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Solar Operated Battery Charging System in E-Vehicle

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ABSTRACT

Utilizing a buck boost converter project for battery charging improves mobility, environmental quality, and electric efficiency. We use two batteries, 12-volt, 1.5 ampere batteries in this setup. The car is powered by first battery and second battery start charging at running time of car By Using Solar Panel. Two DC motors used of 30rpm and the second battery received the energy produced by this. However, a second battery will get charged. And the voltage well be gate sensed by voltage sensor and this sensed voltage will be given to arduino and arduino converted to percentage this percentage will displayed on display .

INTRODUCTION

Electric vehicles becoming influential means in the field of transport day by day. As these electric vehicles are free from pollution emission, world is looking to make transportation field electrified. Nowadays, battery operated vehicle becoming popular sine the fuel prices becoming more expensive. Due to these scenarios, vehicle manufacturers looking for alternatives of energy sources other than gas. The use of electrical energy source may improve the environmental protection. Most EV s used rechargeable battery which is lithium-ion battery.

It is smaller to be compared with lead acid battery. Lithium-ion battery life cycle can be shortened by some reasons such as overcharging and deep discharge. On the other hand, EV usually has limited range of travelling due to battery size and body structure. Now, an important reason that limit the application of EV' s is the safety of existing battery technology. According to the buyers of Electric vehicle, the main problem with EV's is the limited capacity of battery and charging infrastructures availability, which leads to a variety of concerns like drivers are afraid to drive a battery powered vehicle for far distances.

These issues have importance comparatively cost of battery and vehicle. Even with development of new battery batteries for electric vehicles, various concerns can limit the use of electric vehicle. In recent days, great efforts have been made to study range reduction concerns by improving the automotive battery tracking systems with low- cost microcontrollers. This project represents an easy way to represents the range extension and time consumption of charging in the vehicles.

PROBLEM STAAASTEMENT

The electrical bikes we have charge the battery on charging station.

LITERTURE REIEW

Shrinivasa Kannan Jeyakanthan, Sudharshan (2017)"Design and Fabrication Of Self-Charging Electric Vehicle" has developed a self charging electric vehicle which generates the electric power required to drive the vehicle during the running condition by the means of two auxiliary power source. One power source is dynamo which is directly coupled with driving motor and second one is horizontal windmill placed in the front of the car. The power source are managed by the means of a current regulator for a charging the battery simultaneously.

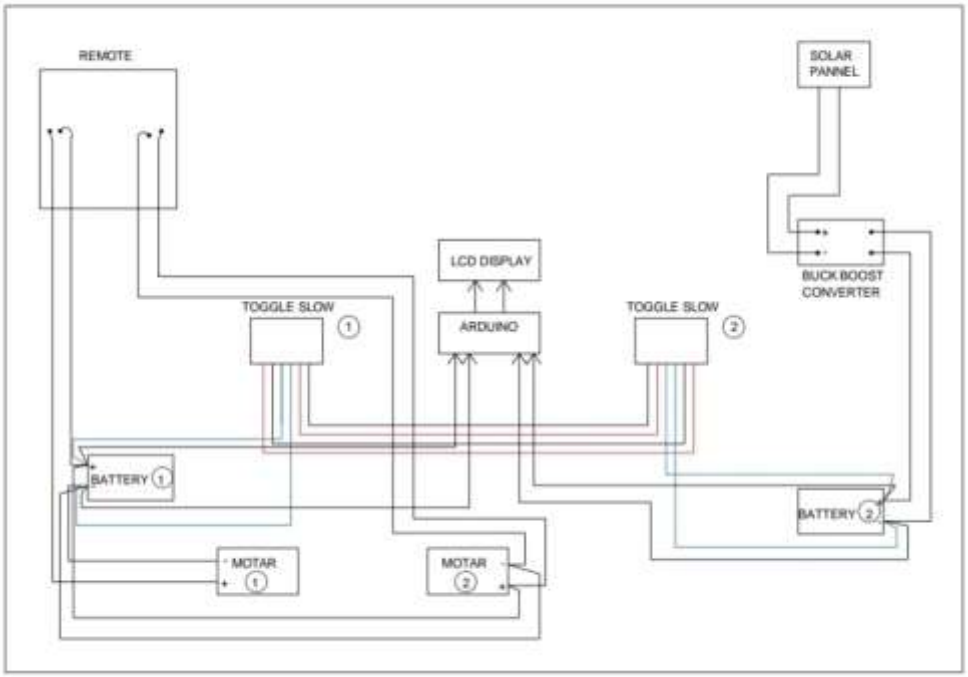
Suhas V, Sukeerth Calastawad, Phaneesh M, Swaraj S(2015)" Performance Of A Battery Electric Vehicle With Self Charging Capacity For Its Own Propulsion "in this work they have designed and fabricated a self charging system for 2 passengers and for weight up to 250kgs.they fabricated an electric vehicle same as commercially available golf carts. The components used are alternator, motor, and dc-dc converter. All were arranged in such a way that the rotational energy is

transferred ay a MS bright rod to the alternator and the alternator has a capacity to produce 12v to 14v which was directed to dc-dc converter through a batter source. Dc-dc converter converts 12v to 54v, which energy was used to charge the batteries.

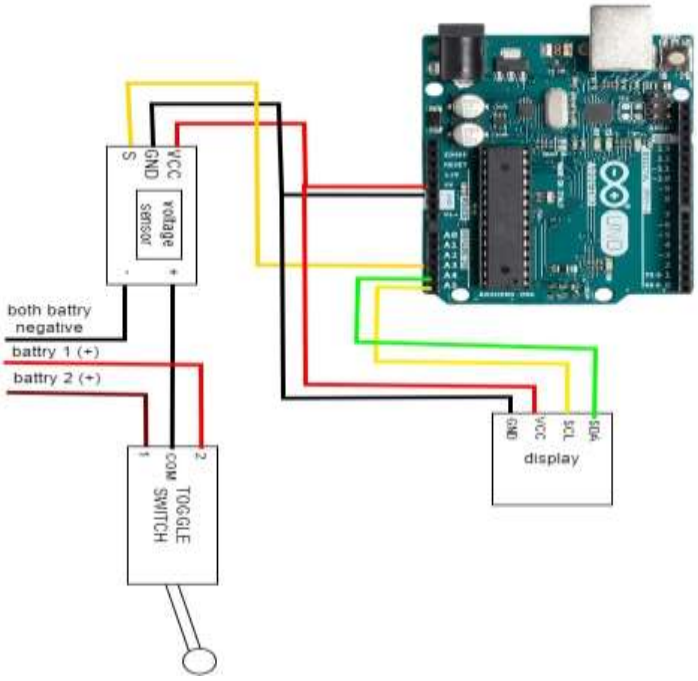
A batan O.A., A dewale A.O., Alibi A.A.(2008) “Constant Electricity Generation From Self Charging Inverter” this paper focused on an economical, noiseless, emission free and uninterrupted alternate source named self charging car.

Methodology

Block Diagram



Circuit Diagram of Arduino



Working

When we switch ON the ON-OFF switch then the supply get started and the display will get turn On. Then after selecting the toggle switch position the supply will get to the charged battery which is acts as a main battery.

With the help of that control board we can start the car. At that time the battery-1 will act's as a main battery, supplying battery and battery-2 will acts as auxiliary battery.

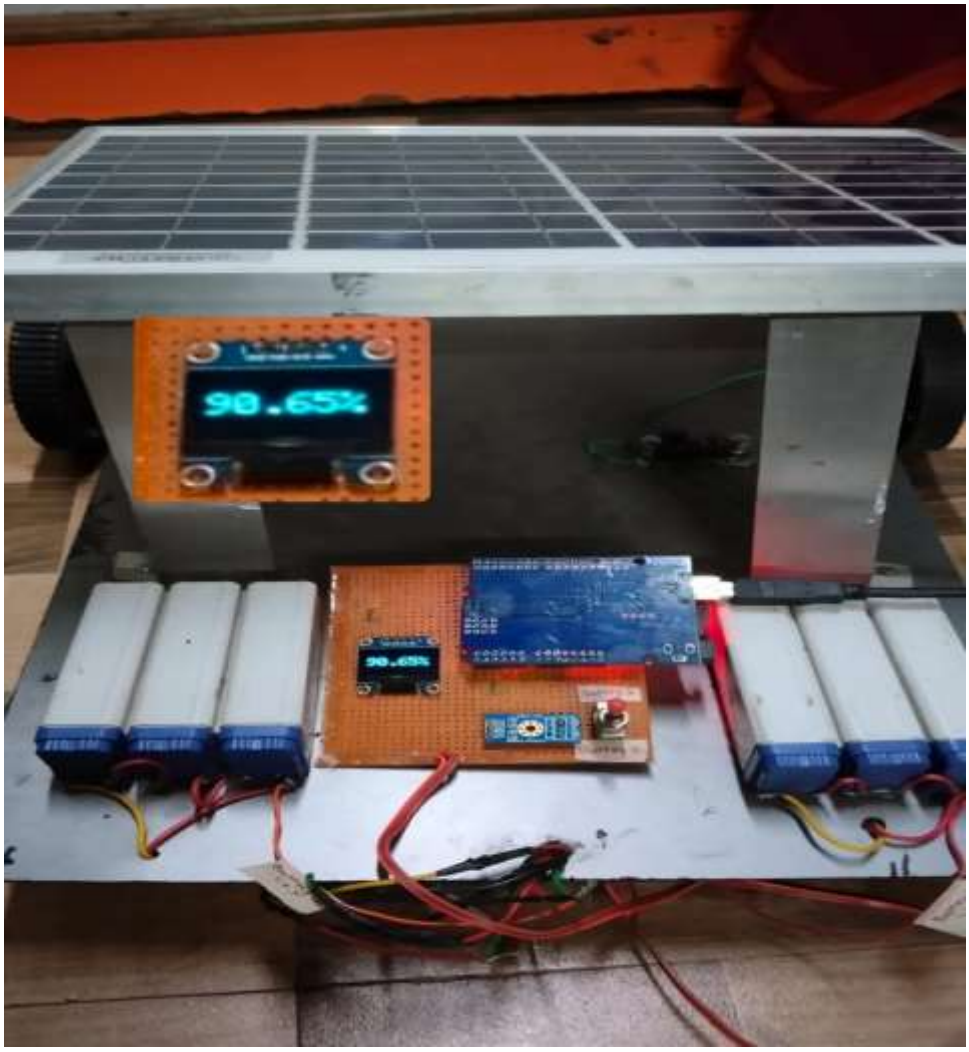
Then the car start rotating on the main battery supply and the battery-2 will get charged through solar panel which is totally discharged in the nature. And at that time the battery-2 will be get in charging condition and first the supply is given to the booster converter which is acting as stabilizer because we have to give the constant supply source to the battery which is given by this unite.

And with the help of the voltage sensors the voltage of the battery will be get sensed and it gives further command to the arduino and the arduino will convert this voltage of the battery into % and Display we will show the how much the battery-1 will get discharged and battery-2 will how much get charged. And after the getting of totally discharge of the battery-1. Then we have to change the position of the selector switch-2 then the battery-1 will go to charging mode and get charged through solar system which is used and battery-2 will feed the supply to the motors. This way will charge the battery of the car at the time of running condition of the car in solar system.

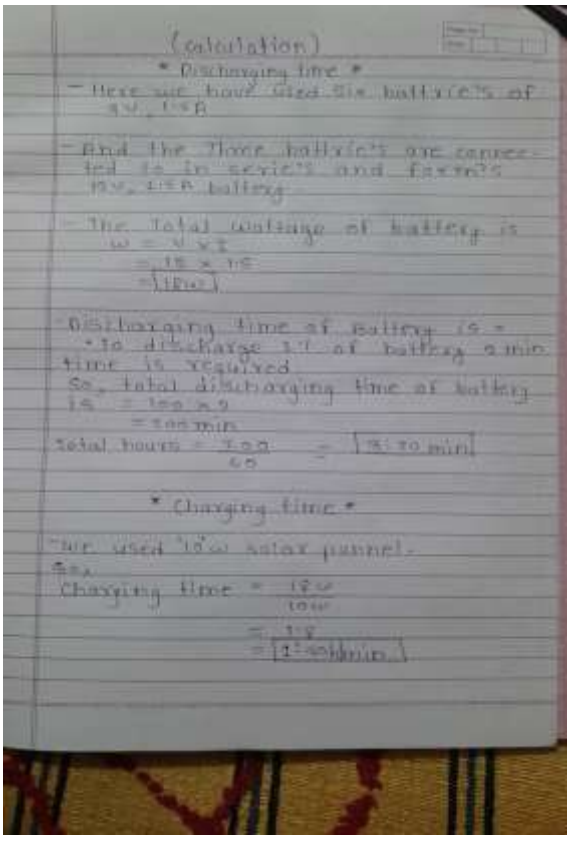
A free charging system for electric vehicles utilizing solar power involves integrating photovoltaic panels onto the vehicle's surface to harness sunlight and convert it into electricity. These panels would be strategically placed on the car's roof, hood, or other suitable areas to maximize exposure to sunlight while driving or when parked. The captured solar energy would then be stored in the vehicle's battery pack or used directly to power the electric motor.

RESULT

Battery 1



Battery 2



Conclusion

Utilizing solar energy for charging EV batteries aligns with the goals of reducing carbon emissions and combating climate change. Solar power is renewable and emits no greenhouse gases during operation, thus contributing to a cleaner environment.

By tapping into solar energy, EV owners can potentially eliminate or significantly reduce the cost of charging their vehicles. Once the initial investment in solar panels and charging infrastructure is made, the ongoing electricity costs can be minimal or even nonexistent, resulting in long-term savings for EV owners.

Solar-powered charging systems promote energy independence by reducing reliance on grid electricity, which is often generated from non-renewable sources. EV owners can generate their own electricity from sunlight, providing a degree of autonomy from traditional energy providers.

In conclusion, free battery charging for EVs through solar systems offers a promising solution to address environmental concerns, reduce costs, enhance energy independence, expand infrastructure, drive technological innovation, and influence policy decisions towards sustainable transportation solutions. However, widespread adoption will require continued investment, collaboration, and supportive policies from stakeholders across various sectors.

FUTURE SCOPE

A self-generating battery charging system refers to a system that harnesses energy from renewable or alternative sources to charge batteries without relying on external power sources. The scope of a project involving such a system can vary based on its intended application, scale, and specific requirements. Here are some key aspects to consider in the scope of a self-generating battery charging system project:

1. **Energy Sources:** Identify and evaluate potential energy sources that can be harnessed to charge the batteries. This may include solar energy, wind energy, kinetic energy (such as human motion or vehicle movement), or any other renewable or alternative energy sources available in the environment.
2. **System Components:** Define the components of the charging system, including solar panels, wind turbines, generators, energy harvesting devices, charge controllers, batteries, and any necessary power management and conversion equipment.
3. **Battery Technologies:** Select appropriate battery technologies based on the application requirements, such as lithium-ion batteries, lead-acid batteries, or other types of rechargeable batteries. Consider factors such as energy density, cycle life, cost, and environmental impact.
4. **System Design and Integration:** Design the charging system considering factors such as energy efficiency, scalability, reliability, and compatibility with existing infrastructure. Integrate the components into a cohesive system that optimizes energy capture, storage, and distribution.
5. **Control and Monitoring:** Implement control algorithms and monitoring systems to regulate energy flow, optimize charging efficiency, prevent overcharging or undercharging of batteries, and provide real-time performance data for system management and troubleshooting.
6. **Safety and Compliance:** Ensure that the charging system complies with relevant safety standards and regulations. Implement safety features such as overcurrent protection, overvoltage protection, temperature monitoring, and fail-safe mechanisms to prevent accidents and ensure user safety
7. **Environmental Impact:** Evaluate the environmental impact of the charging system throughout its lifecycle, including manufacturing, operation, and disposal. Minimize environmental footprint by selecting energy-efficient components, reducing waste generation, and adopting sustainable practices
8. **Applications:** Define the intended applications of the self-generating battery charging system, such as off-grid power supply for remote locations, portable energy solutions for outdoor activities, emergency backup power systems, or sustainable transportation infrastructure.
9. **Cost and Budgeting:** Estimate the cost of the project, including equipment procurement, installation, maintenance, and operational expenses. Develop a budget and cost-benefit analysis to assess the economic feasibility and return on investment of the charging system.

REFERANCE

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Model Photographs of project: