Project Proposal Reference Number

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A PROJECT SYNOPSIS

"Dynamic Self-charging Electric Vehicle "

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Self-Charging electric vehicle, automatic switching/changeover switch, Arduino UNO, controller unit, relays, BLDC motor.

Introduction

Now days the automobile industry become more competitive the vehicles can get the energy from petrol or diesel engine for its drive. The recent years electric vehicles became more attractive and less maintenance cost, but only drawback of electric vehicle is requiring frequent charging form EB supply. In this paper is based charging arrangement on the electric vehicle. The motor is using the electric energy from battery and battery can receive electric energy from dynamo. This energy is stored in battery. Market available electric vehicle batteries are designed to spent 6-8 hours/charge by using EB supply. This electric vehicle running cost is very low, when compare to other sources of energy.

Today available electric vehicle is using 3-4 no' s of 12v batteries. But in this project, we use only one 24v battery, so battery cost is reduced. Then these batteries are charged by dynamo. So electric supply cost also reduced. There are numerous sorts of electric vehicles as we think about Battery Electric Vehicle (BEV) the Electric vehicle that utilizes chemical energy accumulated in rechargeable battery packs. BEVs want to utilize motor controllers and motor in Place of ICEs (Internal Combustion Engines) for drive/propulsion. The capacity of an electric vehicle is more unrivalled than every single other type of propulsion presently being used likewise it offers the chance of charging EVs from sustainable power sources or renewable energies. At whatever point there is work of power, the vehicles utilizing it tend is to produces zero emission at the tailpipe.

Every electric vehicle revives their batteries by connecting them to a homely/simple electrical outlet or an uncommon charging station. This will deal primarily with electric vehicles used for personal transportation where the internal combustion engine is replaced by a battery and electric motor drive.

by the masses, that is, be able to charge vehicles with very different needs.

Objectives

Objectives of the proposed project are as follows,

- Design of quad vehicle mechanical structure for disabled.
- Design of boost converter for dynamic charging.
- Monitoring the SoC of the battery.
- Design of change over switch for the batteries.
- Monitoring the speed regulation and range.

Methodology

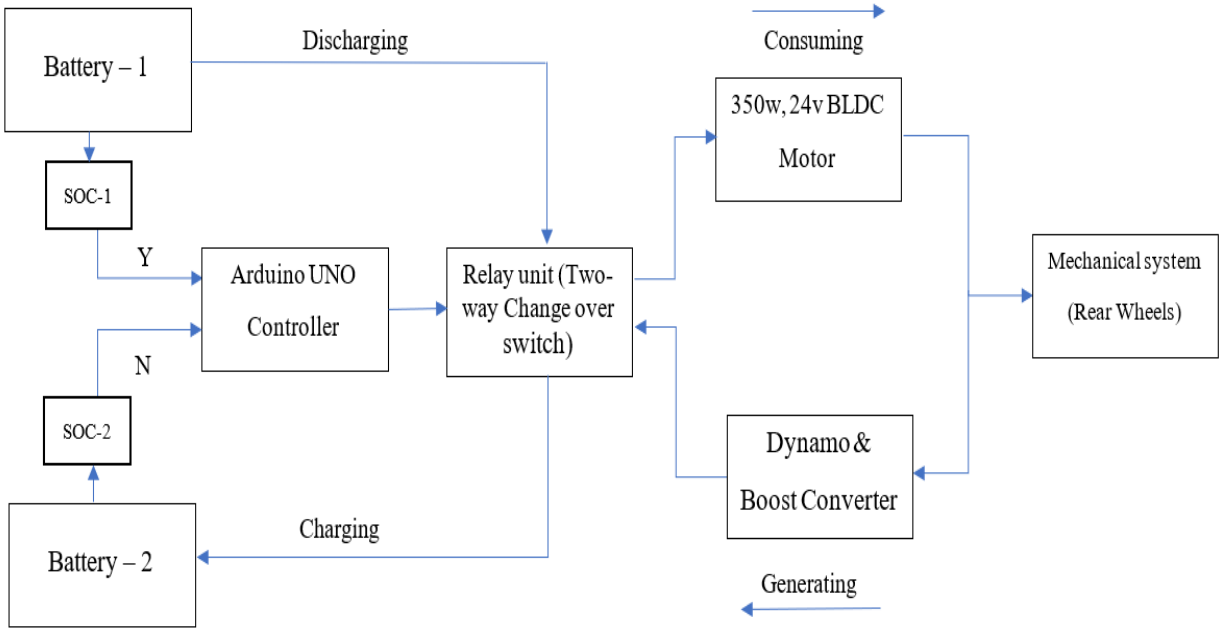

Fig 1: Block diagram

Figure 3.1 shows the block diagram of the self-generating electric vehicle. It consists of four basic elements like alternator, booster, battery, controller & motor etc. In left hand side charging element are placed which generated the electric charge for the battery on the rotation of wheel. This element are Dynamo and booster. Dynamo generate the charge on the rotation of wheel. In right hand side discharging element are placed which received charge from battery for working. Here battery is connected to the controller. Controller is heart of E-vehicle which controls the operation of vehicle. Headlight, throttle, and motor is connected to the controller. Battery is also connected to the booster which receives the charge from the dynamo. Dynamo

rotates on the rotation of rear wheel through belt drive. Pulley is attached to the rear wheel which transmit power to the dynamo.

SOC blocks – these blocks consist of the voltage divider circuits nothing but voltage sensors which works in ratio of 5:1 which is connected to analogue pins of Arduino.

Controller block – this block is the Arduino micro-controller which is the mind of automatic change over switch.

Relay unit block – this block contains the two channel 5v relay module which works as a switch in the system.

Motor block – it contains the controller and motor which is connected with the battery.

Dynamo block – contains the dynamo which generates 12v voltage and it is given to DC-DC booster circuit which increases voltage to 25v.

Battery block – 24v 10ah lithium-ion batteries.

2 Switching circuit / change over switch.

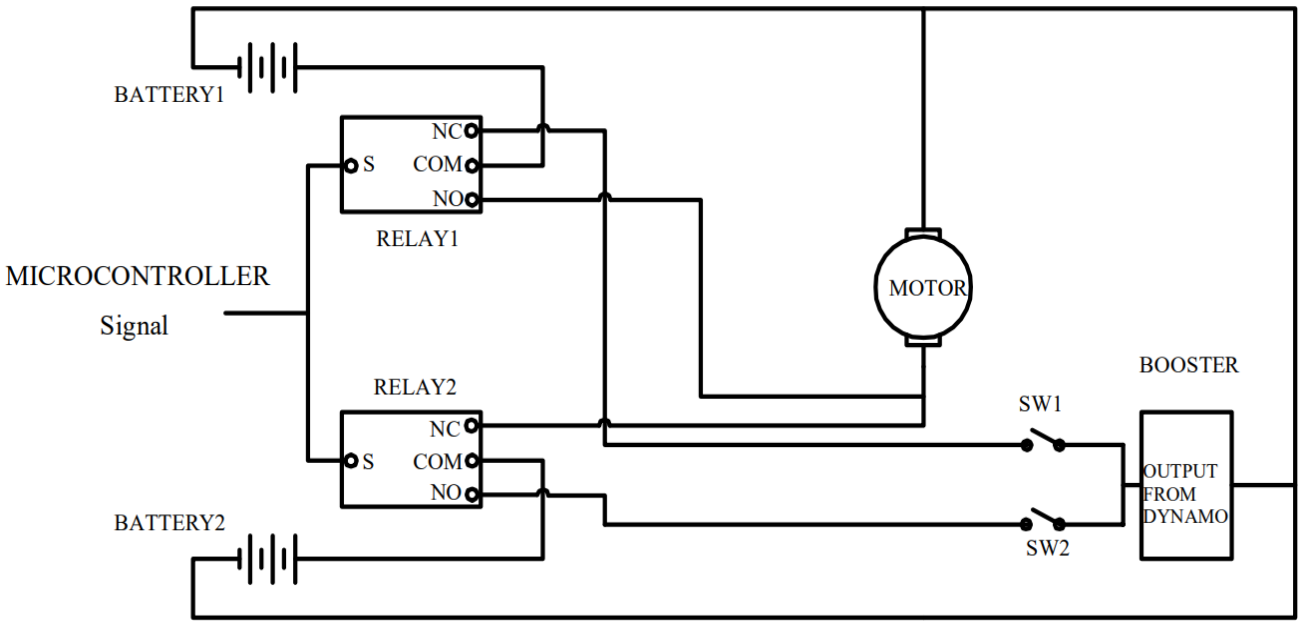

Fig 2 Change over switch circuit diagram

Above figure 2 shows circuit diagram of change over system, in this system two-channel 5v relays are used for switching action. The relays operate on the (high/low) signals generated by the Arduino controller.

The controller continuously keeps monitoring both the battery levels using analogue pins, depending upon the voltage levels of the battery and the conditions the controller generates signal through which the relays are operated.

The NC/NO terminals are so connected that when both batteries are fully charged the second battery should drive the motor which is connected through the NC terminal of relay-2 whereas the other battery is connected to motor through NO terminal of relay-1.

The output from booster circuit is given to the left-over terminals of the relays which operates sequentially with respect to battery levels.

Result and Conclusion

The transportation sector is one of the major contributors to air pollution and carbon dioxide emissions. Widespread adoption of Electric Vehicles (EVs) is a promising solution to address the environmental problems and de-carbonize transportation sectors.

Fig 3 Test images of vehicle

Fig 3 shows the recent images of testing vehicle, in this project, it is concluded that developing a charging circuit for a battery and its performance characteristics is analysed under the consideration of supply from both the electricity and renewable energy which

makes improvement in the range of the vehicle, reduces the charging and running cost, dynamically switching of batteries through change over switch is done and vehicle structure helps disabled people to drive in effective way. By the use of dynamo, the vehicle is able to efficiently charge the batteries. This prototype model can be expanded in future by many ways to serve many purposes.

Future Scope

In future, this project can be improved and improvise by adding many advanced systems and technologies. The vehicle can be improved by implementing points as mentioned below:

- Use of alternator against dynamo to increase efficiency as the alternator is used in modern cars.
- Use of even smarter micro-controllers and including artificial intelligence.
- Use of artificial intelligence for data acquisition and control (SCADA)
- By providing GPS tech within the vehicle to locate the vehicle.
- By implementing regenerative braking and enhance the vehicle range.