

Efficient Electric Vehicle by using Supercapacitor

Sakshi R. Junghare, Samruddhi D. Kharbade, Sakshi S. Madaghe,
Aayush D. Kalbhande, Akash S. Lohe

P. R. Pote Patil College of Engineering and Management, Amravati, India

Abstract: From Recent years we know that the pollution problems has been increased tremendously and the cost of fossil energy such as oil, gas, etc are increasing rapidly. By considering this problem the vehicle manufacturer thought to manufacture the Lithium battery electric vehicle. But after manufacturing those electric vehicle the problems such as the battery weight and cost problems were not solved. The batteries must provide extra energy and high power during the transitory state. These are the drastic conditions for the batteries. To overcome these severe circumstances, the combination of batteries and super capacitors is analogous with a high-quality power management is present for a satisfying solution. Super capacitor is also known as Ultra-capacitor which store the energy that's why we can also called it as storage devices. This device helps to supply the high power to electrical vehicle during the transitory state. During the stationary state, batteries will furnish the energy requirement. This procedure enable to reduce the weight and it also increase the duration of the batteries. The super capacitors have move advantage over other conventional capacitor and the battery. The Ultra capacitor are mainly used to get better state. To get better state the necessity of giant amount of power for the short length of time duration. For the short time we can use Supercapacitor.

Keywords: Supercapacitor.

I. INTRODUCTION

We know that in today's world population is one of the biggest problems which is increasing rapidly. Every time we go for out for drive always due to the vehicle gas emitted directly into the air which causes the pollution which give rise to the risk for our health especially the people who live near the highway or crowded road or on busy roads and it is also harmful for the environment. So, the pollution has become the serious problem in this world. By using fuel vehicle, we are just inviting the problems and various diseases for which the fuel vehicles are responsible.

To overcome all this problem the use of electric vehicle is the solution. The electric vehicle does not produce any pollution or gases from the vehicles exhaust pipe. There are some lacunas in the electric vehicle like it does not cover long distance, battery discharge fastly and all. So, efficient electric vehicle by using super capacitor is this solution for the problems occurs in the electric vehicle the main component in our device is super capacitor. Super capacitor is also identified as the Ultra capacitor. The Ultra capacitor is the high-capacity capacitor which has the capacitance value very high than any other capacitor and it also has the low voltage limits. It stores more energy than any other capacitor. It stores around 10 to 100 times more energy per unit volume than other capacitor. It charge very fast than the other capacitors or batteries and it also tolerates more charge and discharge cycle then Rechargeable batteries. In this device super capacitor is nothing but a secondary cell to store the charge.

II. LITERATURE REVIEW

In the early 1950s, General Electrical masterminds conduct exploration with passable carbon electrodes in the design of capacitors, from the design of energy cells and rechargeable batteries. Actuated water color is an electrical captain that's an especially passable" spongy" form of carbon with a high specified face area. In 1957, H. Becker Because the double subcaste medium was unknown to him at the time, he wrote in the patent that" It's unknown exactly what's taking place in the element if it's used for energy storehouse, but it give rise to an immensely high capacity." At the end of the 1980s, upgraded electrode accoutrements increased capacitance values. In 1982, The first supercapacitor with low internal resistance was developed for military purpose through the Pinnacle Research Institute(PRI), and they were retailed as" PRI Ultracapacitor". In 1992, Maxwell Laboratories seize this development. Maxwell acquired the term Ultracapacitor from PRI(Pinnacle Research Institute) and called them" Boost Caps ” to punctuate their use for power

operations. Since capacitor's energy content enhances with the forecourt of the voltage, experimenters were looking for a way to enhance the electrolyte's breakdown voltage. In 1994, using the anode of high voltage 200V tantalum electrolytic capacitor, David A. Evans developed an "Electrolytic Hybrid Electrochemical Capacitor". These capacitors combine point is electrolytic and electrochemical capacitors. They combine the high dielectric strength of an anode from an electrolytic capacitor with the high capacitance of a pseudo capacitive essence oxide(Ruthenium(IV) oxide) cathode from an electrochemical capacitor, yielding a mongrel electrochemical capacitor. Evans' capacitors had an energy content about a factor of 5 lesser than the similar tantalum electrolytic capacitor of the same size. Their high costs limited them to particular military operations Recent developments include lithium- ion capacitors. In 2007 these mongrel capacitors were settled by Fujitsu's FDK. They combine a electrostatic carbon electrode with pre-doped lithium- ion electrochemical electrode. Also, this combination enhances the capacitance value, the pre-doping process reduces the anode eventuality and results in a high cell affair voltage, farther enhancing particular energy. The supercapacitor or ultracapacitor is electrically called as the electrochemical capacitor(EC) because it stores electrical charge in the electric double subcaste of a face- electrolyte interface This interface is primarily a high face- area carbon. The large breadth, combined with the tight area of the double subcaste, gives the device one of the loftiest capacitance labors of any capacitor around. In 1957, the first electrochemical capacitor device was patented. capacitor device was patented by H.I. Becker Though a double- subcaste charge storehouse was used with this device, it was impracticable because of the need to immerse it in a pool of electrolytes(source Batteries & Energy Storage Technology 2007). Fig2.1 Maxwell Supercapacitor The standard EC design used moment was constructed by Robert A. Rightmire, a druggist at the Standard Oil Company Ohio(SOHIO).

III. SYSTEM ARCHITECTURE

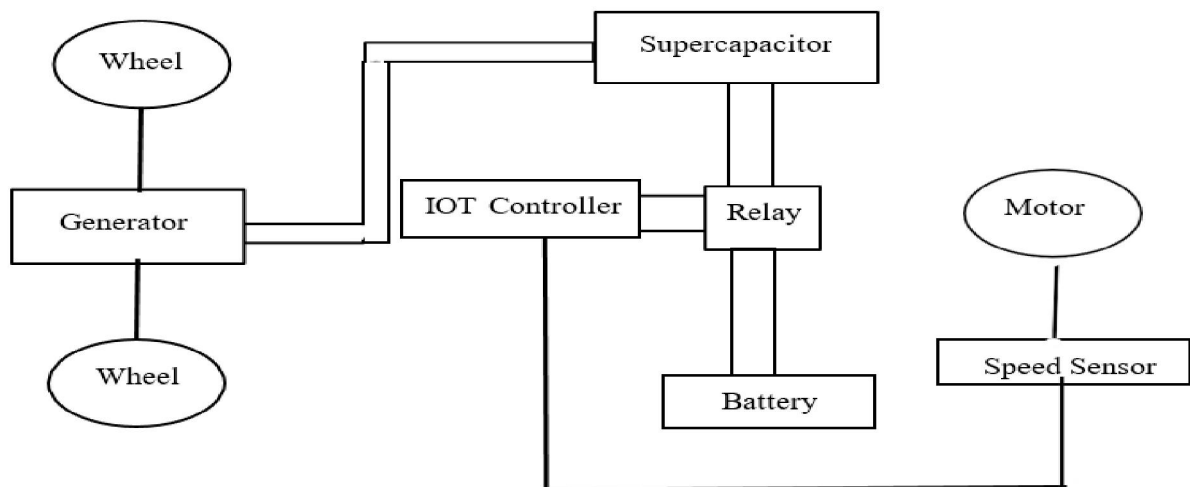


Fig1:Basic diagram of proposed system

First of all, our vehicle will run on the lithium-Ion battery. After reaching to the particular speed, it will shift on the supercapacitor with the help of the relay. We are using Supercapacitor because super capacitor charges fastly and drains slowly. Simultaneously with the help generator which is placed between the wheel which will convert the mechanical energy into electric energy and due to that the lithium-Ion battery charge will be unchanged. As the Supercapacitor will drain it will again shift to the battery with the help of Relay which is placed between supercapacitor and battery and this process will continue. We have used the Speed sensor to know the speed of the vehicle. This is how the model will work.

IV. OBJECTIVES

The main objectives of propose system are as follows:

The ideal of the proposed energy operation system is to concentrate on use the super- capacitor characteristics and on adding the battery continuance and system effectiveness. To give constant current. Supercapacitor is one of electrical

energy sources that have faster charging- discharging times when compared to other power sources, similar as battery and energy cell. thus, it's often used as a fresh power source in an electric vehicle
Supercapacitors have a much advanced capacitance than conventional capacitors and come in a variety of sizes from 0.1 F to over 1000F. Their low internal resistance and high-power viscosity, enable them to be suitable to charge and discharge as well as have a nearly immediate capability to absorb and deliver power. But a supercapacitor's part in an electric vehicle can go beyond a provisory power force. Unlike batteries, the energy in supercapacitors is incompletely stored as a stationary charge, leading to a high-power viscosity that batteries warrant. While batteries are perfect for a slow discharge over time, rapid-fire bursts of power fluently damage the chemical rudiments and reduce their performance

V. ADVANTAGES AND DISADVANTAGES

Advantages

- Balancing energy Storehouse with charge and discharge times. While they ca not store as important energy as a comparably sized lithium- ion battery, Supercapacitor can compensate for that with speed of charge.
- Supercapacitor offers fast charging ability.
- Supercapacitor environment standards. Hence, they are eco-friendly.
- It offers superior low temperature performance.

Disadvantages

- Supercapacitors are not well- suited for long- term energy storehouse.
- The discharge rate of supercapacitors is significantly advanced than the lithiumion. quantum of energy stored per unit weight is vastly lower compare to electrochemical This is about 3 to 5W.h/ Kg for an ultracapacitor than 30 to 40W.h/ Kg of batter

VI. CONCLUSION AND FUTURE SCOPE

6.1 Conclusion

Thus, in this project wen concentrated on the operation of supercapacitor during ride through condition. With the help of Supercapacitor, the life of battery is increase. By using this combination, the overall characteristic of battery is improved and the performance of battery is improved.

Supercapacitor can be used whenever high -power delivery or electrical energy storage is storage is demanded. therefore, numerous operations are possible. In a particular, Supercapacitor have great eventuality for operations that bear a combination of high power, short charging time, high cycling stability. thus, Supercapacitor may crop as the result for multitudinous operation specific power systems. With the help of Supercapacitor, the life of battery will increase. By using this combination, the overall specific of battery will meliorate and the performance of battery will meliorate. The use of Supercapacitor and battery together as well as individual meliorate the system performance.

6.2 Future Scope

This design can be extended to control each and every parameter of the power system as well as every process in the operation of the power system. This design can be further developed by adding a Speed control system which would control. The speed of the vehicle.

As now many Children ride the vehicle very harshly and at high speed so we can add a system which will send the record speed to their parents. So that Parent's will know about their riding by using IOT.

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