FINAL YEAR PROJECT

Design of Cattle Health Monitoring using Wireless Sensor Networks

Components Selection and Functional Description

OVERVIEW

This document covers the Selection of Components and Sensors along with the description of functional models for the development of Cattle Health Monitoring System.

MCU, Wireless and Power Modules

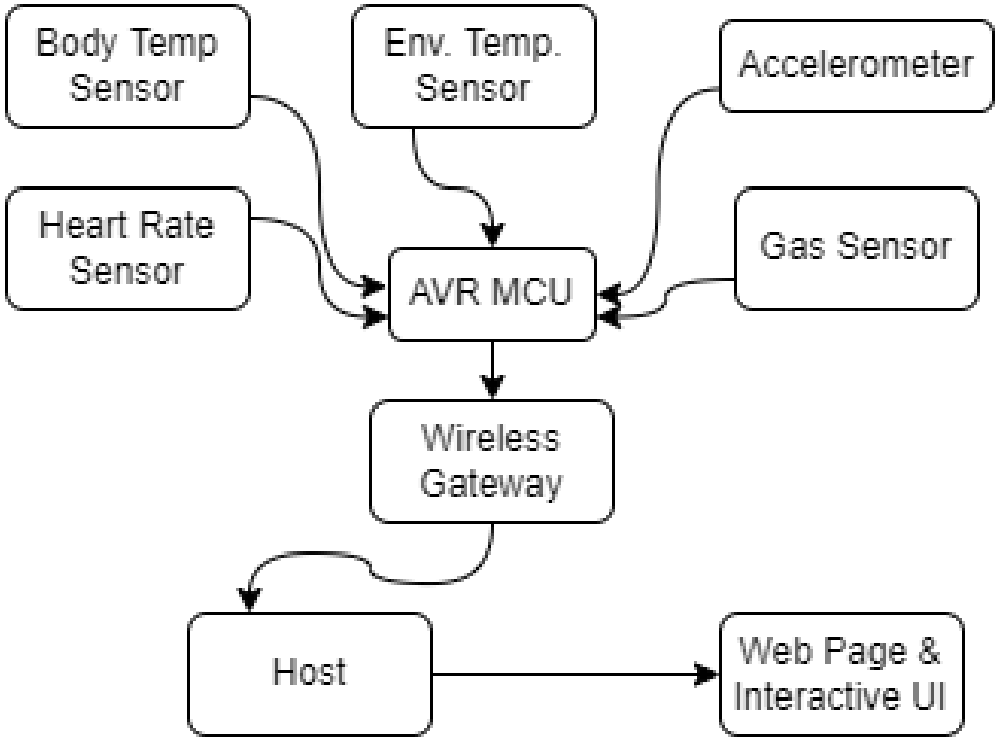
Component	Application	Comments
32-Bit Microcontroller based on ARM Cortex M Processor: ATMEL, AVR, MICROCHIP etc	Micrcontroller will provide interface for sensors and communicate with wireless Gateway	A microcontroller with 32-Bit Core Processor embedding peripherals including UART, SPI, I2C
NodeMCU/ESP32, Xtensa Based Wireless transceiver supporting IEEE 802.11 & IEEE 802.15	Provide Wi-Fi based wireless gateway to IoT Host on the cloud to enable the communication between sensor node and Web Host	ESP32 WROOM-32 or ESP32 Wrover based Devkits with 4MB Flash and 512kB PSRAM
PMU (Power Management Unit)	Capable of Delivering Uninterrupted Power at multiple voltage levels while supporting battery sources	Buck Regulator Module with Low Quiescent Current and Higher Efficiency while maintaining support for Low Weight Batteries

SENSORS

Sensor	Operation/Application	Available Models	Reference/Comments
Accelerometer & Gyroscope	Monitor walking, standing, sitting & movement	MPU6050, ADXL335	Detection of Grazing, feeding, walking and movement activities
Gas Sensor	Monitor the Environmental Gasses	MQ135	Detection of Air Quality and Measuring Exposure to gasses like Ammonia, Sulfide,
Heart Rate & Blood Oxygen Level	Heart pulse Rate detection and monitoring of Blood Oxygen Level	MAX30102	Detection of Heart rate and Blood Oxidation Level
Body Temperature Sensor	Measure animal body temperature	BME280	Fever, poisoning, indigestion, anthrax, influenza and foot & mouth disease
Environmental Temperature & Humidity	Measure the temperature of surrounding environment	DHT11	Keep track of the environment to avoid any potential exposure to extreme temperature ranges
GPS/GNSS *	Track the real time location of Animal using satellite communication	NEO 6m Based Modules	Reading the movement of animal to analyze its movement behavior
Microphone *	Detect mooing and Coughing	Electret Microphone with Built-around module	Detect Coughing and Mooing of Cattle to monitor he

*Subjected to discussion

FUNCTIONAL DIAGRAM



==========