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Health Tracking and Monitoring System for Animals

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Abstract - *For keeping up a solid environmental parity on this planet, animals, plants and marine species are as significant as people. Every life form on this planet has an extraordinary spot in evolved way of life that adds to the biological system in its own uncommon manner.*

Pets have become integral part of biological system. The day to day life has become very risky for pets, there is need of assurance to the pets. In this situation observing their heath and keeping track of the pet is very important.

So as to enable the pets to carry on with a sound and healthy life of wellbeing, the proposed framework will help in doing so by keeping track and monitoring their health parameters.

This project prototype will alarm the guardian of the petsor the owner about wellbeing of their pets especially the pulse temperature, movement of that pet, which will accordingly build the concern towards pets and lower loss of their life.

***Key Words*: IoT, WiFi, Microcontroller, GPS, GSM, Server.**

1. INTRODUCTION

As per web data and different specialists it has been distinguished that many pets and even stray animals endure medical issues and even die because of carelessness of the pets and their owners. If there should arise an occurrence of some crisis the owner of the pet or the individuals around will most likely be unable to see or feel that the pet is having some issue with its wellbeing or it is debilitated.

Some of the time, it gets hard to get to the area of the pet if there is any emergency and because of this it might even cost the pet with life. After all, it is important to guarantee the wellbeing of the pet.

The goal of this project is building up a Health Monitoring and Tacking Belt which will expand the security of the pets.

This device has four main functions which are, location tracking of animal, habitual movement recognition, health monitoring of animal and sending data on cloud. This helps the owner take care of their pet animals better.

Each living pet on this planet has same significance in the environment. Yet, presently day to day lives of pets are in danger. If any mishap happens to pet, because of any accident or any sickness, death of pets fix. In such condition we may not discover location of pet in a wide area. To sidestep such issues for discovering explicit position of pet, the following framework is utilized. Discussing current innovations in certain nations, belts are put on the pet's neck. This existing belt has a remote transmitter. After all, primary disadvantage of the existing procedure is that the remote transmitter range is very less.

In the current scenario there are a few applications which help owner keep track of their pet animal's health conditions and medical history.

This Health monitoring and tracking belt will help them to tackle such traumatic situations by timely monitoring, which will alert their owners by sending captured data as well as its location.

The scope of this project is to develop a health monitoring and tracking belt for animals especially pet animals which will help them live a better life. The project aims at increasing the safety of pet animal. The belt will be connected to the website and the owner, who will be alerted at times of emergencies. The Client App will detect the belt location using GPS. App is programmed to update the belt's location periodically with the Centralized Server and also collects the health parameter data from the belt and sends it to the server. An IoT platform consist of three component: sensing, wireless communication, and cloud service. This project has been inspired from the loss of animal life due to negligence and lack of awareness of the health conditions of the pets and looks forward to reduce the above.

2. EXISTING SYSTEM

2.1 Health Monitoring and Tracking System for Dairy Animals

The device presents Self-ruling Wellbeing Checking Framework (AHMS) for dairy animals to continuously monitor their health. It is completely computerized, observing creature wellbeing by giving data to the client by means of SMS with respect to animal's condition. AHMS utilizes a few sensors that are mounted around the neck of the dairy animals by methods for neckline belts. Using GSM innovation, the robot will move the sensor data to the client. Also AHMS encourages the client to know about the present health status of animals present in the farm.

The proposed system is made up of three modules: Sensors - This consists of various monitoring sensors such as motion sensor, Piezoelectric sensor for measuring heart rate/min (PIR), air flow sensor for monitoring animal breathing rate/min (O2) and temperature sensor (T 0C) . A RFID tag is also attached which helps in identifying the animals. These sensors are fixed in belt which can be placed around the neck of the animal. A Zigbeetrans receiver is also present on the belt for transmitting the signals.

Similarly the robot in the present study has infrared sensors so that it can identify the pathway and be able to follow it and ultrasonic sensors are also mounted on robot so that it is capable of detecting and avoiding any obstacle in its path. The robot also contains GSM modem (SIM 900L). A LCD is also fixed in the robot which would display the values. The Zigbeetrans receiver present in the robot, receives the values from sensors and transverse it to mobile user by GSM module. The implementation and testing of hardware belt was carried out at the dairy farm located in Loyolo College, Nugambakkam, Chennai-5. A total of 6 crossbreed dairy cows were screened by the proposed system by providing identification number. The architecture diagram of the proposed system, the sensors placed in the belt and a mobile robot with all its module adopted in the study [3].

2.2 Movement Monitoring of Pet Animals Using Internet of Things

Animals have become important part of the biological ecosystem. In recent times life of animals are in danger, there is need of protection to the animals. Therefore monitoring and tracking of animal has become more and more important. In this paper the author discusses about four main applications that are installed which includes health monitoring, location tracking, movement monitoring and sending data to cloud. In location tracking system GPS is used for obtaining animal location. In health monitoring unit temperature sensor is used for measuring the body temperature of animal. Generally each animal has particular body temperature. If the animal has any wounds or fever, the temperature can be multiplied and obtained. To monitor the above, temperature sensor is used. It continuously tracks the animal's temperature. In movement monitoring unit accelerometer sensor is used to monitor the movement of animal.

In this , the proposed framework for habitual movement monitoring of animal using Internet of Things which is used to transmit the values which are sensed from the remote animal to the server by using wireless transmission technologies such as GSM. It is completely integrated so that it is possible to track anytime from anywhere. It has real time capability. The accuracy of system is affected by some factors such as weather, environment around the moving animal whereas GPS receiver having accuracy of 90% and sensitivity of system is 90%. GPS tracks position of animal anywhere in globe and also health system monitors animals temperature parameter. Less complex circuit and modules used are smaller in size and also lightweight so that they can be carried around [2].

2.3 A Survey on Various Animal Health Monitoring And Tracking Techniques

There are growing number of issues related to various animal health conditions. Hence, an animal health monitoring and tracking system by using the ZigBee module is built. ZigBee Technology increasingly adopted in a wide range of applications. To track the health of an animal, sensors such as the temperature sensor, heart rate sensor, pulse rate sensor and the respiratory sensor are utilized. The ZigBee module is interfaced with a GUI to show the digital data. However, the data from the sensors are converted using the ADC.

Advancement in technology has greatly improved the scope of monitoring health in humans and animals to a large extent. This animal health monitoring and tracking system is very useful to find any disease at initial stages and it can be stopped from spreading it to other animals. Over the years, there has been number of researches done in this field to monitor animal health but the methods adapted cause either an animal's fur to be removed or small chip to be inserted into animal's body. There are proven health monitoring devices used for human health monitoring such wearable hand gears or BP monitoring device, but the same system cannot be used to monitor any animal, also due to the increase in number of pet owners, the need for the same system becomes a necessary item in daily life. The system design would include four sensors namely, respiratory sensor, pulse rate sensor, temperature sensor, and heart beat sensor along with a GPS tracker. Sensors will detect variations in animal health and software can be developed to analyze their health with the recorded data [4].

3. SYSTEM DESIGN

This project was proposed to implement a smart health monitoring and tracking system to help the animal to live healthy and peaceful life. In the current scenario there are a few applications which help owner keep track of their pet animal's health conditions and medical history.

This Health monitoring and tracking belt will help them to tackle such traumatic situations by timely monitoring, which will alert their owners by sending captured data as well as location. This system will alert the care taker of pet animal about their health condition mainly heart rate, temperature , motion of the animal which will help to increase attention towards animals and reduce their death rate.

3.1Architecture of the system

3.1.1 Block Diagram

The block diagram of the proposed system consists of the TTGO T-call ESP32 sim800l to which all the other

components are interfaced. The components include temperature sensor, pulse sensors, and motion sensor. The power supply unit consisting of a charging board and batteries provides the required power to the different components is also connected to the microcontroller.

The TTGO T-call ESP32 sim800l has three Working modes and can be chosen according to the necessary usefulness. Information received from every one of the three sensors is processed on the Microcontroller. The output is given to the client through the site/application which the owner has enlisted during the initialization of the belt. The TTGO T-call ESP32 sim800l has an inbuilt Wi-Fi module and GSM module which is used to interface the belt with the cloud and transmit gathered information into the database and site. It additionally has GPRS module which can be used to follow the pet in the event that it has gone far away. The progression of information is unidirectional for example from segments to TTGO T-call ESP32 sim800l and TTGO T-call ESP32 sim800l to site/application.

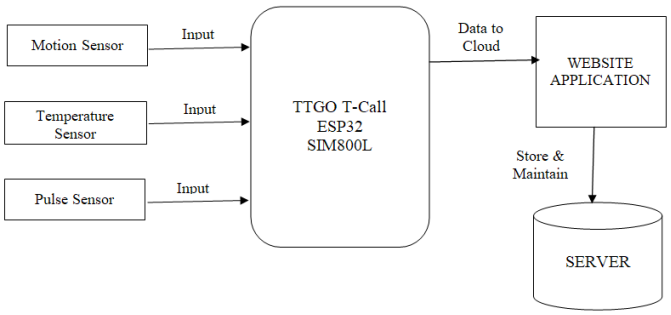

Fig -1: Health monitoring and tracking system for animals block diagram

3.1.2 Schematic Diagram

The schematic graph indicates the placement of different segments used in the development of the IoT belt model. Heartbeat sensors is set at the front of neck where the pet has 2 arteries using any of which the beat can be determined of the pet .The temperature sensor is set underneath the left ear from where the pets' exact temperature can be calculated from the nearest part of the pets' ears. The crate containing the microcontroller, the motion sensor and the power supply is put on external side of belt. The box will likewise contain a 5v pin for the IoT belt which can be used to charge the belt remotely.

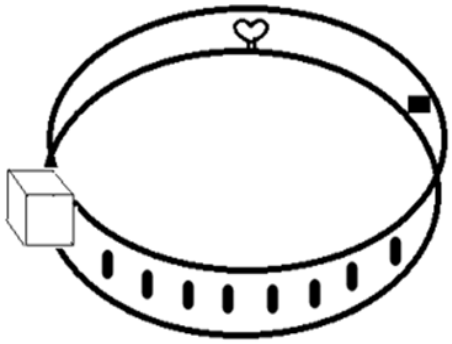

Fig -2 : Schematic Diagram of the Belt

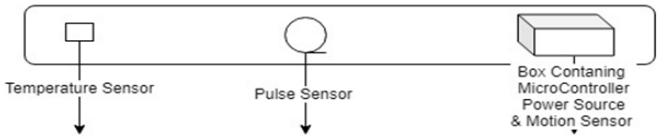

Fig -3 : Expanded view of the Belt

3.2 Flow of control

3.2.1 Hardware End

At the beginning, the device will turn on and initialization of different segments will start and the framework will be prepared to catch the contributions from the sensors. After the introduction stage the framework will push ahead and will take the contributions from each of the three sensors. The proposed framework will send sensor data to the cloud and it will be stored in the database. It will likewise contrast the qualities and the limit values that were initialized during the procedure of setting up of the belt. If the values satisfy the threshold condition it will essentially plot the diagram and will go into deep sleep mode and after a specific interval again start a similar procedure. In the event that the value is abnormal, i.e. it doesn't satisfy the threshold. It will promptly produce a text containing the sensor values and inform it to the owner and will decrease the clock by half and will again begin a similar procedure once more.

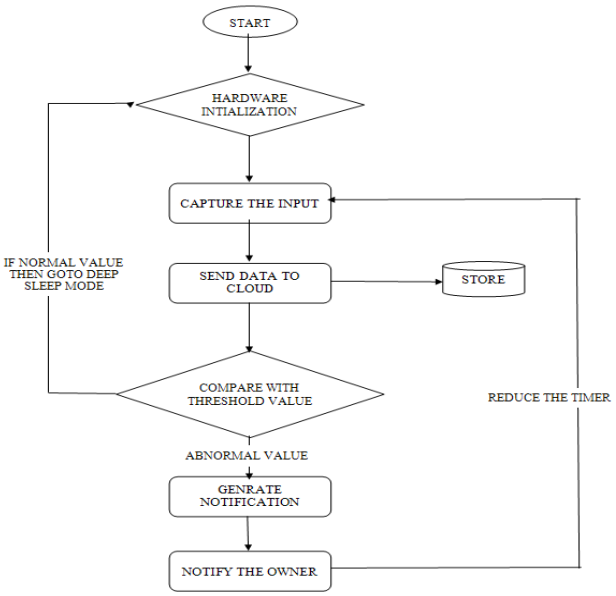

Fig -3 : Flow Design

3.2.2 Website End

At the Application end the information will be at first gathered from the sensor data which will be transmitted using GSM/Wi-Fi Module which will be stored on site database as another record with the date and time related to it.

The site will recover values from the database and compare it to the threshold values. If the conditions are satisfied that is they are in normal range, it will generate a status graph and repeat this procedure on receiving next set of values. Also if the conditions are not satisfied that is they are out of range, it will generate a notification text which will be sent to the owner and subsequently send a copy of data for generating a status graph.

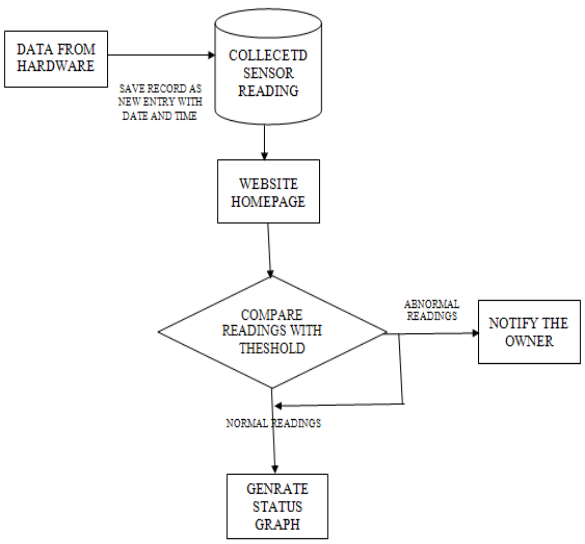

Fig -4 : Application end Flow Design

4. CONCLUSIONS

Research of various health parameters of animals was done by visiting veterinary and understanding how their vitals vary along with the hardware components which are used to create the system.

The working prototype was implemented by using the components and methods that have been studied. Also the web application for user interaction and maintaining and keeping track of the health parameters of pet animals was implemented.

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