

RFID BASED ANIMAL HEALTH MONITORING SYSTEM

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ABSTRACT

This RFID technology based health monitoring system can be used for detecting different physiological parameters like heart rate, body temperature and ECG of animals. The system has high accuracy and long operational time comparing to other existing systems. The aim of this paper is to introduce a low-cost telemetry system is based on common wireless power transfer system, RFID technology and IoT kit. Here RFID reader is used for animal identification with the help of RFID tags. IoT kit ensure animal health details monitoring from anywhere in the world using particular webpage. Three sensors namely temperature sensor, pressure sensor and ECG sensors sense their corresponding signals and are transmitted in digital bit stream form. So this is very useful to identify the each small animal and send the parameter details individually to user.

INTRODUCTION

Animal health monitoring details provide very useful information for preclinical biomedical research and also for detecting diseases at its early stage and prevent its spreading to other animals. Here a simple animal health monitoring system for monitoring the physiological parameters such as body temperature, heart rate and ECG with surrounding temperature and humidity has been developed. The developed system can also analyze for transmit the data using wireless power transfer technique.

In each animal body we are fix multi sensor unit with measuring device. If you are having WPT transmitter and you will go near to small animal. Then the wireless power is transmit to small animal and activate all sensor units and measure using interfaced microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller in which we already programmed with software.

In existing system we are monitor the measured sensor value in each small animal are in particular distance of each home server PC. But if you are in outside of home and you want to monitor the small animal health condition. We will go to use IOT kit (internet of things) device to monitor anywhere in the world using particular web page. Then the every WPT device near to small animal the microcontroller transmit the health details to web page using IOT module with 2G/3G/4G SIM support.

At the same time RFID reader is used to find each animal with the help of RFID tag in animals. So it is very useful to identify the each small animal and send the parameter details individually to user. Here ECG sensor electrocardiogram is used to check the heart function in each small animal and send this all details to web page using IOT kit.

One of the existing systemis used for detecting the small animal physiological parameters. In which each animal body is having multi sensor unit with measuring device. If the person having WPT transmitter will go near to small animal,thatwireless power is transmit to small animal and activate all sensor units and measure using interfaced microcontroller. Then the small animals have one ZIGBEE transmitter for collecting small animal health details and transmit to server PC using microcontroller. The output signal of the developed sensor modules are sent to a host computer through zigbee module. The values of body temperature, heart rate and Respiration level can be displayed on the PC server through wireless ZIGBEE.

PROPOSED WORK

This animal health monitoring system is divided in to two sides ,human side and animal side.

A.Humanside

In each small animal body we are fix multi sensor unit with measuring device. If you are having WPT transmitter and you will go and near to small animal. Then the wireless power is transmit to the animal.

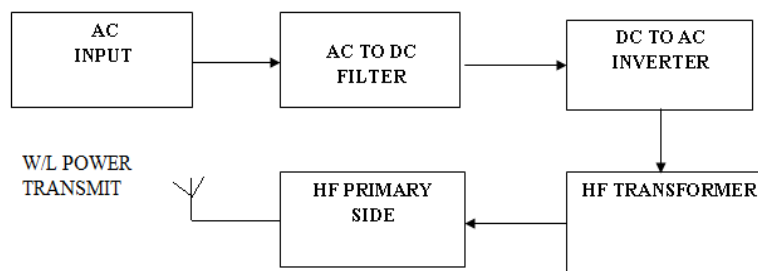


Fig1 Block diagram of humanside device

B.Animal side

That wireless power will activate all sensor units fixed in the animal body and measure using interfaced microcontroller. At the same time RFID reader is used to find the each small animal with the help of RFID tag in the animals. Every WPT device near to small animal the microcontroller transmit the health details to web page using IOT module for with 2G/3G/4G SIM support.

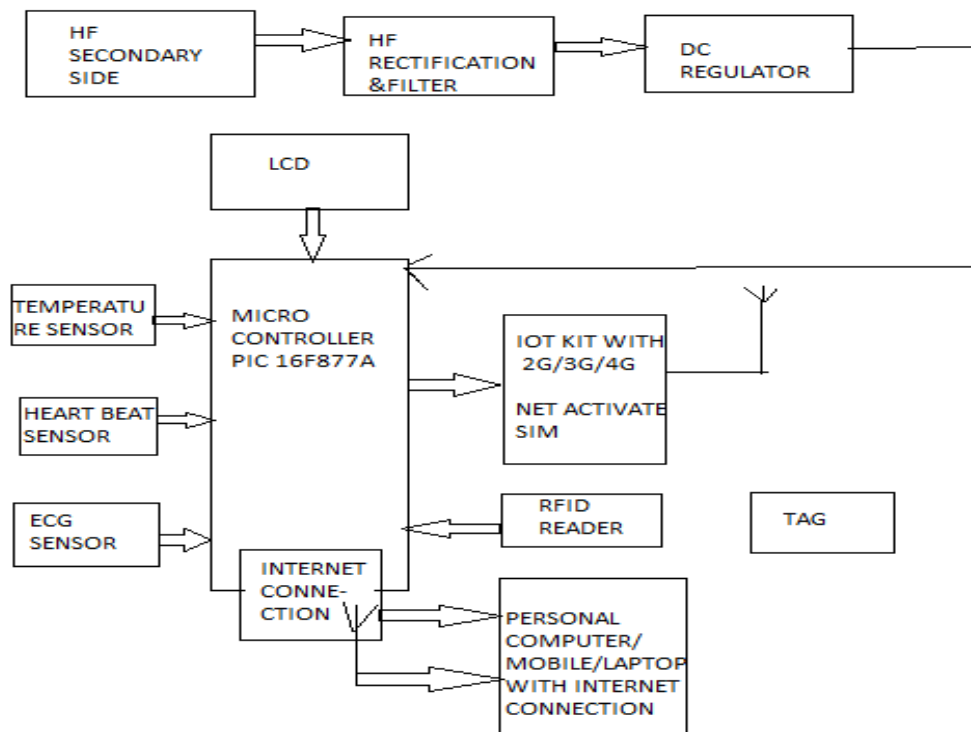


Fig2 Block diagram of animal-side device

MODULES

The sensors such as a heart beat sensor, body temperature sensor and ECG electrodes are used in this animal health monitoring system. These are connected to the PIC microcontrollers.

1. Temperature sensor LM35

The LM35 temperature sensor is used for animal temperature monitoring. Whose output voltage is linearly proportional to the Celsius temperature. The LM35 thus has number of advantages over linear temperature sensor like it does not require any external calibration, low cost, low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry

especially easy, has very low self-heating and it can be used with single power supplies, or with plus and minus supplies

Heart beat monitoring

IR transmitter and receiver are placed in the pulse rate sensor in straight line to each other. In order to measure the pulse rate, the pulse rate sensor has to be clipped in the finger. Depending on the blood flow, the IR rays are interrupted. Due to that IR receiver conduction is interrupted so variable pulse signals are generated. Using amplifier circuit output signal is amplified and comparing with reference value. Then the final square wave signal is given to microcontroller in order to monitor the heart rate.

Electrocardiogram

Unipolar leads are used for ECG measurement. Where a single positive electrode that is referenced against the two limb electrodes. These positive electrodes are located on the left arm, right arm and left leg respectively.

PIC 16F877A

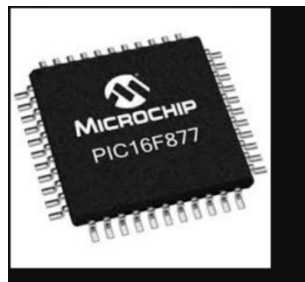


Fig3. 8 bit pic16F877 micro controller

Here the interfaced microcontroller is PIC16F877A. It is the first RISC based microcontroller fabricated in CMOS that uses separate bus for instruction and data. Some of its features are High-performance RISC CPU, it has eight level deep hardware stack, it uses only 35 singleword instructions, all single cycle instructions except for program branches which are two cycle, direct, indirect, and relative

addressing modes are present, has programmable code-protection, power saving SLEEP mode and selectable oscillator options.

It has number of advantages like low power consumption, a very small chip size ,CMOS has high immunity to noise, programmed to carry out a no of tasks, low cost, wide availability easy programming and erasing capability

CONCLUSION

A concept of simple RFID based animal health monitoring system to measure physiological functions in animals has been proposed, developed and characterized by sampling body temperature, heart beat and ECG. The system has high accuracy and long operational time comparing to other available telemetric device. System mainly use three technologies namely simple WPT, RFID and IoT. System used simple WPT for activation of sensor modules in the animal side and RFID technology for individual animal identification IoT kit is used for monitoring the animal health details anywhere from the world

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