IoT Based Cattle Healthcare Monitoring System

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***Abstract*— The main aspect of the cattle healthcare monitoring system is to check the health of individual cattle. continuous monitoring is used to prevent the cattle from widespread diseases and analyze physiological parameters like body temperature, humidity, heart rate, rumination. To productivity, it is required to take care of the health of the cattle and also use various operations of automation. The day- to- day monitoring of cattle conditions is difficult, especially on a large farm where employees do not have enough time to observe cattle and detect the first symptoms of diseases. This paper presents an automated, IoT-based monitoring system designed to monitor the health of cattle. When cattle are either not eating or are ruminating, and an alert will be given one to two days earlier before the cattle become clinically sick. The health parameters are collected by using the respective sensor. That data is transmitted wirelessly over the internet and is stored in a database using IoT technology. The system alerts in criticalconditions.**

***Index Terms*— Cattle health care monitoring system, temperature, humidity, heart rate, rumination.**

I. INTRODUCTION

Health monitoring of dairy cattle plays a vital role for increasing the dairy products supply chain. Nowadays livestock forms are largely affected by the health condition of cattle. Cattle with a communicable disease can drastically bring down the productivity of the whole form. So it is highly recommended to identify unhealthy cattle. In this context IoT can contribute in terms of developing an autonomous system for health monitoring of cattle. The data gathering node is provided with various sensor to sense the health parameters of the cattle and these data gets transmitted in to the owner of the cattle. Variation caused in temperature may affect the cattle health leading to various diseases like foot mouth disease, mad cow disease which can be easily spread into human being. Variation caused in heart rate lead to myocardial disease, lymphosarcoma, tachyarrythmias, disease in cattle. Thus the cattle health care monitoring system facilitates the continuous assessing the condition of individual cattle and reporting this data to livestock formers. In this paper we present such a device to overcome this problem as the cattle health monitoring system which is a helos to people to monitor the health condition of health. Because a large number of researches are going on the human being through which we are able to obtain valuable information. Despite the boosting of an advanced technology, there are very few researches on cattle. So this device is a step towards monitoring the well of cattle. we are going to give the brief introduction to cattle health care monitoring system with their advantages.

II. LITERATURE SURVEY

The listed literature gives us a basic understanding of concepts and helps us to design a new system of

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monitoring the health parameters of cattle by overcoming the various drawbacks in the existing system. Rajshree S.Thakre[1] proposed a ZigBee-based health monitoring system, and it has low power consumption with better transmission range and is beneficial for medical practitioners to do the treatment. Anushka Patil, Chetan, Pawar, et alm [2] proposed a smart health monitoring system using an Aurdino microcontroller system with is mounted on an animal body to get the current status. Anuj Kumar and G.P.hancker[3] proposed animal health monitoring based on IEEE 802.15.4 for low-cost requirement, fast response, power consumption. B.C.Basker[4] proposed health monitoring using a thermistor to monitor the temperature of cattle. J.I.Huricanet al [5] proposed a Zigbee-based WSN forcattle monitoring system used to cover a large network for low-power wireless LAN. E.Lindgram[6] proposed the validation of rumination measurement equipment and its role in dairy cows and is focused on measuring the stress response in cattle to estimate the stress by using the ruminant system.

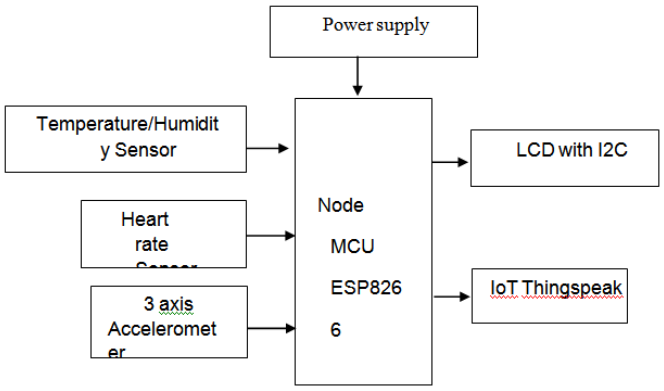
III. EXISTING SYSTEM

In the existing methodology, the system is just providing the intimation to the user about the temperature and heartbeat values. Manpower is required in this system for periodic checking. The data are not collected for the future analysis of the cattle and their productivity rating. The Existing system is time- consuming. Since the farmers have to go in person to check whether or not the animal is affected by any kind of disease, this requires more time when compared to the automated system. And then a notification is not sent to the cattle owners when there is an abnormal change in the health of the cattle, they are not aware when it is affected by any kind of disease. So the cattle owners are not able to treat the cattle at the correct time, which may lead to the severity of diseases.

IV. PROPOSED METHOD

In our proposed method, these paper designs and embedded setup wear the cattle that check the temperature, heartbeat, and 3 – axis accelerometer for their fall detection periodically and uploads the data to the cloud. This system is mainly proposed to reduce manpower and periodic checking of the cattle's health by automation and IoT technology. Further, collected data are used for future analysis. , IoT-based monitoring system designed to monitor the health ofcattle. The system is composed of hardware devices, a cloud system, an end-user application, and innovative techniques of data measurement and analysis algorithm. The system was tested in a real-life scenario and has proved it can effectively monitor cattle health.

V. BLOCK DIAGRAM



A. Temperature and Humidity Sensor

DHT11 is used to measure temperature. The normal temperature of an adult cow is 38.50C. A temperature over 39.50C may indicate an infection or inflammatory process. The DHT11 sensor's temperature range is from 0 to 50 degrees Celsius and its humidity range is from 20 to 80 %. It operates reliable technology and thus provides high stability. It has two main parts one is used for temperature measurement and the other is used for humidity measurement. It also contains an IC which is used to send data to another microcontroller.

Fig.1 Temperature sensor (DHT11)

B. Heart rate Sensor

In the heart rate sensor, we are using KG011 to sense the heartbeat of the cattle. The normal heart rate of the cattle is 48 to 84 bits per minute. Heart rate is one of the important parameters for monitoring health. It indicates stress level and irritation accrued upon cattle body. Variation of heart rate normally shows stress anticipation movement and several diseases. It is plug and play type sensor its an operating voltage of +5v or 3.3v and it has an inbuilt amplification and noise cancellation circuit.

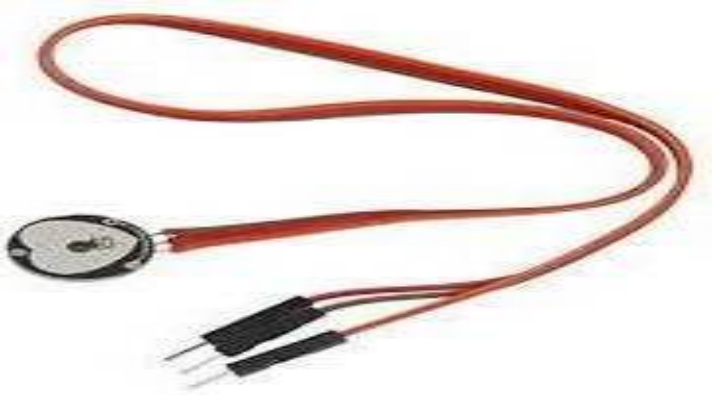


Fig 2.Heart rate sensor (KG011)

C. 3 axis Accelerometer

The cattle monitor may sense, record, and wirelessly transmit the 3-axis acceleration. measuring device supposed to use for rut detection by deciphering the measured knowledge to spot a cow's behavior and act. The observation device's primary application is to automatize rut detection for insemination, however, the potential to trace the cow's motion characteristics could give dairy farm operators the capability to assess the cow's behavior and act to boost the general well-being and health of the cow.

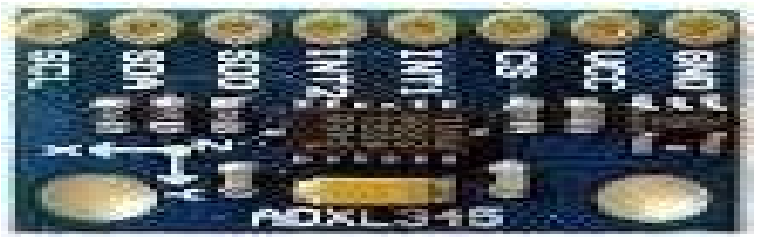


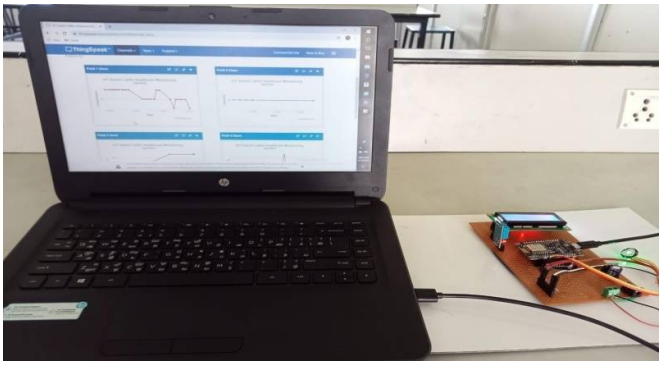
Fig.3. 3 axis Accelerometer (ADXL345)

D. Node MCU

The ESP8266 Wi-Fi module is a low-cost and IoT platform, small and maintains Wi-Fi connection and encryption in client mode and access point mode. It initially included firmware based on the ESP8266 Wi-Fi SoC from Express Systems and hardware which was based on the ESP-12 module. We measure health-related data with the node MCU-12E, with the help of this device we measure the health-related status of cattle.

Fig.4 Node MCU (ESP8266)

VI. EXPERIMENTAL SETUP



VII. EXPERIMENTAL RESULTS

Be a combination of hardware and software. the hardware is interfaced with all the sensors within the Node MCU. The sensor provides input to the controller. The NodeMCU is interfaced with all the sensors on the board. The sensor provides input to the NodeMCU and the cattle owner receives the information on the cloud platform in detail. Thing speak cloud platform gives information regarding cattle health. It iseasy to identify cattle diseases.

Fig.5 Live data of Temperature and Humidity from Thing Speak

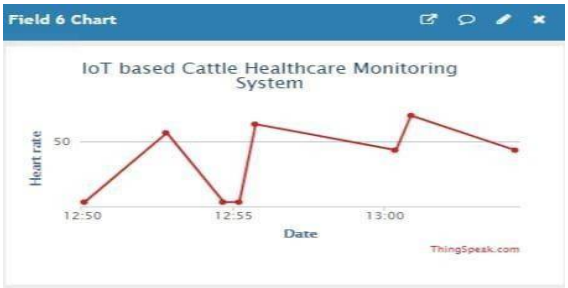


Fig.6 Live data of Heart rate from Thing speak

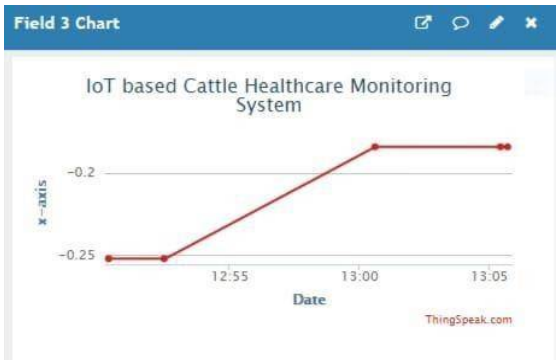


Fig.7 live data of 3 axis Accelerometer X axis from thing speak

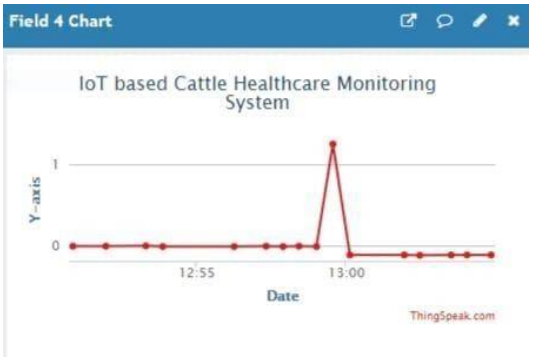


Fig.8 Live data of 3 axis Accelerometer Y axis from thing speak

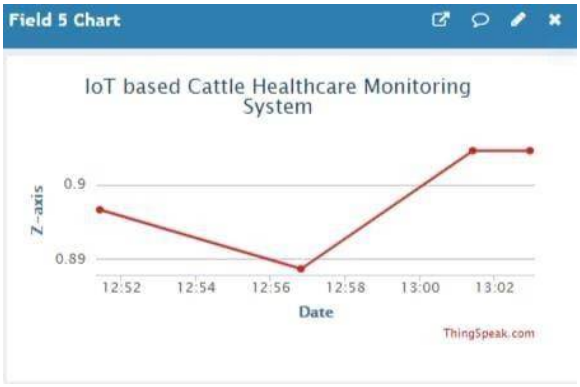


Fig.9 Live data of 3 axis Accelerometer Z axis from thing speak

VIII. CONCLUSION

In this paper, we have presented a prototype of a cattle health care monitoring system. This prototype system is tested for the real-time monitoring of physiological parameters such as body temperature, rumination, heart rate. This system provides accurate and real-time health parameters of the cattle which help monitor the health condition and detect any change in behavior and health problem. It can be a very effective device for people. The health and wellbeing of the cows are essential to a dairy farm and also for their productivity. Unfortunately, periodic monitoring of cattle health is difficult, especially in huge farms where more manpower is required, and they don't have time to monitor all the cattle. So this paper presents an automated, IoT-based monitoring system designed to monitor the health of the cattle.

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