Battery Aware System For Wireless Sensor Network

(For Application Vehicle to Vehicle Communication System)

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Abstract : To monitor activities in remote places we generally use Wireless Sensor Network.Wireless Sensor Network is nothing but the collection of Nodes connected over the internet.Each node is made up of Power Supply unit,Controller and,Sensors.Power Supply unit is solar based.Generally Solar Panels charges the battery which provides power to the Node.

To ensure the efficient use of Power source,we have derived a Battery Aware System.In this paper battery voltage monitoring code is derived.The Controller Software Monitors the Battery level and takes the decision to process the sensing value.Here three levels of battery voltages are considered,Battery at Low level,which ranges from 10% to 20%.Battery at Moderate level,which ranges from 21% to70%,and Battery at High level,which ranges from 71% to 100%.

Here, the application wireless sensor network for vehicle to vehicle communiaction is explained.The System consists ARM controllers,Wifi Module,Keys and IR Sensors,Thingspeak Platform.

IndexTerms **- ARM controller LPC2148,Wifi Module ESP8266,Thingspeak Platform.**

I. INTRODUCTION

To monitor activities in remote places we generally use Wireless Sensor Network.Wireless Sensor Network is nothing but the collection of Nodes connected over the internet.Each node is made up of Power Supply unit,Controller and Sensors.Power Supply unit is solar based.Generally Solar Panels charges the battery which provides power to the Node.

Road accidents account for a severe threat to human lives from both the injury as well as a financial perspective. Given that vehicles are designed to facilitate a smooth means of transportation, manufacturers have been long in the process of designing vehicles based on principles of reliability and safety. However, due to reasons such as human-error, circumstantial error and negligence, accidents occur. Today, special attention is focused on the technologies that can reduce traffic accidents. V2V technologies are simple to implement primarily because of their reliance on wireless communication.

The communication protocol includes Wifi Module ESP8266 to communicate the information between two vehicles. The distance measurement between two vehicles is done by Ultrasonic sensor. The microcontroller controls entire process, it is programmed to send a signal to buzzer and Wifi Module ESP8266 when the distance range is obtained. The main objective of our project is to alert the driver when he is close to the front vehicle. During night times some of the vehicles such as car, bus may break down at the highways. This vehicle now appears to be an obstacle to the vehicle that is coming behind of it. This causes a greater chances of accident, the vehicle coming
from behind may hit hardly to the back of stationary vehicle and it may lead to the greater damage.

II. PROPOSED SYSTEM

Here we are designing a intelligent self sustained collision avoidance with accident information system for highway.
There are many scenarios we have considered for our application:

Accident avoidance:

For this we have interfaced an ultrasonic sensor at the front end of vehicle. The ultrasonic sensor will continuously sense the distance using Doppler Effect. When the distance between the two vehicles decreases the vehicle will automatically apply brakes for accident avoidance.Also we have interfaced an IR sensor at the back side. Whenever a vehicle comes very close to the vehicle from back side the µC gives an indication to driver.

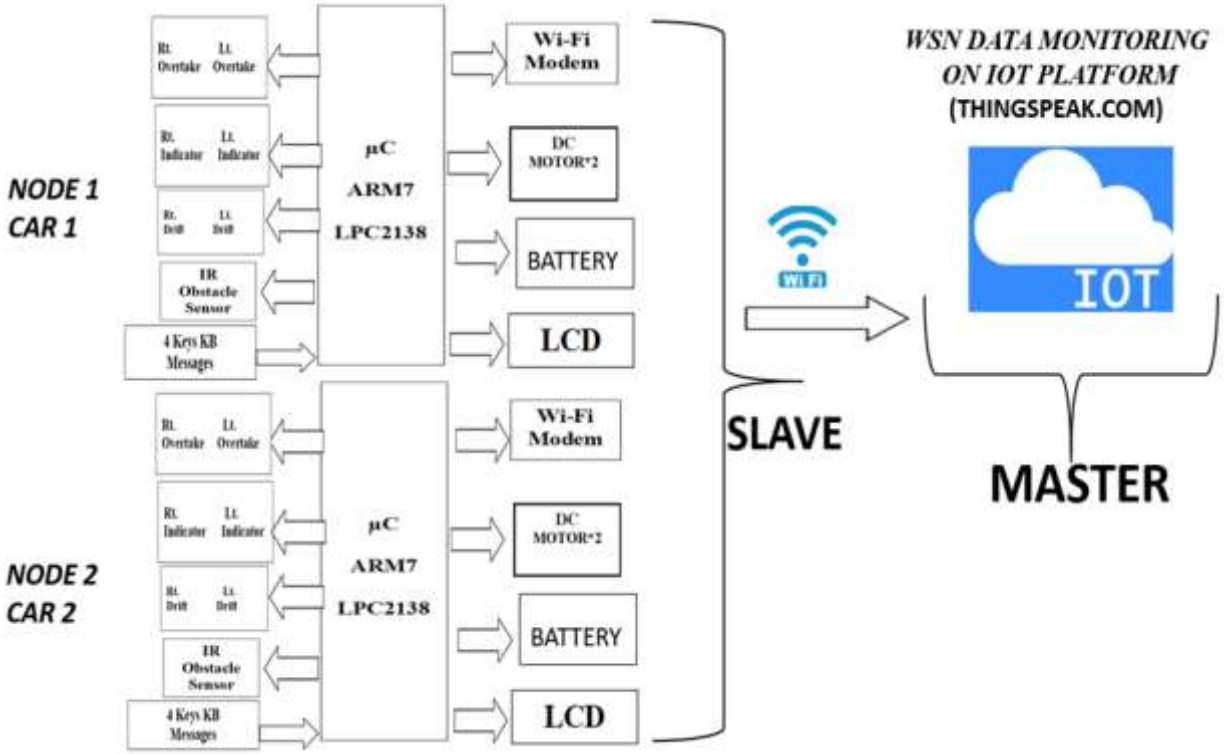


Figure 1:Block Diagram of System

Lane Drift:

Here we have interfaces 2 keys for steering the vehicle left and right. Whenever the driver wants to leave the lane he has to first press an indicators. If the vehicle leaves the lane without indicator then it is assumed that the driver is drowsy and the vehicle come back in its LANE.

Vehicle Overtake:

For overtaking scenario we have give 2 keys, one for left overtake and second for right overtake. As soon as the user presses left or right overtake then the corresponding indicator starts blinking and an wireless request is sent to the vehicle in front. The front vehicle will accept the request and respond to the request using RF communication. If the request is accepted then only overtake can be done. Also while overtaking the vehicle, the sensors at the back of vehicle will warn the driver of any incoming vehicle from behind.

Vehicle to vehicle Messages Communication:

Accident avoidance Message: In this kind of message communication the vehicles send a distress message on the Wireless network such as FOG warning, Road Barrier information, Automatic breaking system.

III. BRIEF SYSTEM ALGORITHM

- Start
- Initialize Nodes
- Is ultrasonic obstacle detected? Y→ Apply breaks → Update data to Cloud
- Is IR sensor detected? Y→ Turn ON buzzer → Update data to Cloud
- Is Lane drift detected? Y→ Move the vehicle back into lane→Update data to Cloud
- Is Wireless message detected? Y→ Display the message on LCD→"A"→ Update data to Cloud

IV.RESEARCH METHODOLOGY

Battery Consumption of WSN
Present Connectivity in Vehicles
Low Power Consuming Controllers to build nodes of Wireless Sensor Networks

V. RESULTS AND DISCUSSION

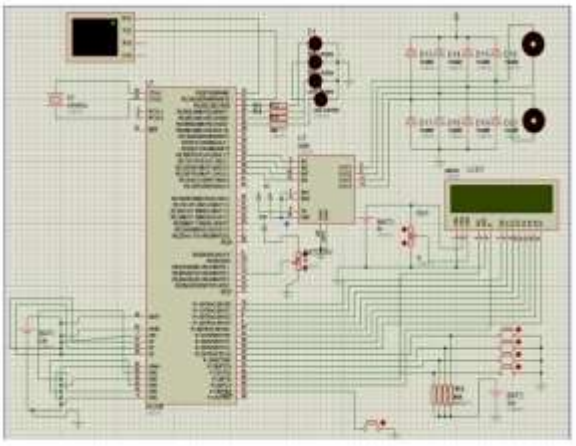
Software Based Results:

Software simulation results are obtainted for the proposed system using Proteus Software.We can load the .hex file generated from keil to the controller in proteus.

Simulation and testing :

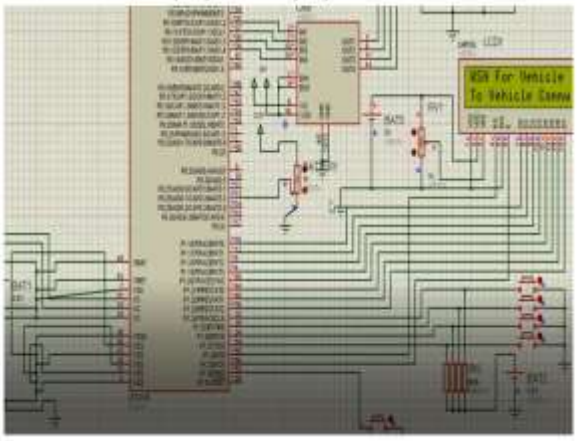
- FLOW OF THE PROJECT-

OFF TIME



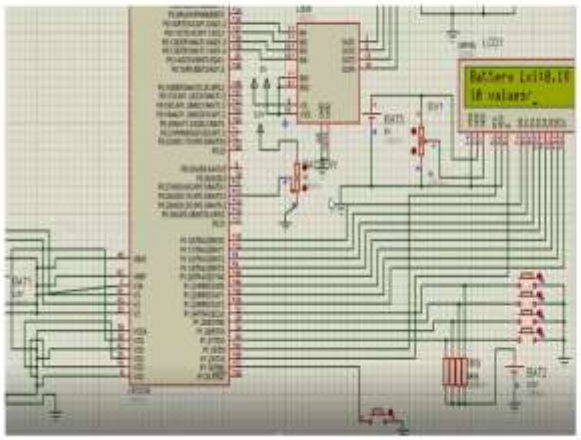
ON TIME

1-Name of the project is Displayed on LCD-

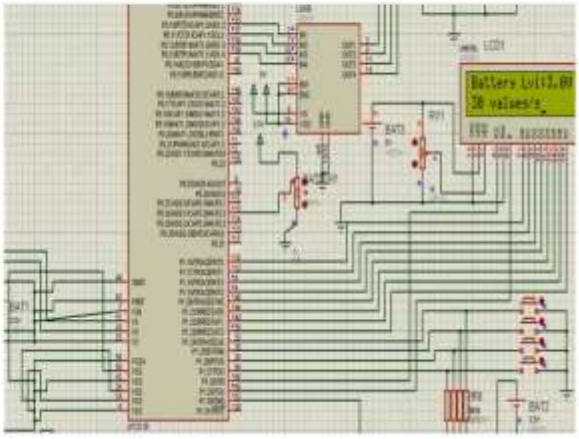


2-Reads Battery Voltage and Decides Values/sec

0 to 1.7 V : 10 values/sec : Battery percentage is low



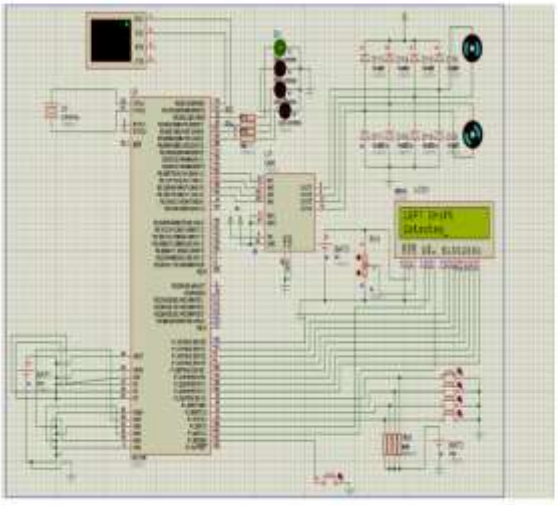
3.0 to 3.3 V : 30 values/sec : Battery percentage is high

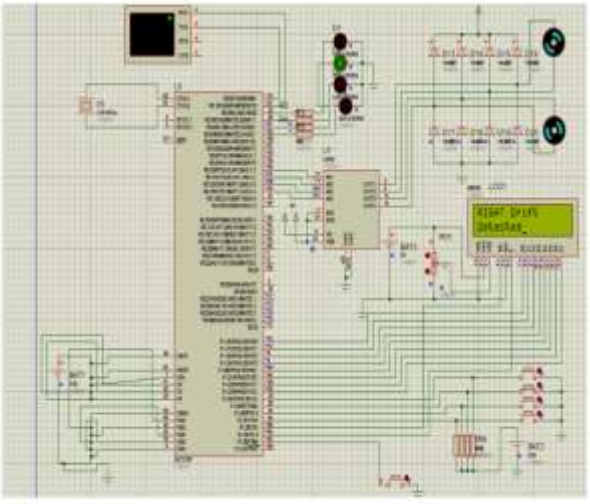


3-READS KEY STATUS

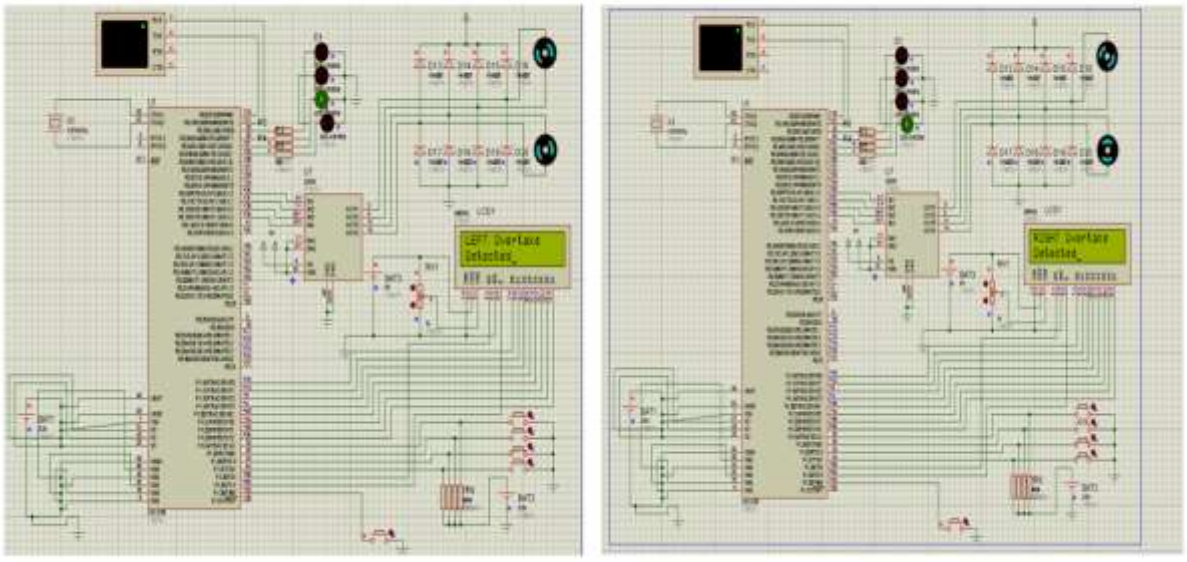
FOUR CONDITIONS OF KEYS-

(DRIFT CONDITION)





(OVERTAKE CONDITION)



4-
Depending upon the Battery Level,
only the required number of values are sent.
(Here Values indicate the Messages on the LCD.)

5-
Hence, Battery used efficiently.

Here Off State of the simuated design,ON state of the system with various battery levels are displayed on LCD.The four key conditions are also displayed on LCD.Overall flow of the project also Explained.

VI. Hardware Results:

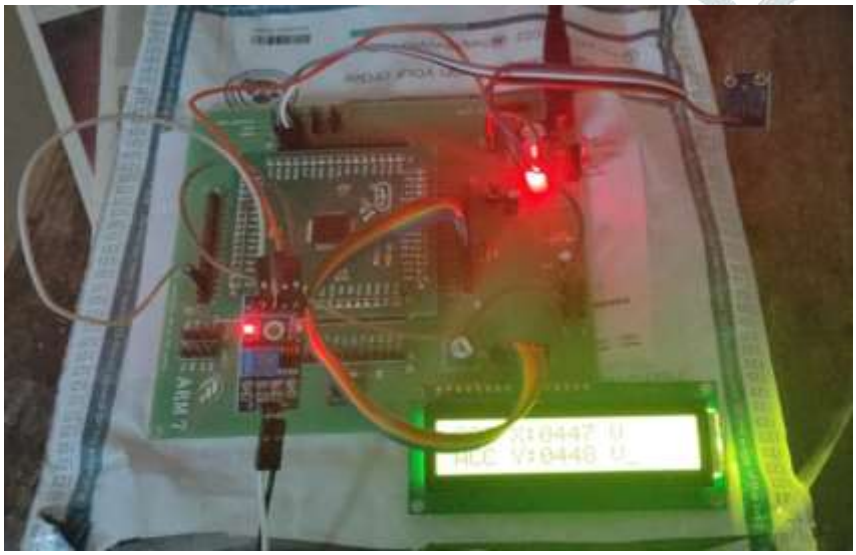


Figure 2:WSN Node with Sensors

Figure 3:WSN Node's Sensor values displayed on IOT domain named thingspeak

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