ISSN: 2278 – 909X
International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)
Volume 4, Issue 5, May 2015

CHARGING AND MONITORING OF ELECTRIC VEHICLES BASED ON REAL TIME POWER SYSTEM

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Abstract- electrical vehicles (EVs) have attracted growing attention in recent years. However, daily charging of EVs, throughout travelling and every one alternative time, particularly in peak hours it'll be build congestion on traffic. This project presents a hybrid simulation technique for real time operation of electron volt .Electric vehicle charging supported power for avoiding traffic knowledge congestion. Associate degree intelligent transport system is employed for charging and solar array is projected for speedy charging. Additionally to those options GPS and measuring instrument square measure won't to track EVs position, speed and direction for security. Supersonic sensors square measure well utilised for automatic obstacle detection throughout reverse gear. Operating states of electron volt will be viewed through simulation. Management strategies square measure enforced by victimization PIC microcontroller. Simulation results and experimental results are provided to validate the projected system. Once electricity was among the well-liked strategies for car propulsion, providing grade of comfort and easy operation that would not be achieved by the petrol cars of the time. The inner combustion engine (ICE) has been the dominant propulsion technique for motorcars; however power has remained common place in alternative vehicle varieties, like trains and smaller vehicles of all kinds. Throughout the previous few decades, environmental impact of the petroleum-based transportation infrastructure, in conjunction with the height oil, has semiconductor diode to revived interest in an electrical transportation infrastructure. EVs dissent from fossil fuel-powered vehicles in this the electricity they consume will be generated from a good vary of sources, together with fossil fuels, nuclear energy, and renewable sources like periodic event power, solar energy, and alternative energy or any combination of these. The carbon footprint and alternative emissions of electrical vehicles vary reckoning on the fuel and technology used for electricity generation.

Index Term-Charge, Solar System, electrical vehicle, Rapid Charging,Hybrid System

NOMENCLATURE

ACC- Available charging capacity.
CPFE- Charging power for future EVs.
SCC -Station charging capacity.
TTC -Total time for charging.

1. INTRODUCTION

The Electric Vehicle technology is one of the most promising solutions for gas emission and air pollution produced by the use of petroleum products. An electric vehicle (EV), also referred to as an electric drive vehicle, uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery or generator to

convert fuel to electricity. EVs include road and rail vehicles, surface and underwater vessels, electric aircraft and electrically powered space vehicles.

When electricity was among the preferred methods for motor vehicle propulsion, providing a level of comfort and ease of operation that could not be achieved by the gasoline cars of the time. The internal combustion engine (ICE) has been the dominant propulsion method for motor vehicles , but electric power has remained common place in other vehicle types, such as trains and smaller vehicles of all types. During the last few decades, environmental impact of the petroleum-based transportation infrastructure, along with the peak oil, has led to renewed interest in an electric transportation infrastructure. EVs differ from fossil fuel-powered vehicles in that the electricity they consume can be generated from a wide range of sources, including fossil fuels, nuclear power, and renewable sources such as tidal power, solar power, and wind power or any combination of those. The carbon footprint and other emissions of electric vehicles vary depending on the fuel and technology used for electricity generation.

2. PURPOSE

This project proposes a new smart management rapid charging system. The solar panel is to be introduced for peak hour charging purpose. It can charge the vehicle when the battery will goes to the dead condition. The system consists of several charging stations. It has the direct contact with the ITS centre. We can avoid the Power system control center because the charging stations itself provides the same function.

In the Hybrid charging system, the three modules are connected to each other. The ITS center is to be act as the mediator. The charging station consist a PSCC module (power system charging station).It calculates the available charge capability of charging station based on the power grid. The balance charge information will be passed to the ITS center.

After receiving CPFE data and traffic data from the ITS centre, the EV terminal estimates the total time for charging (TTC) for different stations, which includes the driving time, waiting time, and charging time. The driver can view these results and choose to be navigated to the charging station corresponding to the minimum TTC. The modular design of the navigation system reduces data transmission, which protects the drivers' privacy since they can choose which charging station to use and are not required to send any data to the ITS system

3. METHODES

3.1. CHARGING STATION BASED SYSTEM

In the gift era, the electrical vehicles are wide applied to attain the consumption of fossil fuel merchandise. For the charging purpose of electron volt a sensible management technique is employed. The charging stations square measure to be introduced for fast charging. The system is predicated on Associate in intelligent transport system (ITS), and contains four modules: an influence system management centre (PSCC), Associate in Nursing ITS centre, charging stations, and electron volt terminals. The PSCC calculates the on the market charging capability and station charging

capability supported installation information and transmits the results to the charging stations. The charging stations verify their charging plans and estimate the on the market charging power for future EVs (CPFE), and transmits these information to the ITS centre. when receiving CPFE information and traffic information from the ITS centre, the electron volt terminal estimates the overall time for charging (TTC) for various stations, which has the driving time, waiting time, and charging time. the motive force will read the results and select wherever to be navigated to the charging station akin to the minimum TTC. The standard style of the navigation system reduces information transmission, that protects the drivers' privacy since they'll select that charging station is to used and isn't needed to send any information to the ITS system .

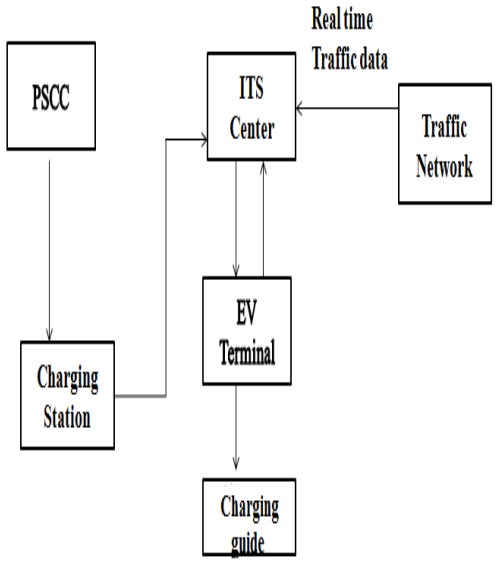

Figure 3.1 Block diagrame of charging station based Elecric Vehicle

The electric vehicles are introduced to achieve the consumption of petroleum products. The charging and controlling of electric vehicle is based on the microcontroller unit. Microcontrollers are destined to play an increasingly important role in revolutionizing various industries and influencing our day to day life more strongly than one can imagine. It is finding using diverse area, starting from simple children's toys to highly complex spacecraft. Because of its versatility and many advantages, the application domain has spread in all conceivable directions, making it ubiquitous. As a consequence, it has generate a great deal of interest and enthusiasm among students, teachers and practicing engineers, creating an acute education need for imparting the knowledge of microcontroller based system design and development. It identifies the vital features responsible for their tremendous impact; the acute educational need created by them and provides a glimpse of the major application area.

Fuel Level sensors detect the level (as in water level) of substances that flow, including liquids, slurries, granular materia ls, and powders. Fluids and fluidized solids flow to become essentially horizontal in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak. The substance to be measured can be inside a container or can be in its natural form (e.g., a river or a lake). The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point-level sensors only indicate whether the substance is above or below the sensing point. Generally the latter detect levels that are excessively high or low.

The MAX232 IC is used to convert the TTL/CMOS logic levels to RS232 logic levels during serial communication

of microcontrollers with PC. The controller operates at TTL logic level (0-5V) whereas the serial communication in PC works on RS232 standards (-25 V to + 25V).

ZigBee protocols are intended for embedded applications requiring low data rates and low power consumption. The resulting network will use very small amounts of power — individual devices must have a battery life of at least two years to pass ZigBee certification. ZigBee is a specification for a suite of high-level communication protocols used to create personal area networks built from small and low-power digital radios.

3.2 SOLAR BASED SYSTEM

A smart management method for rapid charging with spatial load distribution is an essential supplement for current residential charging controlling method through adjusting time and duration. During charging navigation, both traffic data and power system data are considered and they are unified into time term by EV terminal for destination choosing. With considering its actual performance, the presented charging navigation system is built on module design. Each module transforms vast complex original data into simplified results and transmits them, which reduces data transmission of the system as well as calculation of upper control centre.

The solar panel is to be introduced for peak hour charging purpose. It can charge the vehicle when the battery will goes to the dead condition. The system consists of several charging stations. It has the direct contact with the ITS centre. We can avoid the Power system control center because the charging stations itself provides the same function.

3.2.1 FUEL STATION

The proposed system consists of several charging stations. It is under the control of ITS center. The charging station provides proper charging to the EVs. The total control is done by the PIC microcontroller. It uses the CCS PIC C compiler to convert the high level language in to low level language. The RS232 is used for the communication with LCD display. Zigbee modules are used for the wireless communication. The MAX 232 module is used to avoid the power supply mismatches from the range of 0-5v to -12 to +12 volt of the LCD display and PIC microcontroller. The block provides the combination of charging station and center.

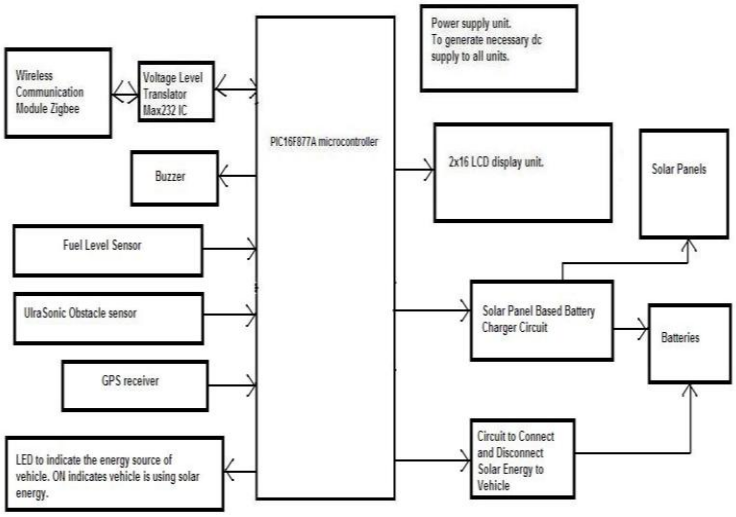

Figure3.2.1 block diagram of fuel station based on solar panel

3.2.2VEHICLE UNIT

The vehicle unit of the system consists of an EV terminal to communicate with ITS center and vice versa. The solar panel is introduced to the vehicle unit for rapid charging. The information from ITS center is received by the EV terminal and also transmits the information like charging time, driving time, waiting time to the ITS center. The GPS is used to identify the position of the vehicle. The LCD display

always displays the available charge present in the vehicle. If the battery is in low condition, the alarm will be activated. The fuel level sensor identifies the balance fuel level. The Ultrasonic sensors are used to detect the obstacles during reverse gear. The MAX 232 is act as the voltage level converter. It is used to avoid the voltage mismatch between PIC microcontroller and zigbee module

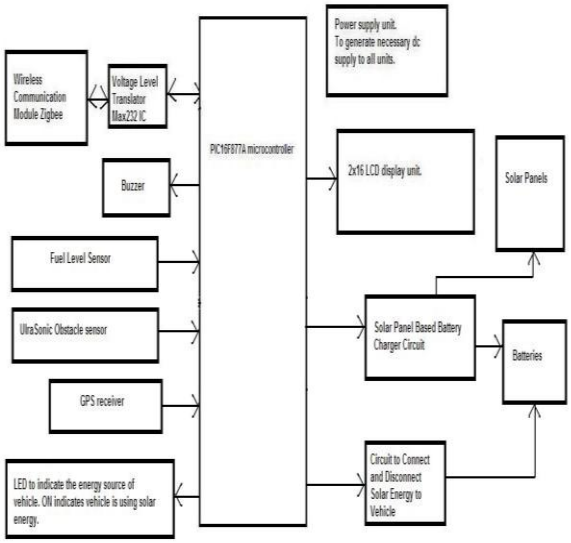

Figure 3.2.2 block diagram of EV based on solar panel.

4 NUMERIC SIMULATIONS

4.1EMBEDDED C

embedded c could be a set of language extensions for the c programing language by the c standards committee to handle commonality problems that exist between c extensions for various embedded systems. traditionally, embedded c programming needs nonstandard extensions to the c language so as to support exotic options like fixed-point arithmetic, multiple distinct memory banks, and basic i/o operations.embedded c could be a set of language extensions for the c programing language by the c standards committee to handle commonality problems that exist between c extensions for various embedded systems. traditionally, embedded c programming needs nonstandard extensions to the c language so as to support exotic options like fixed-point arithmetic, multiple distinct memory banks, and basic i/o operations. it includes variety of options not on the market in traditional c, such as, fixed-point arithmetic, named address areas, and basic i/o hardware addressing. embedded c uses most of the syntax and linguistics of normal c, e.g., main () perform, variable definition, information kind declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.

4.2 PROTEUS

Proteus (**P**rocessor for **T**ext **E**asy to **U**se) is a fully functional, procedural programming language. Proteus incorporates many functions derived from several other languages: C, BASIC, Assembly, Clipper/ dBase; it is especially versatile in dealing with strings, having hundreds of dedicated functions; this makes it one of the richest languages for text manipulation.

5. CONCLUSION

This project presents a sensible management technique for speedy charging considerately of spatial load distribution, which is a necessary supplement for current residential charging dominant technique through adjusting time and length. Throughout charging navigation, each traffic information and installation information are thought of and that they ar unified into time term by heat unit terminal for destination selecting. With considering its actual performance, the bestowed charging navigation system is made on module style. Every module transforms large complicated original

information into simplified results and transmits them, which reduce information transmission of the system in addition as calculation of higher management centre. The bestowed speedy charging navigation technique conjointly considers the stress in addition as privacy of heat unit drivers. 1st of all, the index for charging navigation is minimum TTC that meets drivers' wants particularly throughout daytime. Besides, the heat unit terminal is ready to estimate TTC regionally victimization broadcast info. Besides, the bestowed speedy charging navigation technique conjointly considers the stress in addition as privacy of heat unit ar ensured. the height hour charging is provided by the electrical device. It avoids the congestion and traffic issues. The obstacle is mechanically detected by victimization inaudible sensors. The bestowed charging navigation technique would satisfy drivers' demands with guaranteeing the safety of the ability grid, within which each electrical and traffic factors are thought of. This technique is possible for existing ITS techniques. Additional researches are cantered on application of the bestowed technique.

REFERENCES

[1] Q. Guo, Y.Wang, H. Sun, Z. Li, S. Xin, and B. Zhang, "Factor analysis
of the aggregated electric vehicle load based on data mining," Energies
2012, vol. 5, no. 6, pp. 2053–2070, 2012.

[2] Z. Darabi andM. Ferdowsi, "Aggregated impact of plug-in hybrid electric
vehicles on electricity demand profile," IEEE Trans. Sustainable
Energy, vol. 2, no. 4, pp. 501–508, Jan. 2011.

[3] A. Rautiainen, S. Repo, P. Jarventausta, A. Mutanen, K. Vuorilehto, and K. Jalkanen, "Statistical charging load modeling of PHEVs in electricity
distribution networks using national travel survey data," IEEE
Trans. Smart Grid, vol. 3, no. 4, pp. 1650–1659, Jan. 2012.

[4] U.S. Department of Transportation, Federal Highway Administration
2009 National Household Travel Survey Home Page, [Online]. Available:
http://nhts.ornl.gov

[6] S. Xin, Q. Guo, H. Sun, Z. Li, B. Zhang, and S. Zhang, "A hybrid simulation
method for EVs' operation considering power grid and traffic
information," presented at the Proc. IEEE Power and Energy Soc. General
Meeting, Vancouver, BC, Canada, Jul. 2013, unpublished.

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