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Solar Based Electrical Vehicle Charging SystemUsing RFID

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Abstract **-** Electrical vehicles are the most evolving force for transportation .They have the potential to revolutionize how energy is used ,created and redirected. Charging for the batteries of electric vehicles requires focuses. All the existing AC charging hardware that are as of now in the market will be sluggish in charging Electrical vehicles. The quick charging technique presently accessible is high at cost contrasted with this lethargic charging strategy. Here we build up a proficient charging station for Electrical vehicles by utilizing photovoltaic framework. DC chargers may likewise guarantee a substantially more effective charging than the existing AC charging gear. The photovoltaic cells create the force from the daylight changing over it into power by the assistance of sun- based cells present in it. Here, we are building up sun oriented quick RFID based charging system for electrical vehicles

Keywords: *Electrical Vehicles , photovoltaic framework, inexhaustible framework, RFID based charger, charging station*

INTRODUCTION

It is approximately estimated that the usage of electrical vehicles has raised about 45% to 50% by the end of 2022 and is believed to reach further peaks by the end of this decade. This implies to the need of increase in the convenient public charging stations by means of all the factors like installation cost, ease to use and sustainability. By utilizing environmentally friendly power sources ,an easy dc charging system can be made.

The fundamental objective of our task is to execute a design of the productive method of accusing the EV vehicle of the utilization of sustainable power supply. Energy which is entering the circuit is an environmentally friendly power source, and which is utilized for charging the EV vehicles. indeed, even as on the indistinguishable time pleasurable thenetwork gadget imperatives, for example, the strength solidness, the limits of charging charge of each EV and charging demands sure by EV clients. And also, meets all the requirements of the people with all different economic background and it is possible to reach every developing anddeveloped regions in the country including rural areas.

II. EXISTING MODEL

Electrical vehicle chargers currently come in different models in which the vehicle is connected to the AC power. When it comes to electric vehicles, the converter is built inside the car. It's called the "onboard charger" though it really is a converter. The on-board battery charger of the vehicles converts the AC power from the supply to the DC power and then feeds the car's battery. This is the most common charging method for electric vehicles today and most chargers use AC power This is quiet time taking and sluggish. In addition, it is very expensive and cost contrasted to improve the speed of the AC chargers

III. PROPOSED MODEL

a.The project "SOLAR BASED ELECTRICAL VEHICLE
CHARGING SYSTEM USING RFID" is primarily designed for charging the electrical vehicles by using sustainable and renewable resources.

b. Here we are using solar panels which are known clean well spring source of energy.

c. The RFID reader module is used to read the information from RFID tags and sends to the microcontroller.

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d. Arduino UNO is the microcontroller used in the system which is effective and easy to use by the users and can be modified with ease.
e. The system feeds the DC power to the vehicle which indeed reduces the time taken to charge the vehicle with sustainability. By using the simple and effective components , the proposed model overcomes the flaws of the existing methods efficiently.

ADVANTAGES:

- Saves on Energy Costs
- Convenience
- Sustainability
- Independent power supply
- Pollution free

BLOCK DIAGRAM:

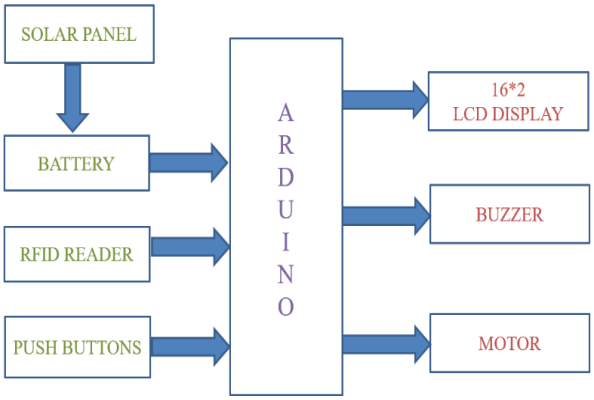

Fig 1: Block Diagram of Proposed Model

IV. HARDWARE IMPLEMENTATION

A. Solar Panel

A Solar panel is a device that converts light from the sun, which is composed of particles of energy called "photons", into electricity that can be used to power electrical loads. Solar panels collect clean renewable energy in the form of sunlight and convert that light into electricity which can then be used to provide power for electrical

Fig 2 : Solar panel

B. Battery

The lithium ion battery is used to store the DC charging current in this battery. Here we are using 12

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Volt battery.The battery gets a power from solar panel by conversion of power through solar cells.

C. Arduino UNO

Arduino give the labeled output entering by code is shown by LCD display. This Arduino runs the programs, which need to process the circuit. Multiple tasks were performed by the Controller which has been integrated with various input and output terminals. Here the input will be provided from push buttons and RFID reader. The required information's are received and smoothly processed based in the control algorithms. Here we are adding an Arduino UNOmicrocontroller to generate a code to process the fast-tag and for our basic needs in hardware. The specification of power supply is 5 Volt

Fig 3: Arduino UNO

D. RFID Reader:

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, whichis used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of- sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.

Fig 4: RFID Reader

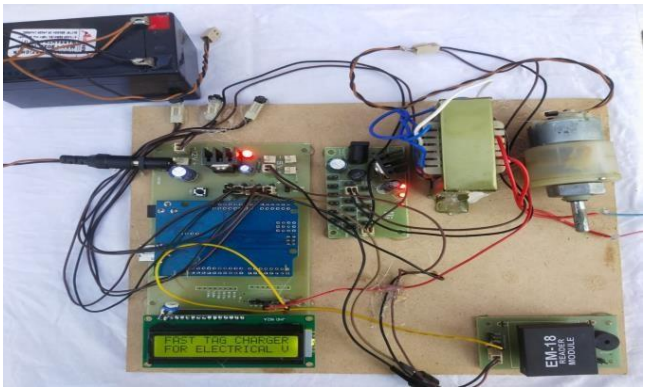

Fig 5: Hardware implementation

V. **WORKING**

We are using a Renewable energy source which is the main source for charging the electric vehicle. The solar energy from the sunlight is collected by the solar cells. And these cells convert the light

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energy from the sun into DC electric current. And this current is stored in a battery which is of 12V capacity. The Arduino is the main heart of the program. Here we are using Arduino instead of a microcontroller or other processing device because in Arduino the programs can be easily entered and can also be easily modified by the user. this is the processing unit of the entire circuit. There are two steps undergone to generate inputs to the program they are: RFID (sensing unit) and push buttons (manual input method). The RFID part consists of two segments one is the RFID Reader and the other is the RFID cards or tags. The RFID reader or interrogator is a device that transmits and receives radio wave signals to communicate with the RFID tags. This segment senses the tags and sends the data as the input signal to the Arduino. The RFID tag is an integrated circuit with an antenna, whichtransmits the data to an RFID reader. And the second method of the input are push buttons which are used to enter the value of the input required for charging the EV Vehicle.
The solar panel receives the solar energy from sun light and converts into electricity and this energy is stored in a 12v battery which acts as power supply to the entire circuit
.The users are issued RFID tags with the prescribed data , through which they get access to the charging system. Soon after the RFID tag is scanned , the card balance and the options are displayed either to recharge the card or to pay the bill. The user can choose their option based on their requirement by giving inputs through the push buttons installed. After entering valid inputs, the motor rotates which indicates the passage of direct current in the circuit which can be given to the load.

RESULTS

Step 1: Charge the rechargeable lithium ion battery by connecting with solar panel and placing in the intense sun light.

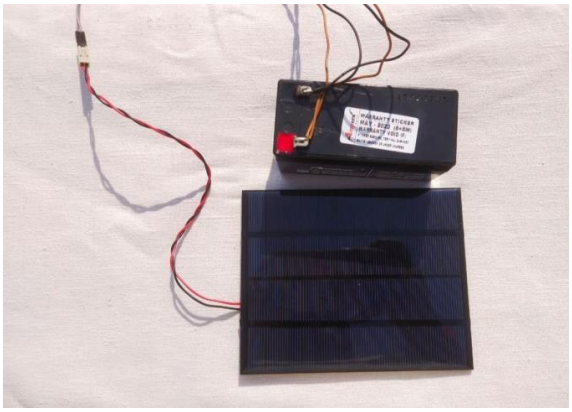

Fig 6: Charging battery using solar panel

Step 2: once the battery is charged , connect to the circuit and then scan the RFID tag at the RFID reader module.

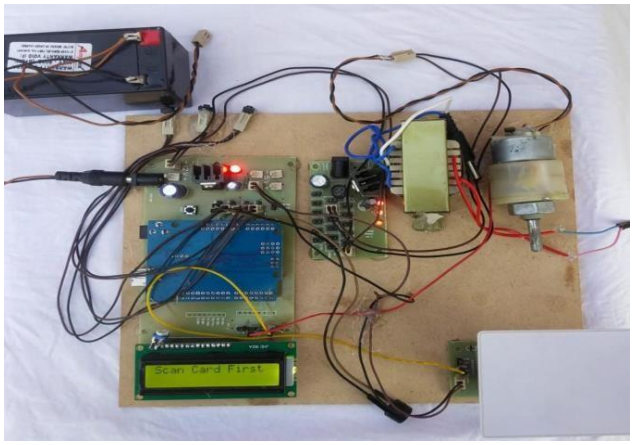

Fig 7: Detection of RFID tag

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Step 3: Enter valid input options either to recharge or to pay bill based on the user requirement.

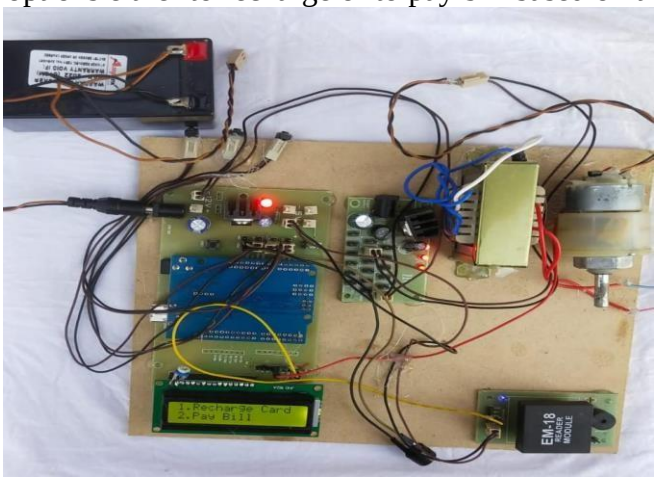

Fig 8: Display of the available options

Once the valid inputs are entered with sufficient amount , the DC motor rotates , which indicates the passage of DC current and can be given to the load.

CONCLUSION

The renewable solar energy based charging system is the solution to conserve the ideology of being switched to the electrical vehicles and also sustainability. The proposed model implies to the increase in the convenient public charging stations by means of all the factors like installation cost, ease to use , sustainability and speed. By using this method, the availability of charging stations for Electric Vehicle is increased. Here we are using a design of a charging station for the Electric Vehicle with a low-cost and efficient model. So, the implementation of the charging station all over the world becomes easier

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