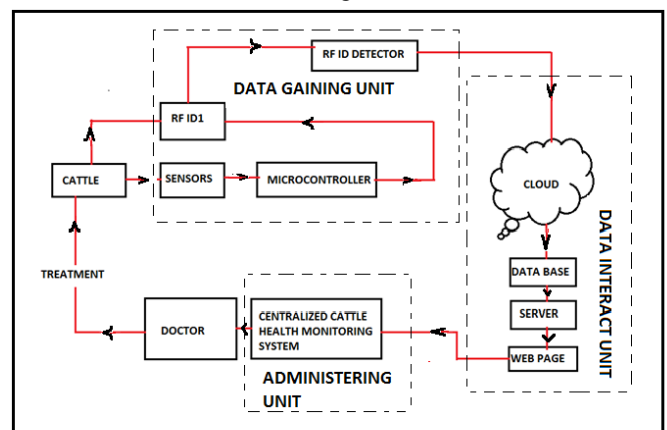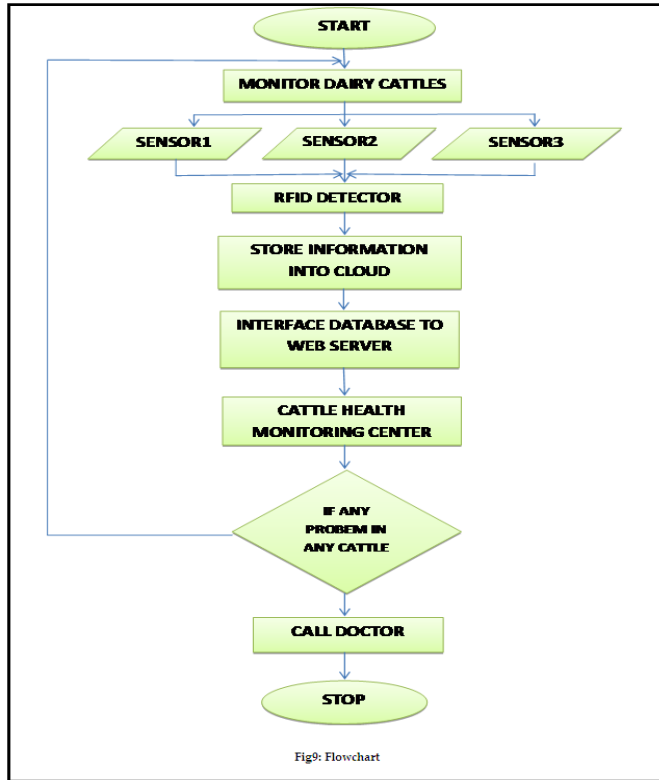2. Data Interact Unit.
3. Administering Unit

Fig8: Architecture of system

Data gaining unit consist of different types of biomedical sensors like body temperature sensor, blood pressure sensor, humidity sensor, heart beat rate detection sensor which is interfacing with microcontroller. The data gaining units obtain data and makes it accessible for the data administering and data interact unit (cloud, server and web page).

The sensors are used for simple and general automatic measurement of numerous health factors. Such type of health sensors will be mounted on the cattle body which continuously observe the body issues of the cattle like temperature , heart beat rate etc and deliver output in the type of electrical signal. These signal are then compared to a standard limit of normal values set as the starting point in data administering unit.

If administering unit are observed major changes or abnormal changes in particular cattle then they can contact to nearer animal care doctor or if some causes doctor will not available in nearer hospital then using IOT administering unit controlling person can send the health graph to the doctor. So by observing this graphs doctor can tell about the animal health information and proper treatment which to be apply on cattle in absence of doctor during emergency.

Special Issue - 2017

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICIATE - 2017 Conference Proceedings

Fig9: Flowchart

VI. CONCLUSION

This research has been undertaken in order to establish specific sensor technologies as a significant means to monitor animal health and to ensure animal well-being in the fast changing conditions of automated farms. Due to the high demand and supply of dairy products, dairy cattle are in a constant demand for high yield, leading to the need of continuously monitoring of their health to ensure their fitness as it directly affects the health of the consumers. Moreover, the overall economy in the dairy farming industry depends on the herds' health. Several cattle diseases have been studied in depth and analysis of the symptoms associated with these conditions. These symptoms were then mapped to the type of sensors that would be able to measure the said behavior.

VII. REFERENCES

[1] https://www.google.com/patents/US6211789
[2] http://people.cs.ksu.edu/~dan/Vet_Cancun_BMOO_Final.pdf
[3] http://www.bioinfopublication.org/files/articles/2_1_2_JGDC.pdf
[4] https://www.ijareeie.com/upload/2016/april/162_MB160501_Sneh al_ Paper_V0.pdf
[5] http://s2is.org/ICST-2014/papers/1569961281.pdf
[6] http://www.academia.edu/781755/Cattle_health_monitoring_using_wireless_sensor_networks
[7] http://dinus.ac.id/repository/docs/jurin/15258.pdf