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# AUTO RECHARGE OF ELECTRIC VEHICLE BATTERY

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**ABSTRACT -** Nowadays, EVs are charging their battery packs through roadside units, standard home outlets, stations,etc.A few hours are needed to fully recharge an EV's battery pack, and the amount of time depends on the capacity used.This is a significant element that influences the use of EVs.Chellaswamy et al. have developed a novel charging system for EVs to solve this issue.This method lowers greenhouse gas emissions while autom atically charging the storage system without the need for a driver.
Majid et al. employ a highfrequency ACDC converter with an EMI filter to recharge the traction battery packs. Noise is muted using an electromagnetic interference filter.Yafei et al. have studied an EV slip angle measurem ent system that includes a sensor and a camera with a high sampling rate. The optimal scheduling, operating cost, and CO2 emission of a hybrid EV are estimated by linear programming under a European drive train. This control mechanism also estimates the electricity consumption of EVs. The state of charge (SOC) of the EVs NiMH battery modules has been estimated by a control algorithm by Man et al. The SOC variation concerning the improvement in percentage and temperature was analyzed. An experimental setup is developed and tests the EV through a parking garage standard outlet and the performance of SOC has been studied under different temperature conditions.

## I. INTRODUCTION

The ever-rapidly growing transportation sector consumes about 49% of oil resources. Following the current trends of oil consumption and crude oil sources, the world's oil resources are predicted to be depleted by 2038.Therefore, replacing non-renewable energy resources with renewable energy sources and use of suitable energy-saving technologies seems to be mandatory. In the present scenario, one of the most pollution-producing pollution-producing. To overcome this pollution electric car is the best. Electric car is an ae electric 18th century, and still it is under implementation with more advanced methods. As advanced that by using the MG-Set (motor generator set), we can regenerate the power dissipated in the motor.Any device can utilise it as a variable frequency ac or dc supply.The MGsethet principle allows us to con vert mechanical energy into electrical output, which enables us to use this as an engine in contemporary electric

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cars in place of the IC engine (a combustion engine with a larger capacity than the IC engine).The current elect ric vehicle needs to be charged frequently at charging stations in order to operate.

However, our suggested model makes use of two batteries.At first, the main battery is charged and is used for driving the load as well as charging the secondary battery .This is done by utilizing the conversation principle of MG-Seth .His primary trained auto-switch the secondary battery to drive the load as well as to charge the primary battery ,this operation is done by using the microcontroller purpose , by the principle charging station can be overcome.

## II. BLOCK DIAGRAM

### *A.* The Block Diagram

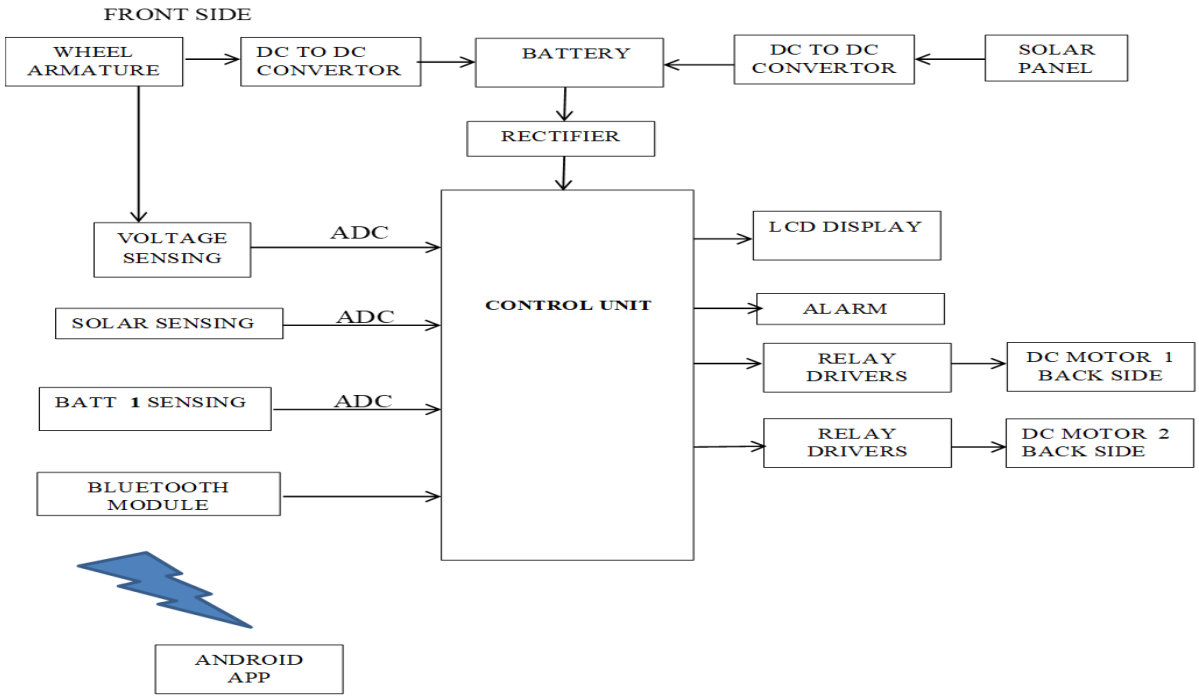


Fig. 1. Block Diagram of Auto recharge of Electric Vehicle Battery

In the proposed project, with the batteries, MG-Set, and the control circuit as the three significant parts of the car, there are many benefits of these vehicles in comparison to gasoline-powered cars and rechargeable electric cars this auto recharge electric cars, dual batteries are used for power supplying the motor generator set. From the motor generator set, it is connected to a voltage regulator circuit for supplying constant power to driving motor as well as to battery charging. Through this process, the perpetual energy loop is produced. Pic microcontrollers are used for switching the dual battery by using the two-channel relay, voltage sensors are used for continuous monitoring of the voltage across the dual battery. Through this process, the efficiency and mileage of the electric car are high compared to gasoline-powered cars and rechargeable electric car.

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*B. Hardware Implementation*

*1) Lead Acid Batteries*:

Lead acid batteries are the most common large-capacity rechargeable batteries. They are very popular because they are dependable and inexpensive on a cost-per-watt base. There are few other batteries that deliver bulk power as cheaply as lead acid, and this makes the battery cost-effective for automobiles, electrical vehicles, forklifts, and marine and uninterruptible power supplies (UPS). Lead acid batteries are built with a number of individual cells containing layers of lead alloy plates immersed in an electrolyte solution, typically made of 35% sulphuric acid (H2SO4) and 65% water (Figure 1). Pure lead (Pb) is too soft and would not support itself, so small quantities of other metals are added to get the mechanical strength and improve electrical properties. The most common additives are antimony (Sb), calcium (Ca), tin (Sn), and selenium (Se). When the sulphuric acid comes into contact with the lead plate, a chemical reaction is occurring and energy is produced.

*2) Arduino Mega:*

The Arduino Atmega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the Uno and the former boards. Arduino Mega is based on ATmega2560 Microcontroller, an 8-bit AVR Architecture based MCU from ATMEL. It is available in a 100-pin Quad package. It is designed and developed to provide a greater number of IO lines (both Digital and Analog), more flash memory and more RAM when compared to UNO.

Features:

- Operating Voltage is 5V
- Input Voltage is 7-12
- Input Voltage (limit) is 6-20V
- Digital I/O Pins are 54
- Analog Input Pins are 16
- DC Current per I/O Pin are 20 mA

*3) Piezoelectric Buzzer:*

The PS series are high-performance buzzers that employ unimorph piezoelectric elements and are designed for easy incorporation into various circuits. They feature extremely low power consumption in comparison to electromagnetic units. Because these buzzers are designed for external excitation, the same part can serve as

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both a musical tone oscillator and a buzzer. They can be used with automated inserters. Moisture-resistant models are also available. The lead wire type (PS1550L40N) with both-sided adhesive tape installed easily is prepared.

Features:

- tone type: single
- operating voltage: 3-6V DC
- rated voltage: 5V DC
- current consumption: 25mA
- OSC sc. frequency: 3.2kHz
- sound level: 87dB
- connector type: PCB
- body color: gray
- weight: 0.056oz

*4) 16*2LCD Display:*

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Clickto learn more about internal structure of a LCD.

Features:

- Operating Voltage is 4.7V to5.3V
- Current consumption is 1mAwithout Backlight
- Alphanumeric LCD display module meaning can display alphabets and number.
- Consists of two rows and each row can print 16 characters.
- Each character is built by a 5×8-pixel box
- Can work on both 8-bit and 4-bit mode
- It can also display any custom generated characters
- Available in Green and Blue Backlight

*5) DC Motor:*

Geared DC motors can be defined as an extension of DC motors that already had their Insight details demystified. A geared DC Motor has a gear assembly attached to the motor. The speed of the motor is counted in terms of rotations of the shaft per minute and is terms RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure.

Features:

- Runs on DC power or AC line voltage with a rectifier.
- Operating speeds of 1,000 to 5,000 rpm.
- 60-75% efficiency rate.
- High starting torque.
- Low no-load speeds.

*6) Regulated IC LM 7805:*

The MC78XX/LM78XX/MC78XXA series of three-terminal positive regulators are available in the-220/D-PAK package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down, and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

Features:

- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area Protection

*7) Buck Convertor (step up):*

DC-DC buck converters are used for battery chargers in many applications including renewable energy sources, inverters, electric vehicles, and robots. In this paper, a buck converter was built and its controller was developed using peak current control mode for the current loop and phase lag for the voltage loop. This paper proposes a formulation of plant disturbance due to load variation to obtain a nominal model based on a small

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signal approach. The controller was derived analytically based on the nominal model. Experiment results show that the buck control system functions well in regulating the output voltage. During the start-up without any load it can reduce the input voltage from 300 V to an output voltage of 133.9 V in 19.3 ms. The developed controller can maintain the output voltage under load variation from no load to a sudden load of 0.26 A. When it was implemented to charge a lead acid battery, constant current of 3.36 A was charged in the first 173 minutes followed by the constant voltage of 134.7 V until the end of charging at time 483 minutes. Thus, the developed control system of lead acid battery charge works well.

Features:

- The buck converter is a ubiquitous DC-DC converter that efficiently converts a high voltage to a low voltage efficiently.
- Efficient power conversion extends battery life, reduces heat, and allows for smaller gadgets to be built.

## III. CONCLUSIONS

In this article, the batteries, MGSet, and control circuit are the three important components of the car. These vehicles have numerous advantages over rechargeable electric cars and gasoline-powered cars.
For electric automobiles, a hybrid recharging system based on renewable energy sources (both solar and wind) is suggested.The widespread use of EVs is directly impacted by the current charging system.An innovative hybrid renewable charging system for EVs is suggested as solution to this problem.Finally, we draw the conclusion that this approach reduces the overall journey time and promotes the use of electric vehicles, resulting in a less polluting environment. It is more effective and cleaner.

## IV. REFERENCES

[1] Chellaswamy, C., Balaji, T.S., Muhuntharaj, C. 2012. Design of a fuel-free electric vehicle using fuzzy logic for pollution control. In: International Conference on Modeling Optimization and Computing, Proceedia Eng. 38, 1547–1558.
[2] Majid Pahlevaninezhad, Djilali Hamza, Praveen K. Jain, An improved layout strategy for common-mode EMI suppression applicable to high-frequency planar transformers in high-power DC/DC converters used for electric vehicles, IEEE Trans. Power Electron. 29 (3) (2014) 1211–1228.
[3] Yafei Wang, Binh Minh Nguyen, Hiroshi Fujimoto, Yoichi Hori, Multirate estimation and control of body slip angle for electric vehicles based on onboard vision system, IEEE Trans. Ind. Electron. 61 (2) (2014) 1133–1143.
[4] Federico Millo, Luciano Rolando, Rocco Fuso, Fabio Mallamo, Real CO2 emissions benefits and end user's operating costs of a plug-in hybrid electric vehicle, Appl. Energy (2014) 563–571.
[5] Man Ho Au, Joseph K. Liu, Junbin Fang, Zoe L. Jiang, Willy Susilo, Jianying Zhou, A new payment system for enhancing location privacy of electric vehicles, IEEE Trans. Veh. Technol. (2014) 3–18.