

Advance Method of Battery Charging for EV Vehicle by using Arduino

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Abstract: Electric Vehicles (EV) has recently been gaining increased worldwide interest since they result in far less climate pollution than their gas-powered counterparts. One of the main advantage of electrical vehicle is that it does not emit harmful gases compared to conventional vehicle. Electrical vehicle are the future of transport. But still EV facing some technological and economical barriers but they have some several disadvantages such as a requiring charging station long charging time. The main challenges in adoption of EV are insufficient charging stations, long charging time, high initial cost and limited range. This paper solving problem charging time of Evs. We have designed one system that will help to solving charging problem of EV vehicle.

Keywords: Electric Vehicle, Charging Station, Charging Time

I. INTRODUCTION

Since 1990s. EV(Electrical vehicle) we have become the world's hotspot, the world's major automobile companies have invested heavily in developing their own EV in order to win the initiative in the future EV market governments have introduced policy or formulate plants to promote the development of domestic EV.

21st century Electrical vehicles (EV) as a green transportation tool EV has own great attention from researchers. Electrical vehicles are the future of transport the growing market of EV and declining petroleum fuels marks it a necessity to develop more efficient EV. The dream project of the Indian Government of all Electric Vehicles by 2030 is facing problem in just one city with 200 Electric vehicles, it would be tough nut to crack to encourage it In the whole nation. Hence, the government should try to sort Out the problems of the installation of the charging stations and Their operational expenses to overcome its challenges as early As possible. Therefore, if we keep all these things in mind Electric vehicles will play a major role in controlling the Environmental hazard i.e. air pollution. Also, it would be a great Step forward towards the India's role in Paris Climate Agreement held in Paris, France in 2015. And this effective Transformation can help the environment by resisting the.

Increase in the global average temperature. EV has become one of the most attractive solution for energy saving and emission reduction has been recognized as the main direction of the automatic industry in the 21st century transformation and development of tough. With the number of EV and charging station rapid increase if we will become a new another alternative along with research on compact, rugged and cheaper electronics and sensors.

II. ELECTRIC VEHICLE STATUS IN INDIA

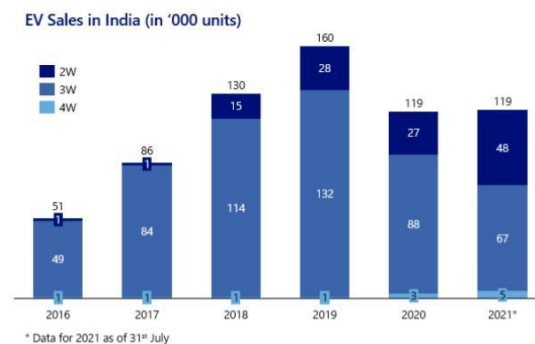
There are about 300 million conventional vehicles that grow at the rate of 60000 new registrations / day. There are 70799 traditional fuel stations compared to just 221 EV stations. As per Society of Manufacturers of Electric Vehicles, 354017 units of EVs were sold till date. India aims to adopt 31 million EVs by 2040 [2]. Tata motors recently won the tender for 10,000 EVs to replace government vehicles along with 4,000 EV chargers. Faster Adoption & Manufacturing of Electric Vehicles (FAME) scheme was formulated in 2015 to incentivize manufacturing of Ecofriendly vehicles. Providing Free EV charging points, community charging stations, regulated rates for charging and battery swapping are some of the incentives planned. Reliable power supply for EV charging stations and alternative energy resources for EV infrastructure are key aspects for the growth of EV industry along with making micro-grids and Renewable Energy Storage part of EV charging infrastructure.

India's goal is to ensure that by 2030 all public transport and 30% of private vehicles are electric. This was one of the key decisions taken in Global Mobility Summit in New Delhi. Transport sector consume 70% of fossil fuels- causing more than 70% of pollution. The Government provides a lower GST at 12% on electric vehicles while the Government levies 28% GST plus cess for petrol and diesel cars. Indian Space Research Organization is providing latest Lithium-ion battery technology to commercial players via the Automotive Research Association of India. Over 65% of energy demand for road transportation & 35% of carbon emission can be avoided if India implements an electric mobility future. Saving of carbon emission would enable India to honour its obligation under the Paris Climate Agreement. India, as part of building a green economy, is aiming for renewable energy capacity of 185 GW by 2022. India paid 4.14 trillion to buy 201.73 million tones of crude oil in 2015-16.

III. CURRENT STATUS OF ELECTRIC VEHICLE MARKET IN INDIA

The below chart shows the EV sales in India from 2016 to 2021. The highest PV cell from the 3W segment on account of the rapid proliferation of e-rickshaws which survey as an economical option for last mile connectivity. The second highest TV sale from the 2W segment. Similar to the 3W segment, electric 2W sales are bring driving bi slow speed 2Ws. Increasingly, the products in the high speed 2W segment are posting competition of ICE 2Ws, especially with the recent increase in FAME initiative for the segment.

The electric 4W segment, while making up for a relatively small size in term of annual units sold has started to register good growth this year. As early As possible. Therefore, if we keep all these things in mind Electric vehicles will play a major role in controlling the Environmental hazard i.e. air pollution. Also, it would be a great Step forward towards the India's role in Paris Climate Agreement held in Paris, France in 2015. And this effective Transformation can help the environment by resisting the drastic Increase in the global average temperature.



IV. EV CHARGING METHODS

The charging of the battery can be divided into three methods. constant current charging, constant voltage, charging and pulse charging

4.1 Constant Current Charging

In the process of charging the charging method of keep the charging current required the use of small current longtime charging mode the disadvantages is that the charging time is long and the early period of charging except the charge current to small. However in the later period of charging the battery tends to be saturated.

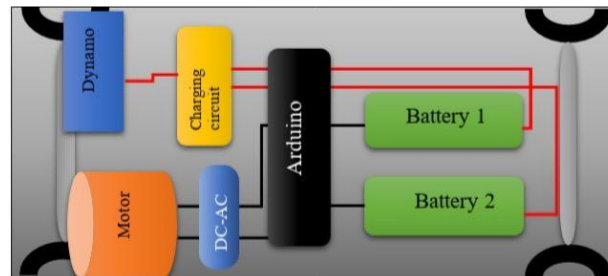
4.2 Constant Voltage Charge

In this process of charging the charging method of the charging voltage maintain a constant value in the early period of charging make the charging current increases with the charging process continue battery electric potential also increase charging current will gradually decrease the disadvantages is that not easy to be fully charged the initial charging current is very big will reduce the battery life may also damage appliances.

4.3 Pulse Charge

The use of pulse current to charge the battery is a quick method of charging the disadvantages is that cannot be fully adequate and the life of the battery will have a negative impact. Following three methods are charging for EV but they have disadvantages that technically matters.

V. BLOCK DIAGRAM



VI. BLOCK DIAGRAM DESCRIPTION

The motor is powered by a dual battery system the vehicle will being used bank one battery was bank one battery has depleted the vehicle will then began to operate on the second battery bank. Our smart device(PLC)will automatically switch between batteries as needed while bank one battery is recharged Bank to battery will take over and power the motor.

When Bank to battery charge is finally depleted and bank one battery is recharged the vehicle will switch bank two bank one battery as the vehicle is again using bank one battery so likewise Bank to will recharge using the same method. The vehicle will alternate between batteries as needed and using our system will eliminate the need of for the unpredictably.

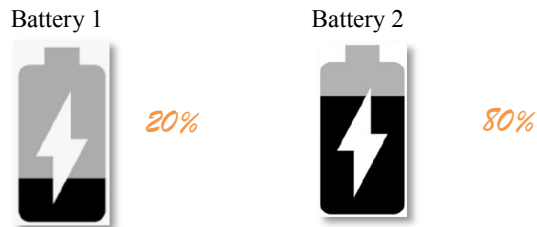
VII. METHODOLOGY

- **Arduino-** is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs – light on a sensor, a finger on a button, or a Twitter message – and turn it into an output – activating a motor, turning on an LED, publishing something online. In this project this Arduino is used for shifting of battery connection
- **Dynamo-** it is a device which convert mechanical energy into electrical energy is the basic rule of Dynamo in car is that is take the mechanical energy from the car as a input and gives the output as electrical energy and that electrical energy is stored in a battery and that is used for emergency purpose. In this project dynamo we are using for give supplied to the charging circuit and then that charging circuit give supply to the batteries.
- **Battery-** An electric-vehicle battery is a battery used to power the electric motors of a battery electric vehicle. These batteries are usually rechargeable batteries, and are typically lithium-ion batteries. These batteries are specifically designed for a high ampere-hour capacity.
- **Motor-** induction motor are the preferred choice for performance oriented electrical vehicles due to its cost. The other advantage is that it can get standard rugged environment condition.

VIII. BATTERY PRIORITY

If you're Battery 1 is 20% charged and battery 2 is 80% charged.

Than charging Circuit will charge first battery 2 than will charge battery 1. Because battery 2 is 80% charge and battery 1 is only 20% so your battery2 will get fast charged than battery 1.



IX. FUTURE SCOPE

As electrical vehicle manufacturing is becoming popular every day. Its market share is also expected to rise greatly. The best part is that this EV vehicle is self charging vehicle so it's more comfortable than other vehicles.

1. No requirement of charging station
2. Time reducing
3. No fuel cost
4. Low cost maintenance
5. Eco-friendly and does not cause noise pollution.

X. CONCLUSION

The Evs are one of the best ways to improve the environmental quality from fossil-fuel pollution. This paper has thoroughly discussed the following important issues-: charging station, charging time Paper discussed a method for charging problem of electrical vehicle. Our vehicle is efficient to run double the distance of ordinary EV Vehicle. Thus this project make the vehicle pollution free and it's not depending upon external source like (charging station) to recharge the battery. This prototype model can be extended in future.

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