International Journal of Scientific Research & Engineering Trends
Volume 7, Issue 2, March-April-2021, ISSN (Online): 2395-566X

Incisive Health Recognizing for Animals

Asst. Prof./HOD Ramya. R, Asst. Prof. Dhivya. K, Afra Banu. A, Arthi. P, Kayalpraba. G, Nithya. V
Department of ECE,
K.S.K College of Engineering and Technology, Darasuram,
Thanjavur, Tamil Nadu, India.
chanmeya.17@gmail.com, divyapandiyan1111@gmail.com, arthiece2013@gmail.com

***Abstract*- In the some cases of emergency, veterinary or pet hospital staff cannot able to treat sick animals immediately as they cannot monitor animals after surgery or recuperating for 24/7. This problem is the leading cause of death in said animals. Therefore, developers have the concept to develop a health monitoring system which keeps tracking the heart rate and temperature of sick animals in veterinary hospital. The web application focuses on the rate of heart rate and temperature. If the heart rate and temperature are abnormal, it will alarm veterinary or pet hospital staff the animal is at risk and needs to be treated correctly. This system can be monitored by recording and analyzing the health information of sick animals, when animals have abnormal heart rate or temperature, they can be treated as soon as possible.**

***Keywords*- Sick Animals, Web application, Heart rate, Temperature.**

I. INTRODUCTION

Recent reports indicate that objective and continuous monitoring of animal heart rate (FHR) and animal movement could identify animal compromise with high reliabilities and decrease stillbirth through time- sensitive management. In the United States alone, an average of 26,000 cases of perinatal mortality occur per year, and this rate has barely changed over the past 15 years. In the UK, 29% of stillbirths occur in the absence of complicating factors.

This results in an urgent desire for a continuous animal monitoring (CFM) system that can keep track of both the animal heart rate and animal movement. Animal heart rate (FHR) and animal movement are the only viable biologic signs that can be continuously monitored and assessed. The animal heart rate variation (HRV) decreases dramatically days before stillbirth until a loss of HR and HRV occurs several hours before the actual stillbirth. Animal Cardiotocography (CTG) and animal electro cardiography (ECG) are two wearable technologies which are widely employed in current clinical settings for monitoring FHR and animal movements.

The CTG uses external Doppler ultrasound sensors to monitor the FHR and the activity of the uterine muscle. Despite their extensive use, current ultrasound sensors have drawbacks. They may be harmful to the fetus if used over extended periods of time due to teratogenic or fetotoxic effects from ultrasonic heating of animal tissues.

This drawback limits their potential to be used as wearable and continuous home-based monitors. FDA recommended that current commercial Doppler ultrasound animal monitors be avoided outside the clinic due to low accuracies as well as unpredictable risks due to unguided usage.

II. RELATED WORK

The goal of this project is to track the location of Animal in the zoo or national parks or forest. This system would include a temperature sensor, heart beat & pressure sensor. The temperature sensor senses the temperature of each animal at the same time heart beat and pressure sensor all work vice versa.

Here, radio frequency (RF) communication is used to track animals if they are crossed boundaries or restricted areas. Generally, every animal having particular range of body temperature. If the animal having any wounds or fever, the body temperature will be automatically increased.

To monitor this, we are using temperature sensor. It continuously monitors the animal's temperature. If any variation in the temperature, Heart Beat sensor is used to monitor animal heart beat & pressure sensor is used to measure animal body pressure changes and It will be displayed on the LCD.

Radio frequency (RF) communication is used to track animals if they are crossed boundaries or restricted areas the controller sensed the signal changes and it will give alert to the people through the siren. And the controller which is interfaced with the IOT, It will give the complete information to the website on PC or laptop.

III. ANIMAL MONITORING

Wireless sensor networks are used to monitor the movement of animals by exact location in either conscious or unconscious state. The designed animal activity

© 2021 IJSRET

monitoring system employs the use of RF sensor tag attached to the animal body to provide the status and exact location of the animal.

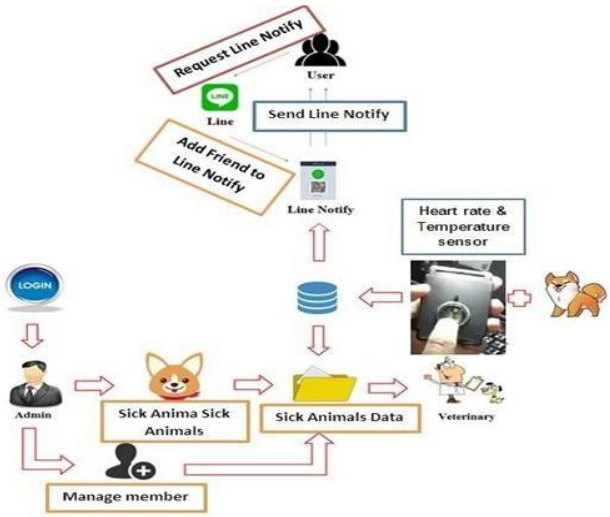


Fig 1. Flow diagram for sick animals health monitoring process.

IV. USER INTERFACE

For user interface, there is a number of things that need to be considering including the database itself. In terms of the database design and the ER Diagram from Figure 3 shows the table relationships in the database to store data and various attributes of data [3].

The web application for sick animals health monitoring system consists of the following parts:

- User information management system
- Animal information management system
- Animal breeding management system
- Device management system
- Graph of data from sensor

1. IOT Module

The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Express if Systems in Shanghai, China. However, at first there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module, which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, the chip, and the software on it, as well as to translate the Chinese documentation. The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing the building of single-chip devices capable of connecting to Wi-Fi. 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 (UIDs) .

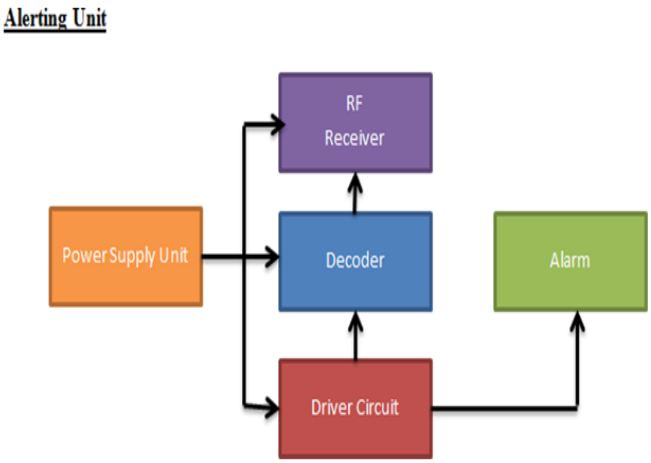


Fig 2. Alerting Unit.

There are a number of serious concerns about dangers in the growth of IoT, especially in the areas of privacy and security, and consequently industry and governmental moves to begin to address these.

2. Work Definition:

The concept of a network of smart devices was discussed as early as 1982, with a modified Coca-Cola vending machine at Carnegie Mellon University becoming the first Internet connected appliance, able to report its inventory and whether newly loaded drinks were cold or not. Mark Weiser's 1991 paper on ubiquitous computing,

"The Computer of the 21st Century", as well as academic venues such as UbiComp and PerCom produced the contemporary vision of the IoT. In 1994, Reza Raji described the concept in IEEE Spectrum as "small packets of data to a large set of nodes, so as to integrate and automate everything from home appliances to entire factories".

V. ARCHITECTURE AND OPERATIONS

The researchers propose developing a web application to keeps track and monitor the heart rate and temperature of sick animals .It is primarily focused on recording heart rates, Pressure and temperature using IOT. If the heart rate is abnormal, it can be assumed that the animal is at risk.

This system can control and monitor sick animal's symptoms from diagrams that showing recorded data within the system. They also can report data to veterinarian or hospital staff. When abnormal data is reported, the animals can be assisting in time which might be able to save their life in time. Radio frequency communication is also include track tha animals if they movement from boundary.

© 2021 IJSRET

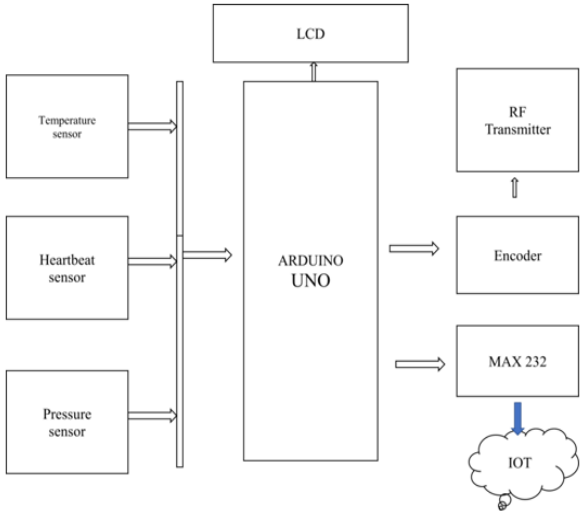


Fig 3. Architecture Diagram.

1. Temperature Sensor:

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in °C).It can measure temperature more. The sensor circuitry is sealed and not subject to oxidation. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. The LM35 has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/°C.

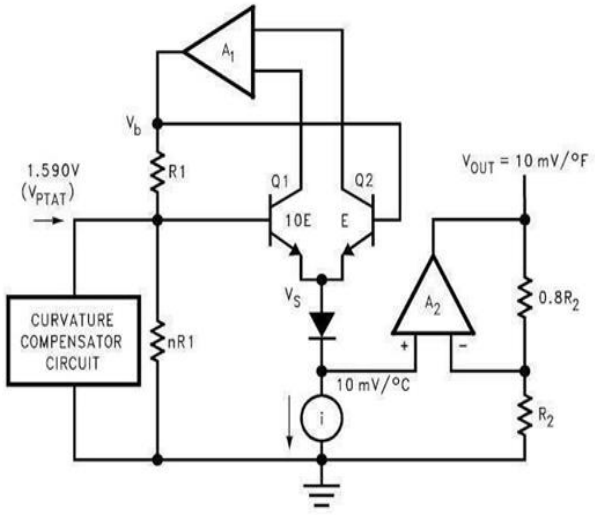


Fig 4. Circuit diagram of LM35 Sensor.

2. Heart Beat Sensor:

The heartbeat sensor is based on the principle of photo phlethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In case of applications where heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by blood, the signal pulses are equivalent to the heart beat pulses.

There are two types of photo phlethysmography:

2.1 Transmission: Light emitted from the light emitting device is transmitted through any vascular region of the body like earlobe and received by the detector.

2.2 Reflection: Light emitted from the light emitting device is reflected by the regions.

3. Pressure Sensor:

A pressure sensor is a device for pressure measurement of gases. Pressure is an expression of the force required to stop a fluid from expanding, and is usually stated in terms of force per unit area. A pressure sensor usually acts as a transducer ;it generates a signal as a function of the pressure imposed. For the purposes of this article, such a signal is electrical. Pressure sensors can be classified in terms of pressure ranges they measure, temperature ranges of operation, and most importantly the type of pressure they measure.

Pressure sensors are variously named according to their purpose, but the same technology may be used under different names.

3.1 Absolute Pressure Sensor: This sensor measures the pressure relative to perfect vacuum.

3.2 Gauge Pressure Sensor: This sensor measures the pressure relative to atmospheric pressure. A tire pressure gauge is an example of gauge pressure measurement; when it indicates zero, then the pressure it is measuring is the same as the ambient pressure.

3.3 Vacuum Pressure Sensor: This term can cause confusion. It may be used to describe a sensor that measures pressures below atmospheric pressure, showing the difference between that low pressure and atmospheric pressure, but it may also be used to describe a sensor that measures absolute pressure relative to a vacuum.

3.4 Sealed Pressure Sensor: This sensor is similar to a gauge pressure sensor except that it measures pressure relative to some fixed pressure rather than the ambient atmospheric pressure (which varies according to the location and the weather).

4. Arduino:

Arduino is an open source programmable circuit board that can be integrated into a wide variety of makerspace projects both simple and complex.

This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world.

4.1 Arduino UNO: Arduino Uno is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and

© 2021 IJSRET

Atmega328 microcontroller. It also supports serial communication using Tx and Rx pins.

4.2 Arduino UNO Pinout: Arduino Uno is based on AVR microcontroller called Atmega328. This controller comes with 2KB SRAM, 32KB of flash memory, 1KB of EEPROM. Arduino Board comes with 14 digital pins and 6 analog pins.

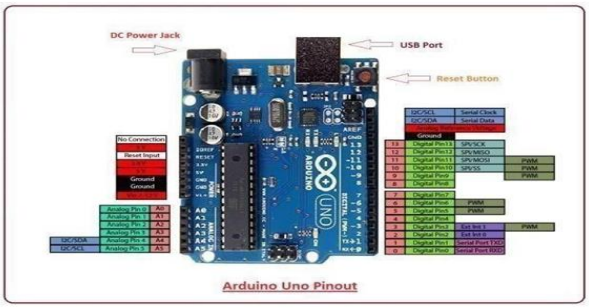


Fig 5. Arduino UNO Microcontroller.

VI. ANALYSIS

When abnormal data is reported, the animals can be assisting in time which might be able to save their life in time. Radio frequency communication is also include track the animals if they movement from boundary. This system can control and monitor sick animal's symptoms from diagrams that showing recorded data within the system. They also can report data to veterinarian or hospital staff.

A wildlife officer have receiver in his/her hand and will search location. However main drawback of this technique is that range of wireless transmitter is less. And in such situations these wireless transmitters are not much useful and they are time consuming. With the help of GPS technology and GSM technology, we can track an animal in the zoo or national parks of thousands of kilometers in length. This system also includes a technology such as Internet of things (IOT).

VII. EXPERIMENTAL RESULTS

An animal tracking system is provided for remotely monitoring animal positioning, The system includes an implant device, a global positioning system, a network, one or more remote servers, and at least one wireless computing device.

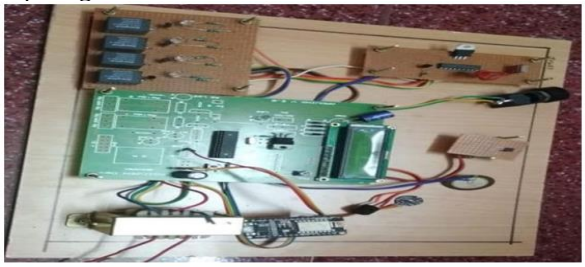


Fig 6. Experimental output.

The application was measured by the satisfaction of topics mentioned beneath for all users. These users are entrepreneurs, staff and veterinarians. The analysis data from all users is calculated with mean value by the system design, the complete content and the application's user friendliness. Owners can remotely access the database via a software application installed on a wireless computing device.Users can select an acceptable roaming range for the animal, an acceptable range between the animal and other animals being tracked, a lack of movement.

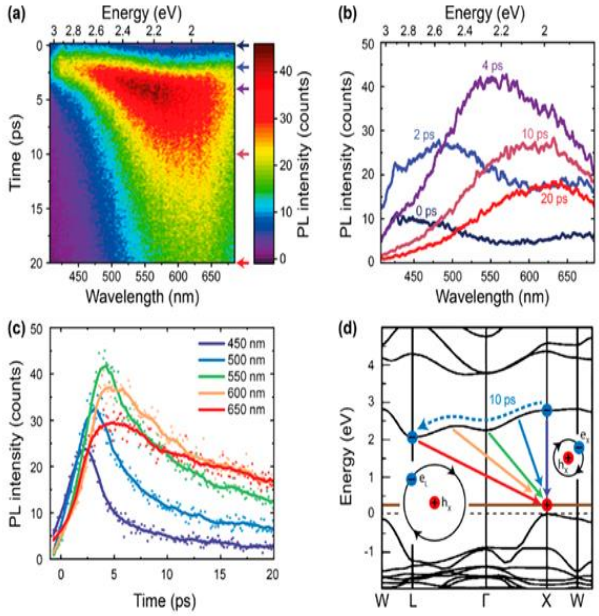
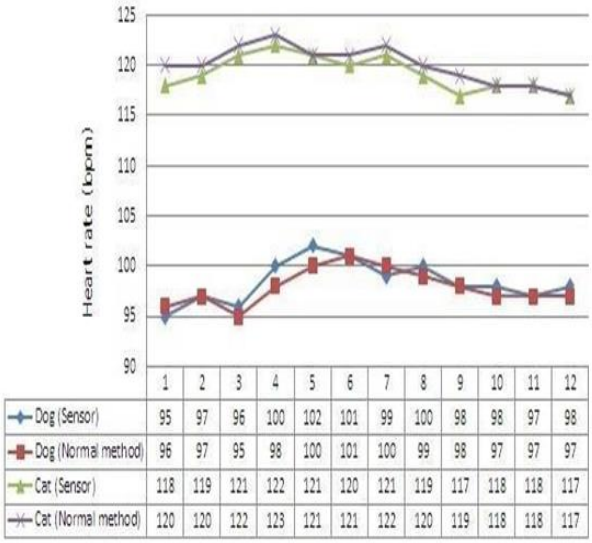


Fig 7. Performance measures of animal.

The result is the performance of satisfaction value from all users is 4.38 which is an acceptable level for sick animals health monitoring system.



	1	2	3	4	5	6	7	8	9	10	11	12
Dog (Sensor)	95	97	96	100	102	101	99	100	98	98	97	98
Dog (Normal method)	96	97	95	98	100	101	100	99	98	97	97	97
Cat (Sensor)	118	119	121	122	121	120	121	119	117	118	118	117
Cat (Normal method)	120	120	122	123	121	121	122	120	119	118	118	117

Fig 8. Reading of sensors.

© 2021 IJSRET

Radio frequency communication is used to track animals if they crossed boundaries or restricted areas the controller sensed the signal changes and it will be give alert to the people through the siren. If the animal having any wounds or fever the body temperature will be automatically increased. To monitor this we use temperature sensor.

Pressure and heart beat changes is monitor through sensors. If changes occurs it will be displayed on the LCD. The temperature sensor is fixed at the surface of the animal. It frequently monitors the temperature of each animal. If there is any variation in the temperature level, it will be displayed on the LCD display

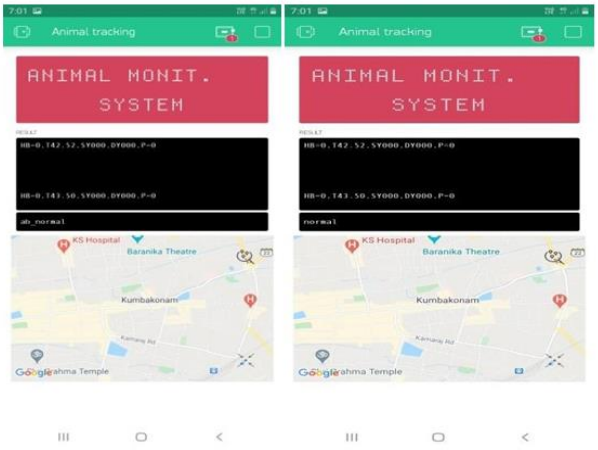


Fig 9. Application Output.

The RF transmitter receives serial data and transmits it wirelessly through its RF antenna. The transmitter module is very simple to operate and offers low current consumption. The GPS device is connected to the micro controller which is used to monitor the location of animals. And it will send the location of the animal which affected due to increased temperature. After getting all the information about the animal location and the temperature and any object movement like human it will be displayed on the PC using the IoT kit.

VIII. CONCLUSION

The wearable sensor good use of Internet of things and a Web application system for sick animals health monitoring system can offer support to entrepreneurs, veterinarians and staff as well as to animals lives. This system can be monitored to records and analyze health information of sick animals. It provides real-time updates and alerts of any animal health-related problems.

REFERENCES

[1] M. F. Mac Dorman, et al, “Animal and Perinatal Mortality, United States, 2006,” National vital statistics reports: from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, vol. 60, pp.122, 2012.

[2] F. J. Korteweg, et al. “A Placental Cause of Intra-Uterine Animal Death Depends on the Perinatal Mortality Classification System Used,” Placenta, vol. 29, pp. 71– 80, 2008.

[3] V. Flenady, et al. “An Evaluation of Classification Systems for Stillbirth,” BMC Women’s Health, 2009.

[4] CMACE, “Perinatal Mortality 2009.” Centre for maternal and child enquiries, United Kingdom, London, 2011.

[5] R. L. Goldenberg, et al., “Stillbirths: The Vision for 2020”, Lancet, vol. 377, pp.1798–1805, 2011.

[6] Rebecca Brown, et al. “Continuous Objective Recording of Animal Heart Rate and Animal Movements Could Reliably Identify Animal Compromise, United Kingdom, London, 2011.

[7] R. Sameni, G. D. Clifford, “A Review of Animal ECG Signal Processing; Issues and Promising Directions,” The open pacing, electrophysiology & therapy journal, vol. 3, no. 4, 2010.

[8] S. Pildner von Steinburg, et al. “What is the “Normal” Animal Heart Rate?” Pier J, vol. 1, 2012.

[9] Greg Byrd, North Carolina State University, “Tracking Cows Wirelessly”, IEEE Journals, June 2015.

[10] Verdone, R., D. Dardari, G. Mazzini and A. Conti, Wireless Sensor and Actuator Networks, Academic Press/Elsevier, London, 2008.

[11] SandoCarrara, LeandreBolomey, Cristina Boero and Fabio Grassi, „Remote System for Monitoring Animal Models With Single-Metabolite Bio-Nano-Sensors“ , IEEE Journals, March 2013.

© 2021 IJSRET