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Wireless E-Vehicle Charging using Solar Panel

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ABSTRACT: In 20th century, humans are preferred the bicycle as transport vehicle. After some decades petrol & Diesel engine had been invented, those engine vehicles are decreasing the human physical stress. But, now within couple of decades, worlds petrol mines are on the verge of exhaustion. Therefore, the prices of petrol & diesel are going high as high which issue that what we are facing now. it is necessity of people go for further options like hydrogen Engine or one of the best options is electronic vehicle using solar panels which is most probably costly but mostly works on free natural resources. Wireless charging is latest technology to charge the vehicle while using it saves lot of time of person. it used in large number of applications such as four-wheeler, two-wheeler, E-Bicycle, medical application like Ambulance, etc. Wireless electronic vehicle charging system is one of the costliest among various options. In this work, we implement of the Arduino-based e-vehicle charging system as a project. This device can be used for wirelessly charging electronic vehicle during drive. Whenever car is passing from a national highway or road, car battery starts charging using coils & solar panel which is already installed in the road. This system has very large applications not only in, luxury sector. But also, same concept used in applications where time& save non-renewable energy are of primary importance. In this, wirelessly e-vehicle is going to be charge during driving or in parking also. Also, it saves lot of time to get charged by using Microcontroller, Displays and Coils presented. This device can be used on highways & roads. The heart of this system is the microcontroller ATmega controller. This charging system has very large applications in the luxury automobile sector where strength and durability are of primary importance. regulator circuitry used to regularize the voltage as required. Also, Vehicle will continuously on the charging state to charge at maximum level & did not wait to charge.

KEYWORDS: Arduino; wireless charging; Controller; ATmega328;

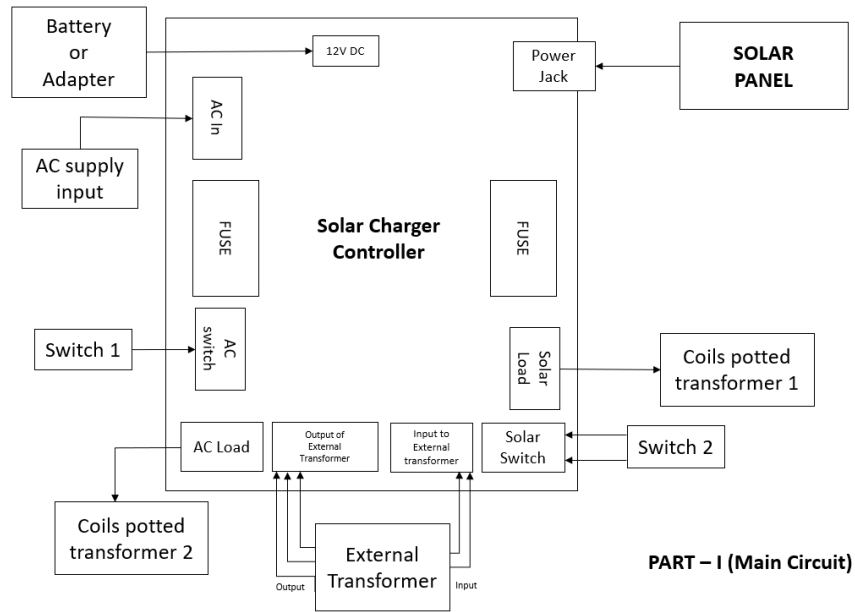
I. INTRODUCTION

Wireless charging system is used in an object in a moving body (E-Vehicle) is required in a large number of different places[1]. These may be simple but complicated and also quite large in size. In embedded systems, various controllers, coils, regulators supplies, other electronics components & of course programming is used[2]. Because of coils, the prices of this going high & also it is most important components of wireless charging system. In this, we describe such a best system which uses induction coils transmitter and receiver units mounted at a small distance between them and a ATmega microcontroller-based system. This microcontroller is very easily available at low cost and equivalent to the most popular 8051 microcontroller[3-7]. These systems are also high powered for applications. In system, a low-cost version of 8-bit or 16-bit microcontroller can also be used in the system to lower the cost. This system has been developed for different applications system[8].

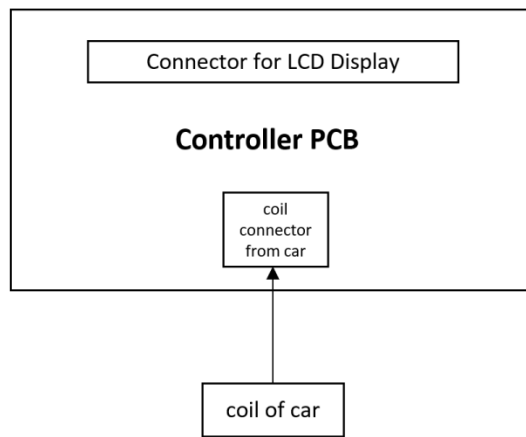
In 21st century, Electronic Vehicles are future of the humans. It not releases any type of harmful or hazardous gases like Carbon dioxide, nitrogen, Sulphur etc. it saves humans from hazardous greenhouse effect or global warming[9]. In this technology, it makes use of a solar panel, battery, transformer, regulator circuitry, copper coils, AC to DC converter, ATmega controller and LCD display to develop the system. The system demonstrates how electric vehicles[10-13] can be charged while moving on road, eliminating the need to stop for charging. induction coils are being used as transmitting coils & receiving coils they are transferring energy to the battery through solar panels[14]. Then, coils transfers energy to battery to store the energy. it requires the charging system. Till the date we are not having charging stations as petroleum & Diesel station. Wireless charging is latest technology to charge the vehicle while using it saves lot of time of person. it used in large number of applications such as four-wheeler, two-wheeler, E-

Bicycle, medical application like Ambulance, etc. Wireless electronic vehicle charging system is one of the costliest among various options[15-20].

II. METHODOLOGY



(a)



(b)

Fig.3.(a) Solar Charger controller PCB connection block diagram (b) connection block diagram of microcontroller PCB

As shown in the figure 1, Printed circuit board of the project, it is named as the Solar charger controller. It is used for controlling the charging part as control excess or less current coming from the solar panel or external supply[33-38]. Solar panel is connected to it with the help of power jack. This circuit works on both AC voltage and also DC voltage. There are two switches (Switch 1 & 2) which works same as safety device. These connections are directly connected to the other circuitry. For this reason, it gives safety to the coils because they are very expensive. It has safety devices as the fuse, if excess amount of current passes from this device. then, fuse terminates the

connection. External transformer primary & secondary windings are also connected to this PCB. It is just helps to conversion. AC load & DC load are directly connected to the copper coils.

As shown in the figure 2, that's how car works as receiving energy wirelessly. Car contains fixture & embedded circuit system as a display. Block diagram explains the description about connections of the Arduino controller & liquid crystal display. Resistor is also used for the contrast adjustment for display. It has ATmega controller to display according the charging & voltage goes on increase. It also installed with the coils as a receiving component.

III. EXPERIMENTAL RESULTS

After a success completion of circuit & connections as per the circuit diagram, when the car is moving from the coils track liquid crystal display turns ON, which is already shown in the following picture. Figure 3 shows the printed circuit diagram of solar charger controller & also embedded circuit or microcontroller display circuit. Also, figure 4 shows the car assembled with the coil. Final diagram shows the car is running over the coil track. Then, its display starts as showing the voltage is increasing. As our project indicates the wirelessly charging the batteries. Thus, we get output the same output as required.



Fig.3. Printed Circuit Board (a) Solar Charger Controller (b) Microcontroller PCB

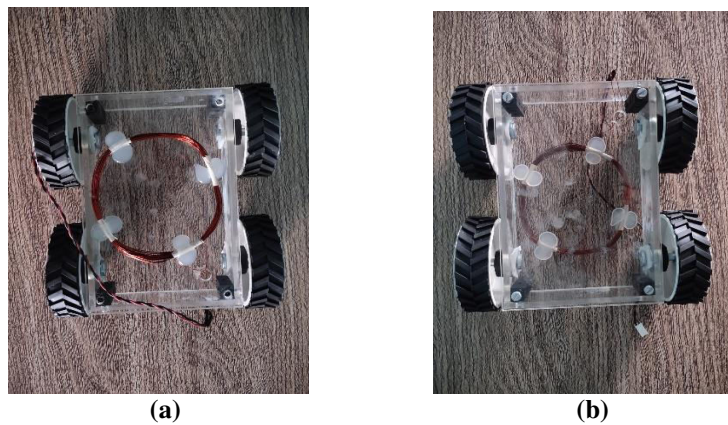


Fig.4 Coil implementation (a) Backside of vehicle (b) top side of vehicle

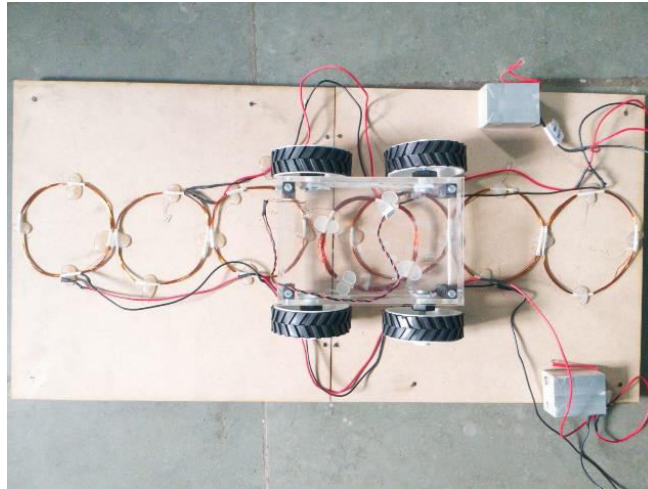


Fig.5(a) Copper Coil implemented on the track

IV. CONCLUSION

As conclusion, the objectives of this project have been achieved. E-Vehicle is used by the all over the world. Battery are been used in this project. It saves the non-renewable energy which we are using now, but it is about to finish. So, we can use renewable energy which not at all cost for anything which is sun light. As per our result is concern, it meets with user convenient to charge the E-Vehicle within the very less time which also saves time with go on from one place to another. The feature of this project is that this is useful in airports where you can save amount of time by holding the passengers & waiting to get charge up of vehicles. The designed system could be applied on very highly used roads like Highways, 4 lanes, 8 lanes & subways due to its ease of use and effectiveness. Static charging increases the system performance by reducing the loss, compared to dynamic charging. Since the source is electricity, this method of charging is considered to be efficient compared to the fuel-based charging. Wireless charging technique reduces the risk of tripping problem that are caused by plug-in charging. Higher efficiency than plug-in charging for electric vehicles by reducing the hazards caused due to plug-in charging. Ensuring the efficient way of charging in a less cost. Better air quality will be ensured which will lead to less health problems caused by air pollution. High-performance, safe, and cost-effective static electric vehicle charging has the potential to revolutionize road transportation.

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