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Analysis of Parameters Influencing Electric Vehicle Range

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ABSTRACT: Range is considered as a key parameter of electric vehicles. Increasing electric vehicles range is important for acceptance of electro mobility. Battery capacity is the main parameter influencing electric vehicles range. In order to batteries are the most expensive part of electric vehicle is it suitable to focus on others parameters such as weight, aerodynamic drag coefficient or correct size of motor. Range is not influencing only by the designs parameters such as battery capacity but also important is driver influence. Simulations were created in order to determine how is influencing those factors range.

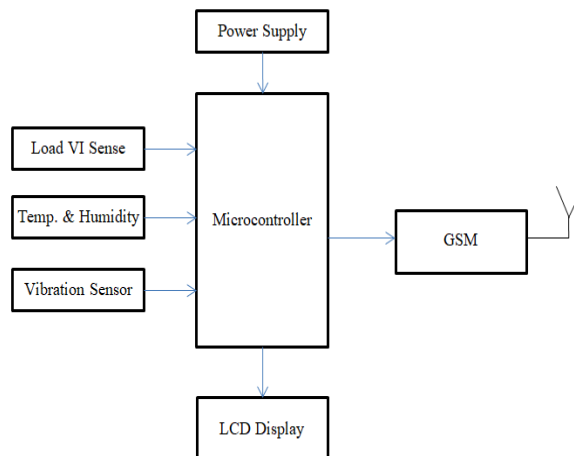
I.INTRODUCTION

Smart sensor interfaces have evolved through the Internet of Things (IoT) which acquires heterogeneous sensor signals and connects them to the Internet, providing intelligent services in various applications such as healthcare systems, automotive systems and EV monitoring systems. More specifically, healthcare systems have pursued the utilization of physiological and biomedical sensor data to improve the efficiency of health management of healthy subjects and patients. Automotive systems have introduced new vehicular services to connect various sensors and GPS-based location information to communication networks. The EV manufacturing environment is also embedding new functions in the form of safety monitoring or smart factories. One recent trend of interest is the combination of heterogeneous systems and services from different fields such as by providing automated healthcare services in automotive environments.

The need for environmentally friendly technology has a huge impact on the automotive world. Fuel consumption in conventional vehicles gets attention from all over the world. So the need for environmentally friendly electric vehicles is becoming increasingly urgent. At present, a lot of research has been done on electric vehicles. Especially research on battery design and performance. For electric scooter applications, its batteries are expected to be able to operate for a long time and have small dimensions. So to observe battery performance, it is necessary to design a compact and integrated battery pack. An integrated Battery Management System (BMS) based on the Galvanic Isolation Concept has been discussed. In this system, in addition to the battery module and module management unit, there is also a package management unit. This is intended to accurately estimate the battery status. In spite of considerable progress in battery chemistry and material, battery systems are still usually oversized and underused, i.e., 20%–50% excess energy capacity is provided, which evokes augmented weight, volume, and purchase cost.

II.EXISTING SYSTEM

Traditionally, safety monitoring and automation systems were typically designed to meet the requirements of a single monitoring application. The EV application has already gone beyond the interconnection of a few large back-end systems, and more and more underground physical devices make the state of objects and their surroundings seamlessly accessible to software systems. As a matter of fact, most works are based on monolithic system architectures, which are brittle and difficult to adapt.

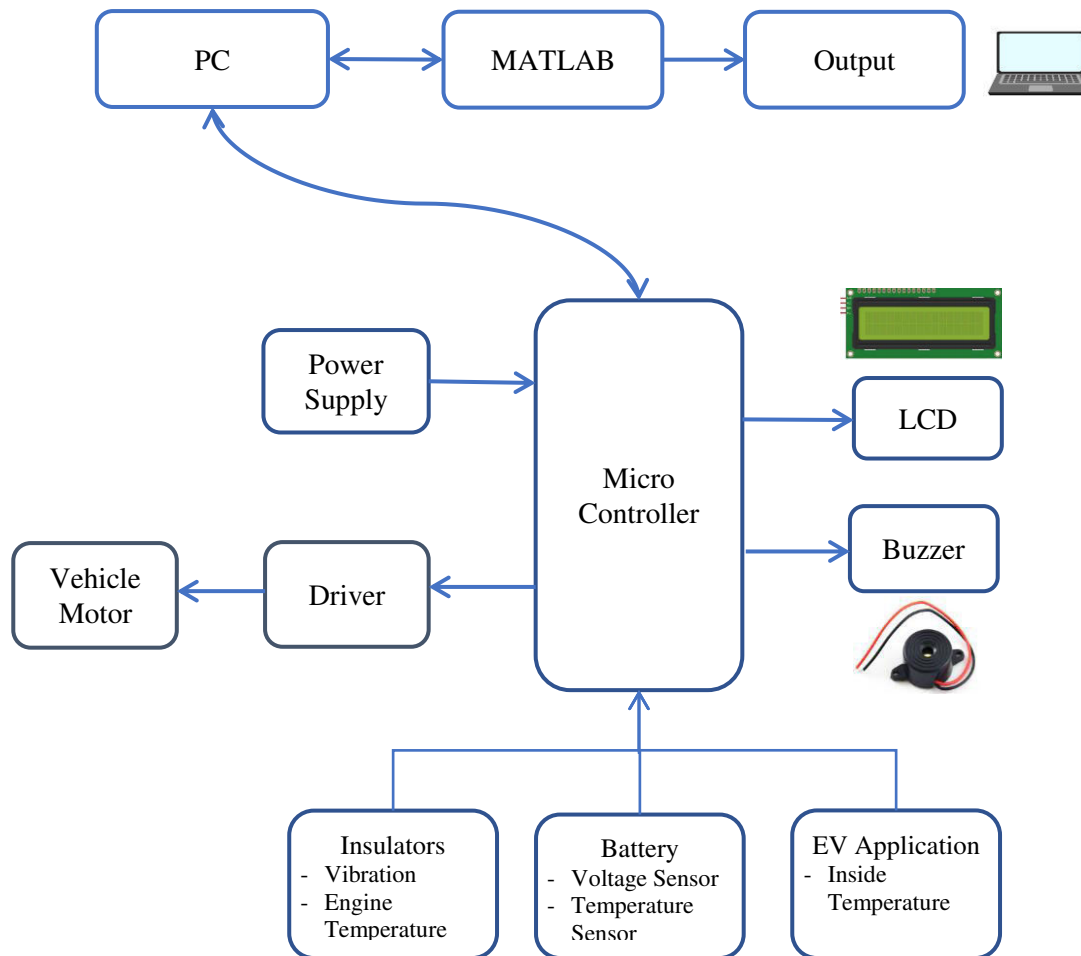


- The persons who are working in the EV have to face various environmental parameters in their EV. So to overcome that problem we are using Zigbee based intelligent helmet for coal miners.
- EV incidents were unpredictable and it has many factors the event of an accident, not only causes huge economic losses, but a direct threat to the safety of miners
- As an ICS is a cyber-physical system, the process of cybersecurity risk propagation in ICSs is different from that in general network systems.
- Most ICS attacks aim to vandalize ICS assets, which include humans, environment, and equipment.
- Traditionally, safety monitoring and automation systems were typically designed to meet the requirements of a single monitoring application.
- The application has already gone beyond the interconnection of a few large back-end systems.

III.PROPOSED SYSTEM

Information Technologies (IT) & Operational Technology (OT) include critical software and hardware systems for the control and monitoring of physical sensor field devices. IT and OT provide essential, inherent integration and visibility for supply chain details about logistics, assets, processes, and completion times. This provides remote control and management units with information, thus keeping the ICS efficient and competitive.

Range is considered as a key parameter of electric vehicles. Increasing electric vehicles range is important for acceptance of electro mobility. Battery capacity is the main parameter influencing electric vehicles range. In order to batteries are the most expensive part of electric vehicle is it suitable to focus on others parameters such a weight, aerodynamic drag coefficient or correct size of motor. Range is not influencing only by the designs parameters such as battery capacity but also important is driver influence. Simulations were created in order to determine how is influencing those factors range. For better accuracy was used real driving cycles.

**Figure.2. Proposed Block Diagram**

- Human Machine Interface (HMI) provides a graphical user interface (GUI) application that assists the interaction of hardware, control system, human operators (staff).
- HMI displays trends, historical and real-time status from data and logs gathered from the ICS environment. MI provides the dashboards to monitor, customize, set control points, and establish the operational parameters required for the day-to-day sensor and controller.
- Micro Controller (MC) is the control component of the ICS ad that provides process management. MC provides supervisory, remote access, and control to devices such as actuators and sensors.
- Remote Terminal Units (RTU) & Master Controller Units (MTU) are microprocessor-based field devices. RTU receives commands from the MTU and sends back the information from the field.

MICROCONTROLLER BOARD

The master board is the main controller of the BMS which functions to process data, acquire data and display the results of process to users. Besides that it also serves to monitor and safety protection. This master board uses the ATmega328 based Arduino NANO microcontroller. This microcontroller is equipped with a real-time operation system that can be done with multi-tasking with a handing timer reaching 16 MHz In the master board, it consists of several module series includes controller Module, Current Sensor Module, Temperature Sensor Module, Voltage Regulator Module, Communication Module, Voltage Sensing Module, Main Contactor Control and Motor Control Module.

VOLTAGE SENSOR

A voltage sensor can in fact determine, monitor and can measure the supply of voltage. It can measure AC level or/and DC voltage level. The input to the voltage sensor is the voltage itself and the output can be analog voltage signals, switches, audible signals, analog current level, frequency or even frequency modulated outputs.

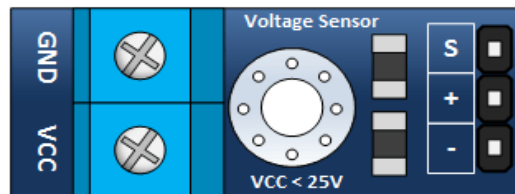


Figure.3.Voltage Sensor

TEMPERATURE DETECTOR

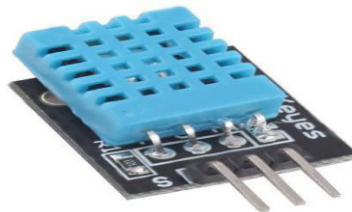


Figure.4.Temperature Sensor

Temperature sensor basically measures the heat/cold generated by an object to which it is connected. It then provides a proportional resistance, current or voltage output which is then measured or processed as per our application.

HUMIDITY SENSOR



Figure.5. Humidity Sensor

Humidity Sensor is one of the most important devices that has been widely in consumer, industrial, biomedical, and environmental etc. applications for measuring and monitoring Humidity. Humidity is defined as the amount of water present in the surrounding air. This water content in the air is a key factor in the wellness of mankind. For example, we will feel comfortable even if the temperature is 00C with less humidity i.e. the air is dry.

IV.RESULT AND DISCUSSION

The proposed formulation on electric vehicles using IOT with EGBA has been monitored using Thing Speak, an online monitoring system. For offline analysis the results monitored in Thing Speak are visualized using MATLAB for conserving exact consequences in day-to-day analysis. To analyze real time implications and for introducing electric vehicles with IoT in industry a real time battery test was performed and it was analyzed with four different scenarios.

Additionally, the authors had multiple user accounts in Math Works and one complete unit of Think Speak with a license. Therefore 33 million messages could be stored and information could be updated for periods of 15 s because it was essential to observe the amount of charges that were passing inside the vehicle. If differences in charges were observed within a short span of time then state of charging information could not be retrieved.

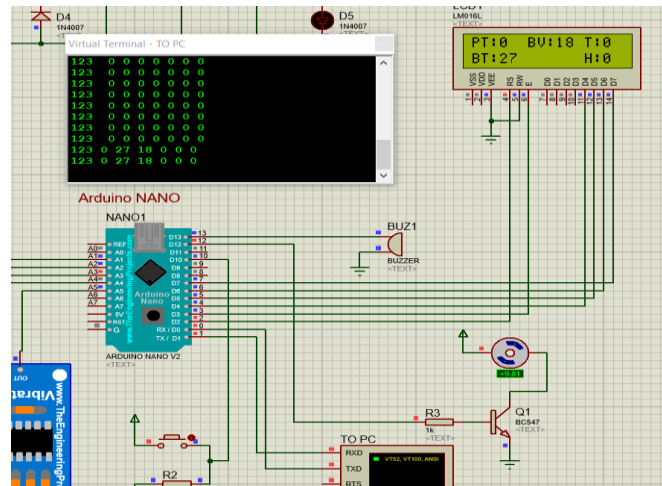


Figure.6. Simulation Results

V.CONCLUSION

Recently, range anxiety has been observed among electric vehicle users. The limited range of an electric vehicle makes EV users worry that the battery will drain while driving and the vehicle will stall on the road. The results of the research presented in the project. EV Control Systems have migrated from being dedicated, air-gapped, centralized infrastructures and have adopted the distributed, corporate systems accessible via the Internet. Although the efficiency, speed, precision quality is increased, this has exposed ICS to the unsecured Internet. Monitoring System for battery pack already designed and able to work well. Balancing cell is an action to prevent damage to the battery pack caused by voltage different between cells. Because the difference in cell voltage can make the lifetime of the battery decrease and break down quickly. In this way, the proposed multi-sensor interface can achieve the compactness and the flexibility of the sensor module by utilizing two reconfigurable methods for various sensor interfaces and also by migrating most of the burdens for signal calibration and analysis to a smartphone. DL approaches have been widely used in various applications. However, in this project, major electrical applications have been considered for review. DL has proven to have phenomenal uses in different fields. The primary state-of-the-art architectures have been discussed, and we have obtained a hardware prototype and MATLAB GUI analysis of them. An attempt to put forward a state-of art EV Vehicle fault diagnosis has been made.

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