Microcontroller Based Swapping of Batteries for Electric Vehicles with Health Condition Monitoring of Driver Using IOT

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Abstract **- In today's world electrical vehicle has been limited by the factors as range, long charging time and power failure. The major disadvantage facing in electrical vehicle is charged in battery is used supply for the motor. We overcome this problem with the help of swapping of batteries here we use two batteries. Hence to change this problem we are using a battery swapping method with a prototype model. Battery 1 is already charged and the battery 2 is charging at the running speed of the vehicle for this purpose. We use Dynamo in the wheels of vehicle. If the battery 1 is drained discharged then it will be swap automatically the battery power from battery 1 to battery 2. Also the power drained battery will be charged using the dynamo. The dynamo is convert which the mechanical energy into electrical energy. The driver's health can also be monitored here by using heart beat sensor which is placed in the driver's seat belt. If there is any abnormalities in the driver's heart rate, the sensor sends the signal to the micro-controller which will send the message to the concerned person.**

Key Words- Swapping, Batteries, Dynamo, Electric vehicle, Heart Beat Sensor, Internet Of Things (IOT).

I.INTRODUCTION

An electric car is an automobile that is propelled by one or more electric motors, using electrical energy stored in batteries or another energy storage device. Electric cars were popular in the late 19th century and early 20th century, until advances in internal combustion engine technology and mass production of cheaper gasoline vehicles led to a decline in the use of electric drive vehicle. The energy crises of the 1970s and 80s brought a short-lived interest in electric cars, but in the mid-2000s a renewed interest in the production of electric cars took place, due mainly to concerns about rapidly increasing oil prices and the need to reduce greenhouse gas emissions. As of July 2012, series production highway-capable models available in some countries include the Tesla Roadster, REVAi, Buddy, Mitsubishi i MiEV, Nissan Leaf, Smart ED,Wheego Whip LiFe, Mia electric, BYD e6, Bolloré Bluecar, Renault Fluence Z.E., Ford Focus Electric, BMW ActiveE, Coda, Tesla Model S, and Honda Fit EV. As of June 2012, the world's top-selling highway-capable all-electric cars are the Nissan Leaf, with more than 30,000 units sold worldwide, and the Mitsubishi i-MiEV, with global deliveries of 20,000 vehicles, including units rebadged as Peugeot iOn and Citroën C-Zero for the European market. Electric cars have several benefits compared to conventional internal combustion engine automobiles, including a significant reduction of local air pollution, as they have no tailpipe, and therefore do not emit harmful tailpipe pollutants from the onboard source of power at the point of operation; reduced greenhouse gas emissions from the onboard source of power, depending on the fuel and technology used for electricity generation to charge the batteries; and less dependence on foreign oil, which for the United States and other developed or emerging countries is cause for concern about vulnerability to oil price volatility and supply disruption. Vehicles are the demand for today's fast life but an increased number of vehicles have grown many serious issues on the environment and also on their management. Moreover, since they are driven by the power of non-renewable sources there is a need to develop better alternatives for future public transportation with an efficient vehicle management section. Dependency on fossil fuels makes them unsustainable as a major part of these have been exhausted and it will take thousands of years to generate them again and hence with them they also make the transportation unsustainable. The Atmel AVR® core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers. The ATmega328/P provides the following features: 32Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10- bit ADC (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power saving modes.

II. PROPOSED SYSTEM

The proposed system uses a in the electric vehicle is that the charge in the battery which gives the supply for motor gets discharge and hence it should be stopped or parked in the area where the current should be easily taken. But the biggest problem is that when the car get loses its full charge while driving in an area where the current could not be taken easily or there is no sort of current in that area then you can't able to reach your palace. Hence to change this problem we are using a battery swapping method which will use two batteries (Battery 1 and Battery2). When the power from battery 1 starts draining, the battery 2 power will be used. This can be done by using a relay which will indicate the status of battery 1 and then it will automatically swap the battery power from battery 1 to battery 2. Also the power drained battery 1 can be charged using the Dynamo which is fitted on the wheels. Since Dynamo is a device which is capable of changing mechanical energy into electrical energy. The description of this technique is that by placing one dynamo in each wheel, so that each dynamo will produce a charge through the rotary motion given by the wheels of the vehicle and these charges is stored in a drained battery and that can be used for the emergency purpose and this process is cyclic. The driver's health can also be monitored here by using heart beat sensor which is placed in the driver's seat belt. If there is any abnormality in the driver's heart rate, the sensor sends the signal to the micro-controller which will send the message to the concerned person.

III. BLOCK DIAGRAM

Here in this project about Block diagram we can explain that the microcontroller unit process that I have two batteries battery 1 and battery 2. These two batteries are none other than Lithium-Ion batteries. Here we connect this battery using relay driver and from the microcontroller we connect LCD display and a vehicle motor driver and through vehicle motor. In LCD display to the driver it shows the all the information like, How much the charge available in the battery. We connect the power supply with the microcontroller and the battery charger unit then we have externally connect the dynamo for the rotation of speed converted into energy that actually mechanic rotation of speed mechanical energy and it Converts into electrical energy. Then we have used to internally the Heartbeat sensor in the seat belt of the driver seat for the emergency purpose of the drive. Then we know the Heartbeat sensor detects how much heart rate will be detected and monitor by the sensor that sense it will the Driver is Normal or Abnormal are gives information to through the GSM module to the consolidated person, the owner of the vehicle. Here this is the concept how we conducting health condition monitoring using IOT. Then externally we give the 12V input power supply for the battery charger unit and working of Microcontroller. In this type of microcontroller namely ATMel 328, The Atmel AVR® core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. Relays are components which allow a low-power circuit to switch a relatively high current on and off, or to control signals that must be electrically isolated from the controlling circuit itself. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. In LCD display the recent advances in technology have resulted in better legibility, more information displaying capability and a wider temperature range.

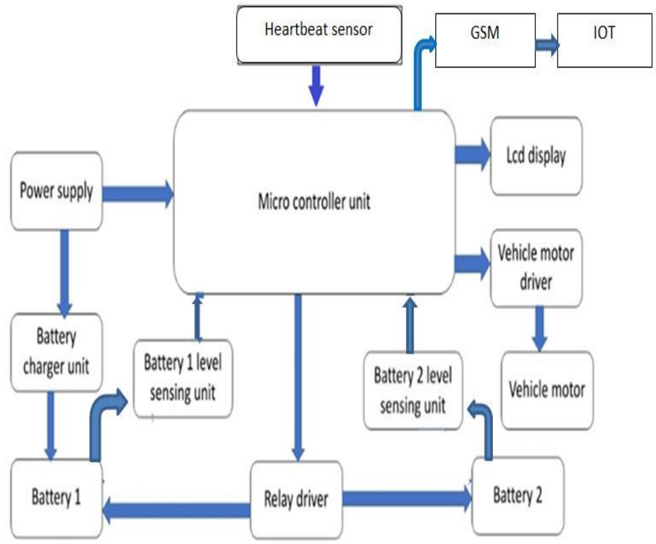

Fig 1: BLOCK DIAGRAM OF THE SYSTEM

IV. WORKING OF THE SYSTEM

When the power from battery 1 starts draining, the battery 2 power will be used. This can be done by using a relay which will indicate the status of battery 1 and then it will automatically swap the battery power from battery 1 to battery 2. . Also the power drained battery 1 can be charged using the Dynamo which is fitted on the wheels. Dynamo is a device which is capable of changing mechanical energy into electrical energy .Hence by using this character of the dynamo the problem can be solved. The description of this technique is that by placing one dynamo in each wheel so that each dynamo will produce a charge through the rotary motion given by the wheels of the EV car and these charges is stored in a separate swapping battery and that can be used for the emergency purpose and this process is cyclic. When car losses its charge while running on the charge produced by the dynamo, the dynamo will not stops its work, it again produce a charge so that you can go for a longer distance.

V. IOT PLATFORM

A web page is used to provide a suitable interface between the user and the Microcontroller Based Swapping of Batteries for Electric Vehicles with health condition monitoring System.

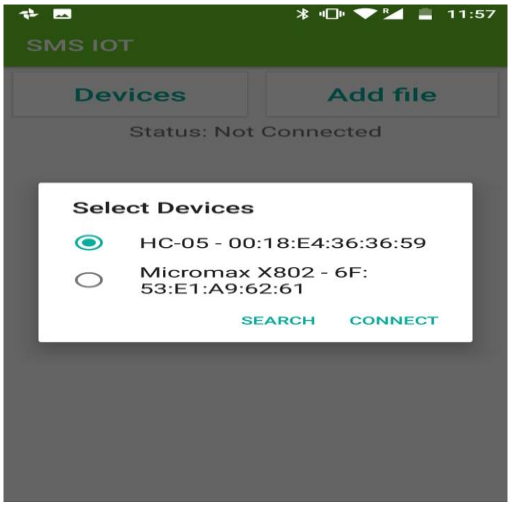

Fig 2 : Connect Page To The IOT

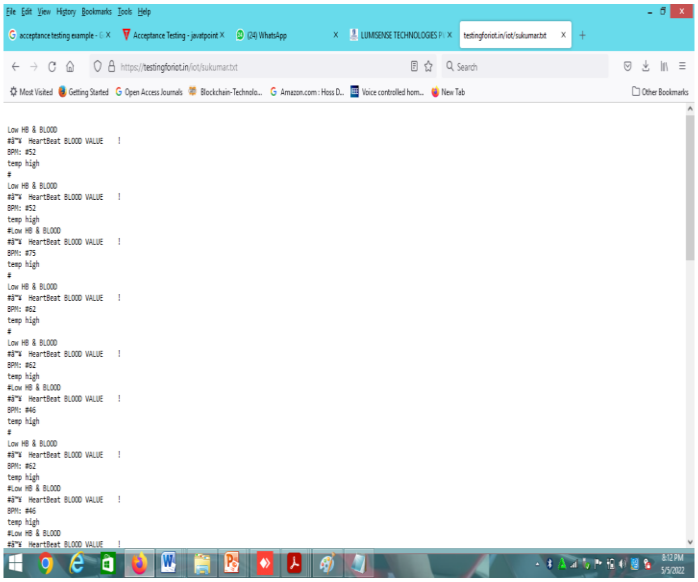

Fig 3 : Real Time IOT based monitoring

VI. RESULTS

The implemented system was tested efficiently and tested for proper working. The swapping of Batteries using Microcontroller and store energy by producing the Dynamo. Then we monitoring the Health Condition of Driver and intimate that message through IOT. The initialization of the IOT and working of the sensors were verified. Messages were obtained after each alert and corresponding data uploaded on to the cloud storage. The buzzer and sprinkler also worked efficiently.

CONCLUSION

A rapidly growing EV market the need for fast chargers can become the prime concern of consumers. Need for optimisation framework defining business model for swapping stations corresponding each stakeholder involved in the smart charging infrastructure, i.e. smart grid, aggregators, and xEV customers. Needs to define internet of things (IOT) paradigms shall be emerged as the supreme technology in providing utilities to intelligent transport specifically for smart charging of xEVs. This IOT system can be easily implemented with maximum reliability and high security driver health with low cost, It is a special enhancement.

FUTURE SCOPE

The system has been tested for various operating conditions and results analysed rigorously. The developed battery management system is effectively charge the batteries as well as protects the battery from overcharging and over discharging. The developed maximum power point algorithm also performed well with maximum power point tracking IOT. The based battery management system is better system for dynamo charging of battery in electric vehicle application..

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