



## EV MITHRA

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**Abstract:** As price of fuel increasing, running cost of the electric vehicles is less than that of gasoline powered vehicles. it is difficult to use internal combustion engine vehicles. The future of automobile is going to be electric. The pollution emitted by the automobiles is increasing rapidly nearly about 73% of total pollution due to the usage of internal combustion engines. If go for newly launched electric vehicle, they are highly priced compare to conventional IC engine vehicle. Battery used by these EVs are costlier, they use lithium-ion batteries which prices around thousands. Obviously, everyone is looking towards making electric vehicles pocket friendly. There is a method of doing this is to converting an internal combustion engine (ICE) vehicle into an electric one. An electric vehicle is a type of vehicle that uses electric motor and battery pack instead of an internal combustion engine. Power is given from battery pack rather than petrol. This saves money and has smaller impact on the environment as well. There are few barriers for the rapid adoption of electric vehicles, like lack of charging infrastructure, limitations of battery technology and high purchase costs. In this project, we are going to converting a petrol bike into electric bike using lithium-ion battery and BLDC motor.

**Keywords:** Electric Vehicle, Electric Battery, Lithium-Ion Battery

### I. INTRODUCTION

Since electric vehicles came into existence in the 19th century. Earlier, they did not work well in the market because it has high cost. So initially, the demand declined worldwide. However, they have been used for transportation and public transport, especially as rail vehicles. As it related to the environment increased in the 21st century, gas-powered vehicles emit a lot of smoke and are very harmful to the atmosphere. Increasing knowledge about air quality and interest in advance vehicles stimulate research being done to improve the propulsion system by reducing the vehicle emissions. Therefore, the interest in electric vehicles increased too. Different type of electrical vehicles has been recently designed with the aim of solving pollution problems caused by the emission of gasoline powered engines. Environmental problems encourage the adoption of new generation electric vehicles for urban transportation. Operating cost of the electric vehicles is less than that of gasoline powered vehicles. An electric bike or scooter is a battery-operated vehicle that is inexpensive with low maintenance cost and zero pollution. As price of fuel increasing, the usage of internal combustion engine vehicle is difficult. The future of automobile is going to be electric. In the increasing population the automobiles are increasing rapidly nearly about 73% of total pollution due to the usage of internal combustion engines. If prefer for newly launched electric vehicle, they are high cost compare to conventional IC engine vehicle. Battery used by these EVs are costlier, they use lithium-ion batteries which is less price. Obviously, everyone is looking towards making electric vehicles pocket friendly. There is a method of doing this is to converting an internal combustion engine (ICE) vehicle into an electric vehicle.

### II. COMPONENTS

#### 1. Old Bike

For this project, four-stroke gasoline powered bike is used. And then remove engine, gearbox and other components. As replace these components with motor, battery and controller.

## 2. BLDC MOTOR

BLDC motors is similar to the permanent magnet motor, brushed DC motor, and synchronous motor, and share many of the same functional principles. A BLDC motor differs from a brushed DC motor in that, they do not use brushes and commutator rings. Instead, they are electrically commutated. BLDC motors are different from the other DC motors in that their rotor contains no coils, and simply made of a permanent magnet. The stator contains coils which induce a magnetic field when a current is passed through them.

## 3. LITHIUM ION BATTERY

A battery is made up of an anode, cathode, separator, electrolyte, and two current collectors. The anode and cathode store the lithium. The electrolyte carries positively charged lithium ions from the anode to the cathode and vice versa through the separator.

## 4. CONTROLLER

A BLDC motor controller regulates the speed and torque of the motor; it can also start, stop, and reverse its rotation. A BLDC motor controller detects the position of the rotor either by using sensors. The sensors measure the rotor's position and send out this data.

## 5. DC-DC CONVETER (buck converter)

A DC-DC converter is an electrical system which converts direct current (DC) sources from one voltage level to another. In other words, a DC-DC converter takes as input a DC input voltage and outputs a different DC voltage. The output DC voltage can be higher or lower than the DC input voltage

## 6. THROTTLE CONTROLLER

An e-scooter throttle is the part of the e-scooter that allows you to control your speed while riding. It is the one sending signals to the speed controller and the motor on how much power to use as you ride. E-scooters often position the throttle beside or near the handlebars. In a few e-scooters, the handlebar itself is the throttle, just like a motorcycle.

## 7. DYNAMO

A dynamo is an electrical generator that creates direct current using a commutator. Dynamos were the first electrical generators capable of delivering power for industry, and the foundation upon which many other later electric-power conversion devices were based, including the electric motor, the alternating-current alternator, and the rotary converter.

## 8. BOOST CONVERTER

The boost converter is used to step-up an input voltage to some higher level, required by a load. This unique capability is achieved by the storing energy in an inductor and releasing it to the load at a high voltage. This converter is a DC-to-DC power converter that steps up voltage from its supply to its load.

### III. METHODOLOGY

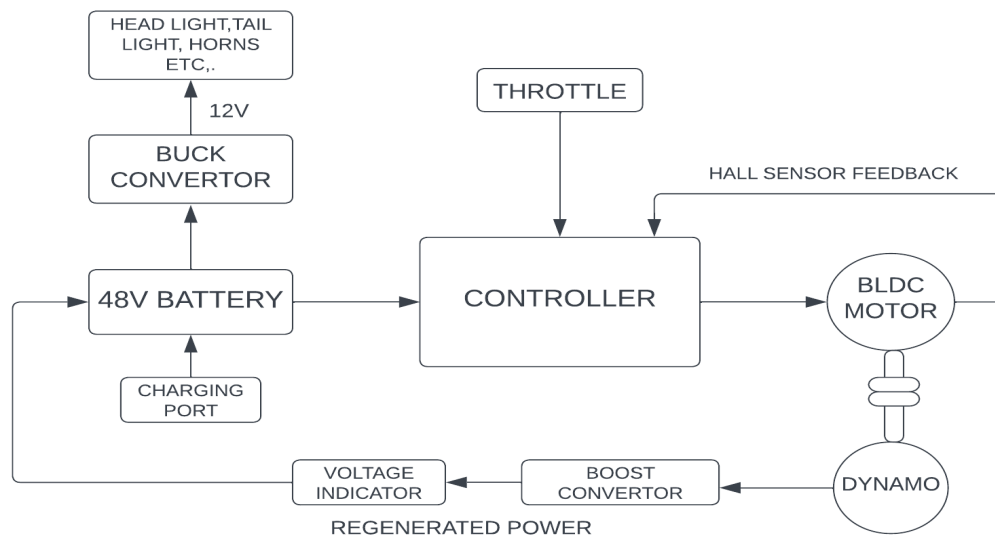


Fig 1: Block Diagram

The battery pack powers the motor and bike starts running. The motor is made to run with the help of lithium-ion battery. The specification of lithium-ion battery is about 48 V, 750 W motor is used for this project. The electric current from the battery is passed to the controller then the required amount of current will be flown into the motor. The voltage of the controller must match with the battery pack. The motor drives the rear wheel of the vehicle with the help of a chain drive. The range of the vehicle can be increased by increasing the battery capacity, and speed can be increased by selecting another motor. Battery can be charged with the selected charger. EV Mithra is a modified gasoline powered Bike with a BLDC motor and a battery. A BLDC motor is fitted in the place of Engine and a 48V 20AH Battery is placed in front of BLDC motor and fitted to chassis which drives the rear wheel through a chain drive. A BLDC motor controller is connected in Between Battery and BLDC Motor, controller consists of a PWM speed controller. A throttle is connected to the controller the speed changes with respect to throttle position. BLDC motor consists a Hall sensor which is placed at the end of the shaft inside the motor and feedback to controller. A 150W 12V Dynamo is coupled with the motor shaft through a chain drive and a Boost converter connected to the output of the dynamo. Headlamps, taillamps, indicators are been connected to the 12 volts output of Buck converter. when the ignition switches ON, the power is delivered from the battery pack and connected to controller. when the throttle given it is connected to the controller. A PWM controller changes the speed by varying the duty cycles. a three phase BLDC motor, the controller is composed of six electronic switches i.e. transistors. opening and closing the transistors in a specific sequence energy the phases of the motor to maintain the optimal orientation of magnetic field induced by the stator versus rotor magnet. The motor can be driven in a six-step trapezoidal commutation, which is broadly used. A 3 Hall sensors which are placed inside the Motor which provides the position of the rotating magnet feedback to a motor controller. A Dynamo which coupled with the BLDC which generates the voltage, the output of the dynamo is connected to input of the boost converter and output is boosted to 48volts and power is regenerated and voltage is indicated in the voltage indicator it will extend the total driving range by 30%.

### IV. RESULT AND DISCUSSION

After completing this project, took test drive and got these outputs. The vehicle can travel at a speed of 50 km/h. The 750 W motor is giving good initial torque. By changing motor specifications and battery capacity, and also by AC generator we can increase speed as well as range of the vehicle. Lithium-ion battery is used as it has comparatively less weight, long life span and supports fast charging.



Fig 2: EV Mithra

## V. CONCLUSION

With the increasing consumption of non-renewable resources such as petroleum and diesel, moving toward renewable sources such as solar, hydroelectric electricity, and batteries. There are different methods for conserving energy. One such mode of transportation is the electric bike; it is also a new mode of transportation that provides us with a convenient mode of transportation. It is also a new mode of transportation that provides us with a simple mode of transportation for people of all ages. By converting petrol-run bike to electrical, can make use of scrap vehicles. And this will be an affordable solution as an EV. It is a low-cost mode of transportation that everybody may afford. The motor in this bike is highly efficient, and the battery bank is light and fast. The electric bike's most important feature is that it does not use fossil fuels, which saves money. The second most important feature is that it produces no pollution, is environmentally friendly, and operates quietly. The most viable solution for reducing environmental pollution is to ride an on-board electric bike.

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