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# Human & Cattle Wellbeing Monitoring System using IOT and Ml

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**Abstract:** With dramatic advancement in the communication technologies, Sensors, artificial intelligence algorithms by scientist, researchers and engineers made many technological innovations in varieties of domains. One of the technical innovations applied in field of Farm Automations. Farm automations with the technologies enables farmer to monitor the health of the cattle's, cows continuously and help farm productivity, which intern helps the humans as they depend on the essential needs such as milk, butter, ghee etc.
In India, gain number of cows in dairies has been taken care and habitually needs to observe the health of cows. This paper discusses farm automation referring to cattle, cow health monitoring systems along with many electronic devices such as mobiles and wireless detector to observe and convey the messages. In this proposed system is machine learning based IoT system which uses wireless technology that maps the special aspects of animal behaviour like temperature, pulse etc. this knowledge is aggregating and coverage to the health care centre. This reduces the nominal health review and long run animal aid price. Along with human monitoring system is proposed to monitor thepulse, blood pressure.

**Keywords:** Milk Fever, Machine Learning, IOT, Health Care, Wearable Sensors

## 1. INTRODUCTION

Nonstop proportion of patient parameters like heartbeat , pulse, and a lot of elective parameters turned into a standard component of the consideration of fundamentally sick patients. when right and prompt choice making is significant for viable patient consideration, electronic screens of square measure need to gather and show physiological information. Increasingly, such data square measure gathered exploitation non-intrusive sensors from less genuinely unwell patients in an extremely clinic's clinical careful units, work and conveyance suites, nursing homes, patients' own homes to see astounding serious conditions or to record routine anyway required data speedily. We will in general now and then consider a patient screen as one thing that looks for and cautions against genuine or extreme occasions in patients, fundamentally unwell or something else. Understanding perception is carefully delineated as "rehashed or consistent perceptions or estimations of the patient, their physiological perform, and the capacity of life bolster instrumentation. Milk fever , a metabolic illness, influences dairy livestock here and there among one or 2 days prior or once parturition, prompting a huge decrease in milk creation thus turns out to be monetarily generally crucial. For controlling monetary misfortunes brought about by milk fever, estimation of prescriptions, veterinarian' s expense, estimation of further work utilized, misfortune because of decrease in milk yield, cost of creatures dead and winnowed are considered. The pervasiveness of milk fever has been discovered thirteen.67 percent in dairy animals and eleven.99 percent in wild oxen over the examination areas. Thinking about the decided predominance of milk fever, the number of inhabitants in humor cows and wild oxen and the per creature misfortune because of milk Continuous proportion of patient parameters like heartbeat, pulse, and a lot of elective parameters turned into a standard element of the consideration of fundamentally sick patients. when right and quick choice making is urgent for compelling patient consideration, electronic screens of square measure need to gather and show physiological information.Increasingly, such data square measure gathered exploitation non-obtrusive sensors from less genuinely unwell patients in an exceptionally clinic's clinical careful units, work and conveyance suites, nursing homes, patients' own homes to see amazing serious conditions or to record routine anyway required data speedily. We will in general some of the time consider a patient screen as one thing that looks for and cautions against genuine or serious occasions in patients, basically unwell or something else. Persistent perception is carefully laid out as "rehashed or ceaseless perceptions or estimations of the patient, their physiological perform, and the capacity of life bolster instrumentation. Milk fever , a metabolic illness, influences dairy livestock once in a while among one or 2 days prior or once parturition, prompting a huge decrease in milk creation thus turns out to be monetarily generally fundamental. For controlling monetary misfortunes brought about by milk fever, estimation of meds, veterinarian' s expense, estimation of further work utilized, misfortune because of decrease in milk yield, cost of creatures dead and separated are contemplated. The predominance of milk fever has been discovered thirteen.67 percent in cows and eleven.99 percent in bison over the examination areas. The Total misfortune has been found as Rs one,068 per influenced bovine and Rs 665 for every bison. Considering the decided predominance of milk fever, the number of inhabitants in humor dairy animals and bison and the per animal misfortune on account of milk fever has been determined

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to be of Rs forty.62 huge whole number in the express, that could be a significant damage to the cultivating network. In the event that we tend to don't screen the bovine as often as possible inside a short time it should wind up in its passing. To beat these issues, we propose a framework which might be utilized for every human and ox-like, to foresee milk fever in steers and anticipate elective inner organ associated sickness in people we will in general use iot and AI.

## 2. LITERATURE STUDY

| Author | Contribution | Published |
|---|---|---|
| Sarfraz Fayaz | ? used RFID, WSN for the identification of devices and information processing of an equipment. Body area network (BAN) will contribute a significant responsibility in backing extensive scope of appeals thereby BAN appliances being exercised within the territory or implant in the internal body. Though, the present electronic health systems do not use mobile phones, tablets or PC to transmit essential data related to the patients' health | 2017 the 6th International Conference on Industrial Technology and Management |
| Luca Catarinucci, Danilo De Donno, Luca Mainetti, | ? this paper proposes a novel, IoT-aware, smart architecture for automatic monitoring and tracking of patients, personnel, and biomedical devices within hospitals and nursing institutes. Staying true to the IoT vision, we propose a smart hospital system (SHS), which relies on different, yet complementary, technologies, specifically RFID, WSN, and smart mobile, interoperating with each other through a Constrained Application Protocol (CoAP)/IPv6 over low-power wireless personal area network (6LoWPAN)/representational state transfer (REST) network infrastructure<br>? The SHS is able to collect, in real time, both environmental conditions and patients' physiological parameters via an ultra-low-power hybrid sensing network (HSN) composed of 6LoWPAN nodes integrating UHF RFID functionalities. Sensed data are delivered to a control center where an advanced monitoring application (MA) makes them easily accessible by both local and remote users via a REST web service | IEEE Internet of Things Journal ( Volume: 2 , Issue: 6 , Dec. 2015 )<br>27 March 2015 |
| Moeen Hassanalieragh, Alex Page, Tolga Soyata, Gaurav Sharma, Mehmet Aktas | Health Monitoring and Management Using Internet-of-Things (IoT) Sensing with Cloud-based Processing: | 2015 IEEE International Conference on Services Computing<br>**Date of Conference:** 27 June-2 July 2015<br>**Date Added to IEEE *Xplore*:** 20 August 2015 |
| Dharmendra singh Rajput, Rakesh Gour | An IoT Framework for Healthcare Monitoring Systems | Journal of Computer Science and Information Security (IJCSIS), Vol. 14, No. 5, May 2016 |
| Prosanta Gope and Tzonelih Hwang | Secure IoT-Based Modern Healthcare System Using Body Sensor Network | IEEE SENSORS JOURNAL, VOL. 16, NO. 5, MARCH 1, 2016 |

## 3. PROPOSED SYSTEM

As a solution to the existing problem in monitoring the health of cattle and humans we proposed an advanced cost-effective system to monitor and to provide the immediate notification for the sustainable healthcare systems.
As shown in fig.1 ESP32 is a WiFi Bluetooth device used to collect the data's from different sensors devices and sends the data to cloud storage ,mainly it consists of (Temperature Sensor, ECG Sensor, Blood Pressure Sensors)which are connected to the ESP32 microcontroller chip with 5v battery. These entire devices are placed in a particular belt where every human can wear it. This device checks the temperature, blood pressure and heart beat rate of humans and stores this data in the cloud using things speak app.so the user can access the data from any place. Even the doctors can access the data and can predict the patients from their home itself. These are for both humans and cattles.Forcattle's we use ESP 8266 where it consists of Ph sensors and used to find whether the cattle consist of milk fever or not after their child birth.

***MACHINE LEARNING***

**Logistic regression** is a regulated learning characterization calculation used to foresee the likelihood of an objective variable. The idea of target or ward variable is dichotomous, which implies there would be just two potential classes. ... Scientifically, a calculated relapse model predicts P(Y=1) as an element of X.

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***Architecture Of Proposed System***

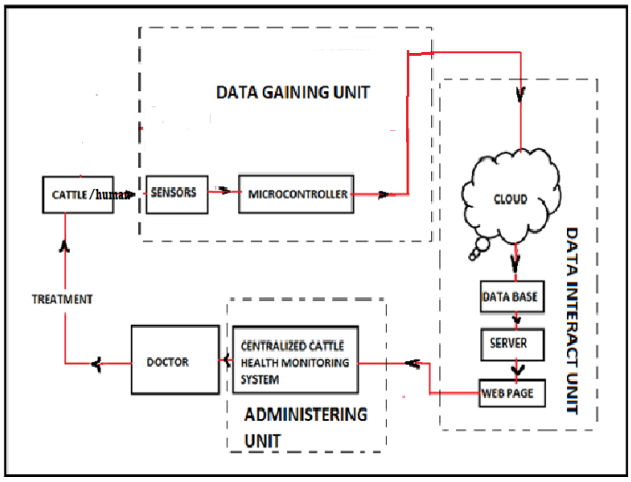


Figure 1: Proposed System

## 4. IMPLEMENTATION

The heart of the system is node MCU ESP 32 to which five different sensors are connected such as heartbeat,temperature, blood pressure, blood glucose level and mems sensor to detect fits. ● Collect the data from the human and cattle through four sensors

● Perform analysis of the sensors

● If any abnormality is noticed then notify the doctor or patient peer using cloud and initiate immediate relief

● Perform Machine Learning on the values of the sensors and determine the condition of the patient.

The system has two motors, one of them which gets turned on in case of high temperature, situation and the other which gets turned on in case of low blood pressure. If any one of the situation arises, themotor gets turned on in order to show that the relief is being implemented as well as a notification is sent to thedoctor or the human and cattle peers.The data collected from the glove is then sent to the ThingSpeak cloud from where a dataset is formed and thenmachine learning is used on that particular dataset [5][7-11]. The dataset is trained for the classification ofhypoglycemia and normal state. Since hypoglycemia exhibits symptoms of increased heartbeat, high blood pressure,low temperature and low glucose level, these symptoms are used to classify the status of the patient. The testing data is then taken from the wearable device and then fed into the trained model. The KNN algorithm is used in the modelto classify a hypoglycemic and normal person.

### A. Sensors

The core of the framework is hub MCU ESP 32 to which five distinct sensors are associated, for example, heartbeat,temperature, pulse, blood glucose level and mems sensor to distinguish fits. ● Collect the information from the human and cows through four sensors

● Perform investigation of the sensors

● If any variation from the norm is seen then inform the specialist or patient companion utilizing cloud and start prompt help

● Perform Machine Learning on the estimations of the sensors and decide the state of the patient.

. The framework has two engines, one of them which gets turned on if there should arise an occurrence of high temperaturesituation and the other which gets turned on in the event of low circulatory strain. On the off chance that any of the circumstance emerges, themotor gets turned on so as to show that the help is being actualized just as a notice is sent to thedoctor or the human and cows peers.The information gathered from the glove is then sent to the ThingSpeak cloud from where a dataset is framed and thenmachine learning is utilized on that specific dataset [5][7-11]. The dataset is prepared for the characterization ofhypoglycemia and ordinary state. Since hypoglycemia displays side effects of expanded heartbeat, high blood pressure,low temperature and low glucose level, these manifestations are utilized to arrange the status of the patient. The testing datais then taken from the wearable gadget and afterward took care of into the prepared model. The KNN calculation is utilized in the modelto arrange a hypoglycemic and ordinary individual.

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### *B. ECG*

As appeared in Fig.2. ,AD8232 ECG sensor, receives an operational intensifier that is without utilizing limitation to assemble a three post low pass channel, wiping out additional commotions. Appraised Temp Range : 0 to 70degree and Working Temp Range:40-85degree.


Figure 2: ECG Sensor

### C. PRESSURE SENSOR

As shown in fig3. BMP280 Barometric Pressure and Altitude Sensor. I2C/SPI Operating Voltage: 1.71V to 3.6V – would typically be operated from 3.3V.Operating Temperature: -40 to +85 deg. Celsius (full accuracy between 0 and +65 deg. C).

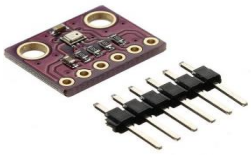
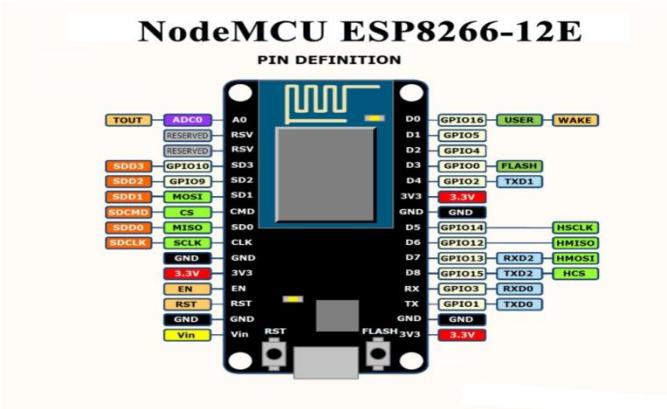


Figure 3: Pressure Sensor

### D. ESP 8266

ESP 8266 is an integreated wifi Bluetooth microcontroller chip. Where this chip consist of each and every code of the sensors and act according to there requirements. this chip collects the data from each sensors and sends the data to the cloud**.**




***EXPERIMENTAL RESULTS:***

In the wake of associating the sensors on the people and steers' body it will offer the hint and heart beat diagram. Utilizing this chart, we can ready to watch the strength of human and dairy cattle and recognize any maladies from which the steers are enduring this can be observed ceaselessly on the web. Consequently, it's tedious and is also hard to follow the circumstance of creatures. In this proposed framework, without human inclusion wellbeing status of the creatures might be observed.

Utilizing this Logistic Regression calculation we are gathering the comparable informational collections of the cows with that gathered datasets with the assistance of strategic relapse calculation Using sensors we are going to check the ph level(0-8) and temperature(30) of the dairy cattle and seeing if the cows has milk fever or not. Eg. On the off chance that the steers' temperature is under 30degree and ph level is over 8 with the assistance of calculated relapse calculation it naturally predicts that steers comprise milk fever.

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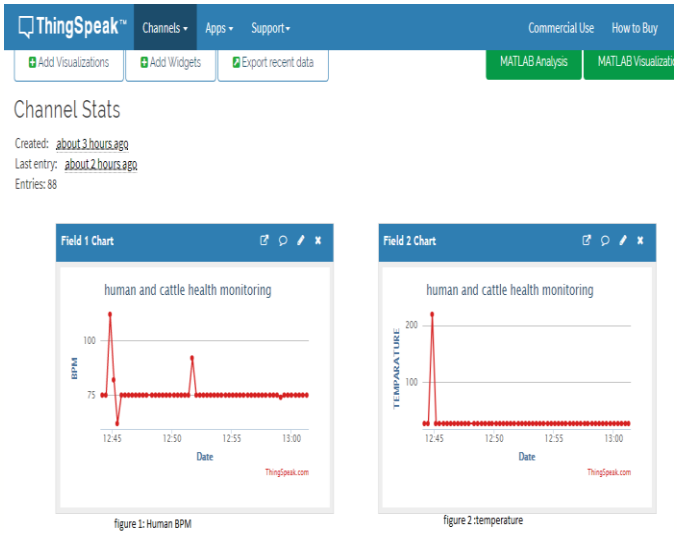


figure 1: Human BPM

figure 2:temperature

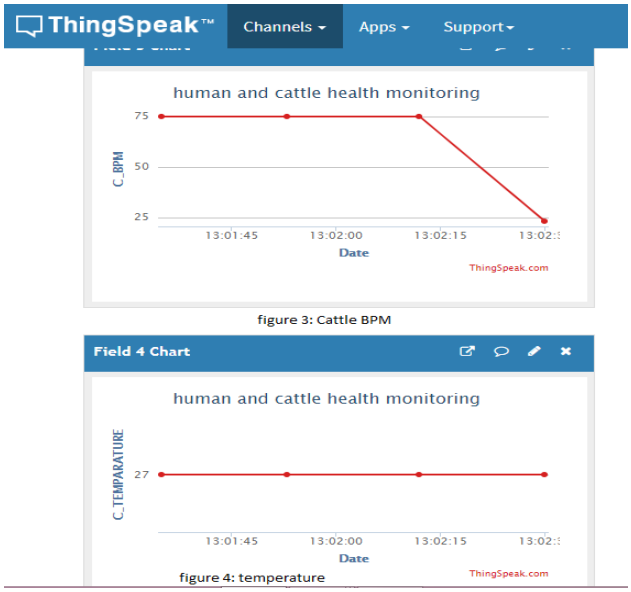


figure 3: Cattle BPM

figure 4: temperature

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 2020-05-16 12:38:01 +0530 | 9 | | | 82 | 26 |
| 2020-05-16 12:38:19 +0530 | 10 | | | 75 | 27 |
| 2020-05-16 12:38:39 +0530 | 11 | | | 75 | 26 |
| 2020-05-16 12:38:58 +0530 | 12 | | | 75 | 27 |
| 2020-05-16 12:39:16 +0530 | 13 | | | 75 | 27 |
| 2020-05-16 12:39:35 +0530 | 14 | | | 75 | 27 |
| 2020-05-16 12:39:53 +0530 | 15 | | | 75 | 27 |
| 2020-05-16 12:40:11 +0530 | 16 | | | 75 | 27 |
| 2020-05-16 12:40:30 +0530 | 17 | | | 75 | 27 |
| 2020-05-16 12:40:48 +0530 | 18 | | | 75 | 27 |
| 2020-05-16 12:41:07 +0530 | 19 | | | 75 | 27 |
| 2020-05-16 12:41:25 +0530 | 20 | 75 | 27 | | |
| 2020-05-16 12:41:43 +0530 | 21 | 89 | 27 | | |
| 2020-05-16 12:42:02 +0530 | 22 | 82 | 27 | | |
| 2020-05-16 12:42:20 +0530 | 23 | 59 | 27 | | |
| 2020-05-16 12:42:39 +0530 | 24 | 62 | 27 | | |
| 2020-05-16 12:42:57 +0530 | 25 | 75 | 27 | | |
| 2020-05-16 12:43:16 +0530 | 26 | 75 | 27 | | |
| 2020-05-16 12:43:34 +0530 | 27 | 75 | 27 | | |
| 2020-05-16 12:43:53 +0530 | 28 | 75 | 27 | | |
| 2020-05-16 12:44:11 +0530 | 29 | 75 | 27 | | |
| 2020-05-16 12:44:30 +0530 | 30 | 75 | 27 | | |
| 2020-05-16 12:44:50 +0530 | 31 | 112 | 219 | | |
| 2020-05-16 12:45:09 +0530 | 32 | 82 | 27 | | |
| 2020-05-16 12:45:27 +0530 | 33 | 62 | 27 | | |
| 2020-05-16 12:45:46 +0530 | 34 | 75 | 27 | | |
| 2020-05-16 12:46:04 +0530 | 35 | 75 | 27 | | |
| 2020-05-16 12:46:22 +0530 | 36 | 75 | 27 | | |
| 2020-05-16 12:46:41 +0530 | 37 | 75 | 27 | | |
| 2020-05-16 12:46:59 +0530 | 38 | 75 | 27 | | |
| 2020-05-16 12:47:18 +0530 | 39 | 75 | 27 | | |
| 2020-05-16 12:47:37 +0530 | 40 | 75 | 27 | | |
| 2020-05-16 12:47:55 +0530 | 41 | 75 | 27 | | |
| 2020-05-16 12:48:20 +0530 | 42 | 75 | 27 | | |
| 2020-05-16 12:48:38 +0530 | 43 | 75 | 27 | | |
| 2020-05-16 12:48:57 +0530 | 44 | 75 | 27 | | |

Data Reading


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## 5. CONCLUSION

This paper proposed a cost-effective model which will monitor human as well as Cattle health. The mode will be set as per the situation and all the data will be continuously sent to thingspeak account. If there is any problem, a notification will be sent to the respective persons. If there's any abnormality within the health condition of cattle remedies may be taken quickly. Hence, it's more practical and helps in the increase of production of milk.

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