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Smart Charging for Three Wheeled Electric Vehicle Using BLDC Hub Motor

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ABSTRACT: The current scenario in automobile sectors is quite competitive which are fueled using petrol or diesel engine. This immensely increases the fuel cost and pollutes the environment through CO emission. The present trend is to reduce the fuel cost is an E-Vehicle (EV) which became more attractive with less maintenance and cost. However, the obstacles in E-vehicles are Battery Management System (BMS), vehicle acceleration and the life of electric motor. This project addresses about proposed smart charging arrangement of the E-Vehicle using dynamo principle. This system is implanted with EV controller which control and monitor the power electronic devices housed in the vehicle. Under vehicle running conditions, the smart charging can be implemented using a dynamo, chains bracket, battery and 7 Watts 100 rpm brushless dc motor. During running condition, the chains bracket drives the dynamo and subsequently the output of the dynamo charges the 12V lead-acid battery. The running cost of an electric vehicle is much lower than an equivalent petrol or diesel. The E-vehicle designed runs with three-wheels which can service for carrying moderate goods for physically challenged persons, University campus, hospitals, airports, residential compounds, etc. Hence, it is obvious that this proposed system is user friendly, economical and safeguard the environment.

KEY WORDS: Battery Electrical Vehicle (BEV), Battery Management System (BMS), BLDC Hub motor, Self-Charging, Proteus

I. INTRODUCTION

An Electric Vehicle (EV) uses one or more electric motors for propulsion. It can be powered by a collector system, with electricity from extravehicular sources, or it can be powered autonomously by a battery (sometimes charged by solar panels, or by converting fuel to electricity using fuel cells or a generator). Government incentives to increase adoption were first introduced in the late 2000s, including in the United States and the European Union, leading to a growing market for the vehicles in the 2010s. Increasing public interest and awareness and structural incentives, such as those being built into the green recovery from the COVID-19 pandemic, is expected to greatly increase the electric vehicle market. The International Energy Agency said in 2021 that governments should do more to meet climate goals, including policies for heavy electric vehicles. Electric vehicle sales may increase from 2% of global share in 2016 to 30% by 2030. Much of this growth is expected in markets like North America, Europe, and China; a 2020 literature review suggested that growth in use of electric 4-wheeled vehicles appears economically unlikely in developing economies, but that electric 2-wheeler growth is likely. There are more 2 and 3 wheels EVs than any other type, combustion engine powered vehicles is needed. As electric vehicles are environment friendly, gas, and vegetable such as peanut oil, linseed oil, rapeseed oil, sunflower oil, etc can be used to replace the existing fossil fuel. But a proper cause and effects has not yet identified. Here the electric vehicle plays a vital role to boom the automobile to the next generation. Most of the electric vehicle uses battery as a major source of

power.

II. PROPOSED METHOD

Controller takes and regulates electrical energy from batteries and inverters with the controller set, the inverter then sends a certain amount of electrical energy to the motor. Battery Electric vehicle consist of an electric motor which is powered by battery connected to it. Electric motor is used for the movement in this type of vehicle. It does not produce emission. In traffic, BEV delivers high torque to the wheels and smoother acceleration than internal combustion engine. It is noiseless while operating motor. But on other side there are some disadvantages like, high production cost, limited top speed, more recharge time required. Controller takes and regulates electrical energy from batteries and inverters with the controller set, the inverter then sends a certain amount of electrical energy to the motor (according to the depth of pressure on the pedal).

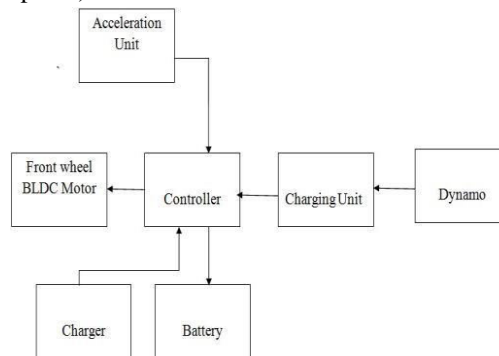


Figure 1: Block diagram

Brushless DC electric motor (BLDC motor or BL motor), also known as an electronically commutated motor (ECM or EC motor) or synchronous DC motor, is a synchronous motor using direct current (DC) electric power supply. It uses an electronic closed loop controller to switch DC currents to the motor windings producing magnetic fields which effectively rotate in space and which the permanent magnet rotor follows. The controller adjusts the phase and amplitude of the DC current pulses to control the speed and torque of the motor. This control system is an alternative to the mechanical commutator (brushes) used in many conventional electric motors.



Figure 2: BLDC Hub Motor

The construction of a brushless motor system is typically similar to a permanent magnet synchronous motor (PMSM), but can also be a switched reluctance motor, or an induction (asynchronous) motor. The advantages of a brushless motor over brushed motors are high power-to-weight ratio, high speed, nearly instantaneous control of speed (rpm) and torque, high efficiency, and low maintenance. Brushless motors find applications in such places as computer peripherals (disk drives, printers), hand-held power tools, and vehicles ranging from model aircraft to automobiles. In modern washing machines, brushless DC motors have allowed replacement of rubber belts and gearboxes by a direct-drive design.



Figure 3: BLDC Controller

An Intelligent Motor Controller (IMC) uses a microprocessor to control power electronic devices used for motor control. IMCs monitor the load on a motor and accordingly match motor torque to motor load. This is accomplished by reducing the voltage to the AC terminals and at the same time lowering current and knar. This can provide a measure of energy efficiency improvement for motors that run under light load for a large part of the time, resulting in less heat, noise, and vibrations generated by the motor.

III.SIMULATION RESULTS

The proposed system that is going to be described in this phase is done using the Proteus model. The simulation circuit has been designed in Proteus software using the respective components present in the Proteus to get the desired output. This simulation circuit will be described in detail below. This chapter describes the design and current implementation of the Proteus dependability manager and object factory. The application requirements and the type of Aqua applications that Proteus currently supports are also described. The gateway, also a component of Proteus.

Proteus PIC Bundle is the complete solution for developing, testing and virtually prototyping your embedded system designs based around the Microchip Technologies TM series of microcontrollers. This software allows you to perform schematic capture and simulate the circuits you design. A demonstration of the use of PROTEUS will be given to you in this lab session. After that, you are encouraged to learn to use the software interactively. Type ' ARDUINO UNO ' in the Keywords field and double click on the result to place the ARDUINO UNO into the Object Selector. Do the same for the LEDs, Buttons, Crystal oscillator, capacitors, 7 SEG-COM-Cathode, Resistors.

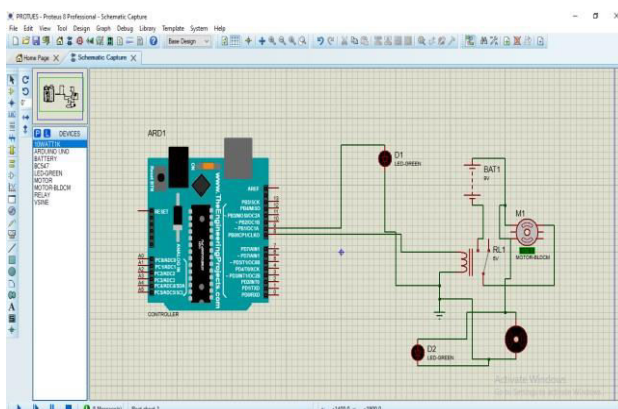


Figure 4: Simulation diagram of smart charging EV

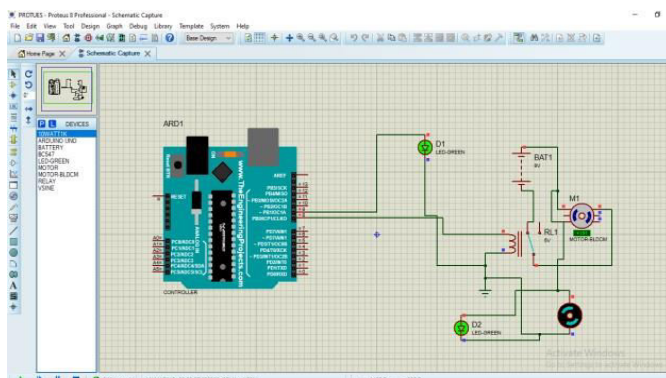


Figure 5: Simulation diagram of smartcharging EV in running condition



Figure 6: Prototype Model

IV.CONCLUSIONS

The progress that the electric vehicle industry has seen in the recent years is not extremely welcomed, but highly necessary in light of the increasing global greenhouse gas levels. An Electrical three wheeled vehicle is an automobile that is propelled by one or more electric motors, using electrical energy stored in rechargeable batteries or another energy storage device. By adding the dynamo, we can generate an additional power to charge the battery. So, we can achieve our target to stop the deep discharging of battery as well as increasing mileage of vehicle. Research into other energy sources such as fuel cells and renewable fuels make the future look brighter for EV.

REFERENCES

1. Abhishek Saini, Shikhar Rana, Simranjeet Singh, Mohit, Harpreet Kaur Chennai, “Designing and Modeling of Water Level Indicator”, International Journal of Scientific Research in Computer Science, Engineering and Information Technology, Volume 2, Issue 6, November-December 2017.
2. S.N.Durga¹, M. Ramakrishna², G. Dayanandam³, “Autonomous Water tank Filling System using IOT”, International Journal of Computer Sciences and Engineering, Vol.06, Issue.9, pp.123-141, 2018.
3. P.Selvappriya, V.Shalini, M.Uma Maheswari, R.Punitha, S.Saravanan,” Cultivation of Cash Crops under Automated Greenhouse using Internet of Things”, International Journal of Innovative Research in Science,



Engineering and Technology, Vol.10, Issue.10, Pp.13897-13905, 2021

4. A.C.K.Vigneshkumar, N.Tamilselvan, S.Vishva, C.S.Satheesh, G.Dineshkumar, S.Saravanan, “Wireless Power Transmission Using Class C Power Amplifier from Solar Input”, International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13906-13912, 2021
5. J.Vinoth, T.Muthukumar, M.Muruganandam and S.Saravanan,” Efficiency Improvement of Partially Shaded PV System, International Journal of Innovative Research in Science, Engineering and Technology, Vol.4, Special issue 6, pp.1502-1510, 2015
6. M.B.Malayandi, Dr.S.Saravanan, Dr. M.Muruganandam, “A Single Phase Bridgeless Boost Converter for Power Factor Correction on Three State Switching Cells”, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1560-1566, May 2015.
7. A.Sasipriya, T.Malathi, and S.Saravanan, “Analysis of Peak to Average Power Ratio Reduction Techniques in SFBC OFDM System” IOSR Journal of Electronics and Communication Engineering (IOSR-JECE), Vol. 7, No.5, 2013.
8. P.Ranjitha, V.Dhinesh, M.Muruganandam, S.Saravanan, “Implementation of Soft Switching with Cascaded Transformers to drive the PMDC Motor”, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1411-1418, May 2015.
9. C.Sowmiya, N.Mohanandhini, S.Saravanan and M.Ranjitha,”Inverter Power Control Based On DC-Link Voltage Regulation for IPMSM Drives using ANN” International Research Journal of Engineering and Technology (IRJET), Vol.5, Issue 11, pp.1442-1448, 2018.
10. N.Yuvaraj, B.Deepan, M.Muruganandam, S.Saravanan, “STATCOM Based of Adaptive Control Technique to Enhance Voltage Stability on Power Grid”, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1454-1461, May 2015.
11. P.Manikandan, S.Karthick, S.Saravanan and T.Divya,” Role of Solar Powered Automatic Traffic Light Controller for Energy Conservation” International Research Journal of Engineering and Technology (IRJET), Vol.5, Issue 12, pp.989-992, 2018.
12. R.Satheesh Kumar, D. Kanimozhi, S. Saravanan, “An Efficient Control Scheme for Wind Farm Using Back to Back Converter,” International Journal of Engineering Research & Technology (IJERT), Vol. 2, No.9, pp.3282-3289, 2013.



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