EasyChair Preprint

№ 7662

Solar Powered EV Charger Using RFID

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March 29, 2022

"Solar powered EV charger using RFID"

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Abstract: As worlds resources are diminishing, govt. agencies and nongovernment organisation are pushing greener solution through the use of renewable energy's sources. electric vehicles are being invented and in order to run the electric vehicle the fuel required is the electricity vehicles through the Electric vehicle smart charging station which is the promising alternative and environmentally sustainable solution to meet up the energy crisis.

This project describes a EV battery charger using solar panel system based on RFID module. This design is based on Arduino microcontroller with LCD displays showing the actual time left. During the time period, a relay output is latched. This can be used at Hotels, Conference centers, Exhibition halls, service offices, Shopping malls, Airports, Train terminals. So that the EV battery users can reactivate a low battery or dead battery by simply plug in & charging for one rupee.

The system battery will charge from the solar panel. Despite solar energy being a good source of energy, there is a need to improve the methods to harness this energy.

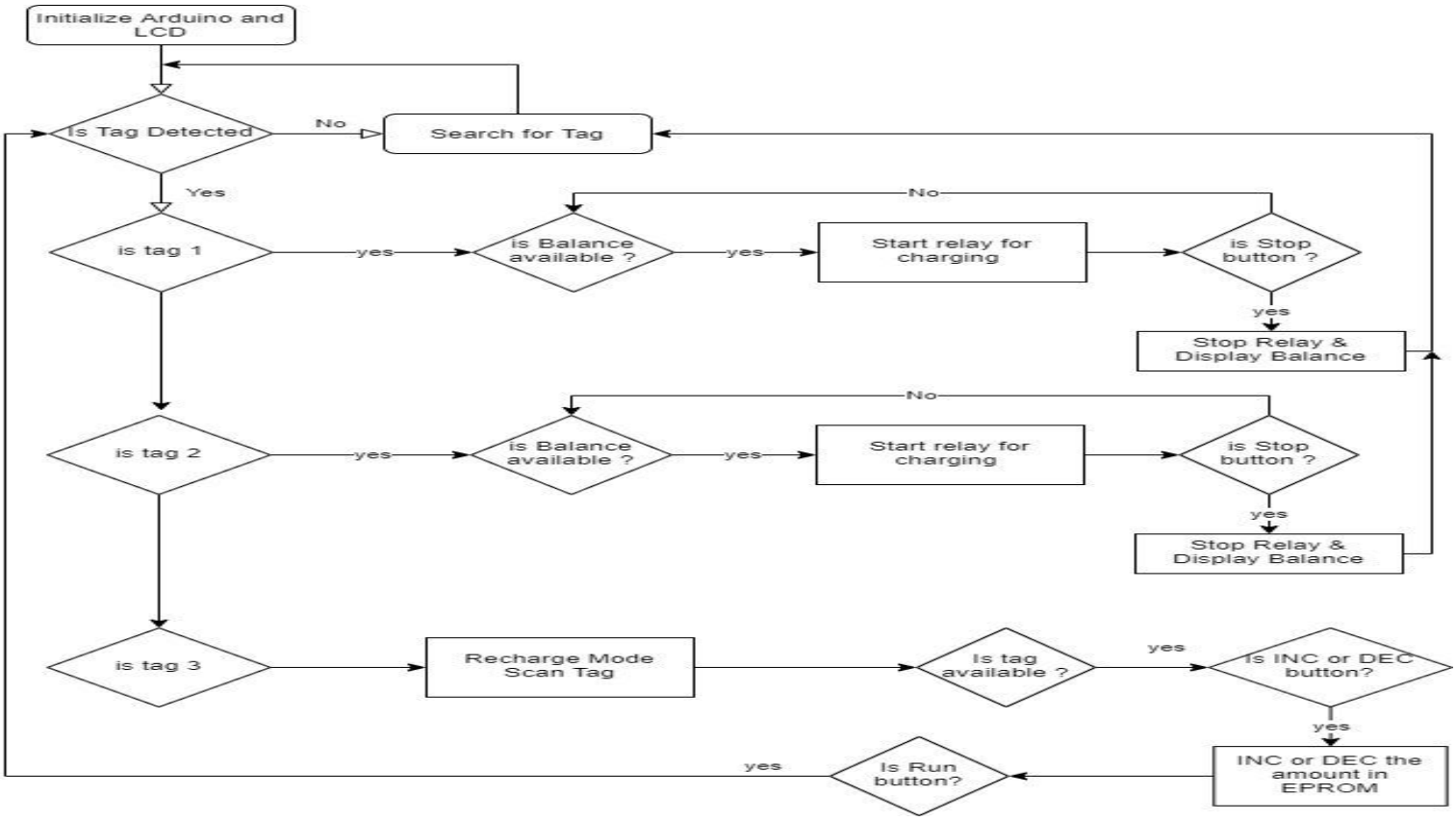
Keywords: Arduino, LCD, RFID AND EM18, SOLAR PANEL

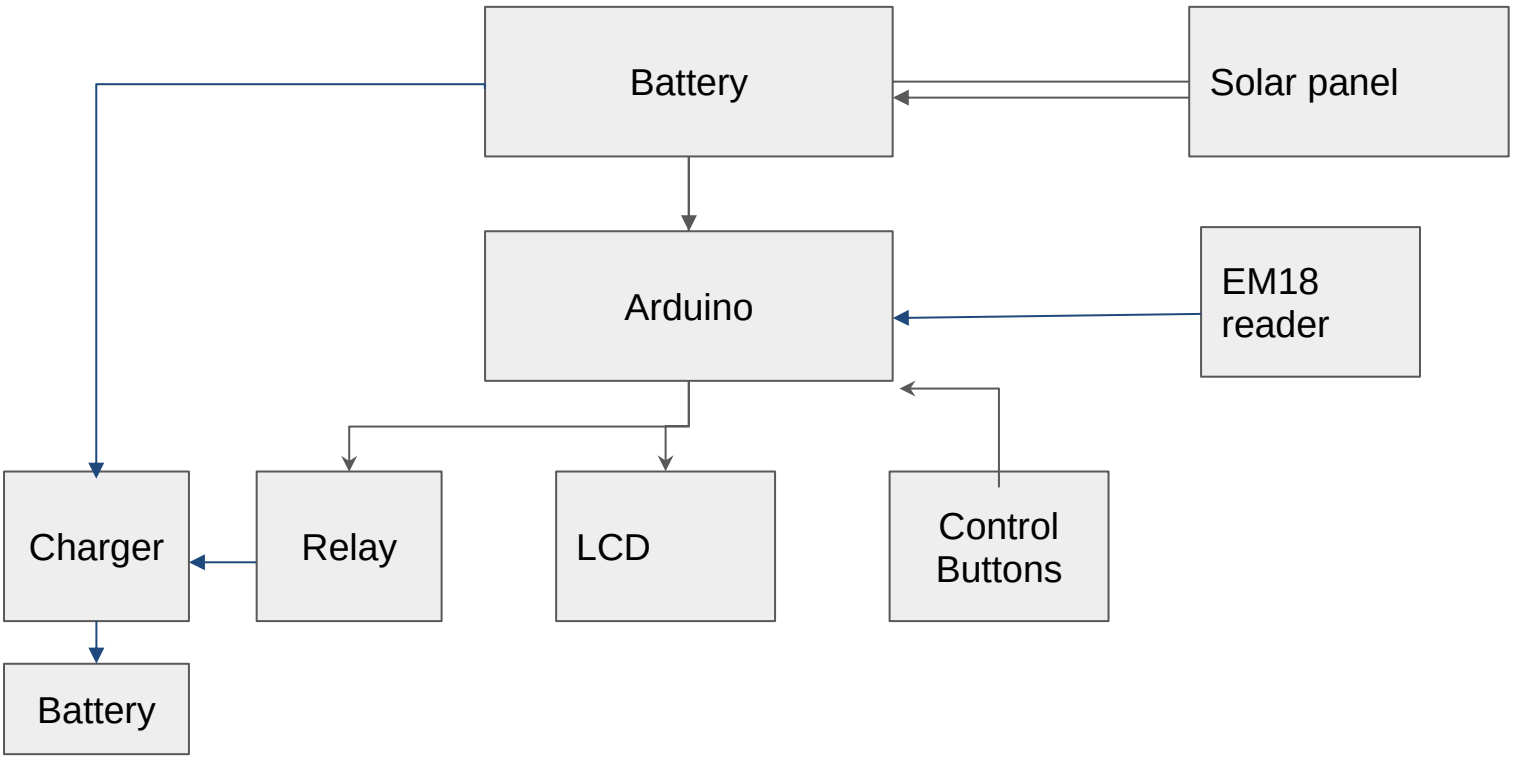
Introduction: In many developing countries, the Grid power supply is not available for several hours on daily basis. Specially in Semi Urban & rural areas where the cell phones are essential communication device. So we use solar panel to charge battery with coin detecting mechanism, microcontroller, RFID, charging circuit and different phone sockets. The coin based charger is similar like a vending machine for charging cell phones, the user has to plug in the phone into one of the adapters and insert the coin for charging at constant current for a definite time period. Coin detecting mechanism is used to detect when user insert the coin, this will detect the coin and sent a corresponding signal to signal conditioning unit which converts the incoming signal into square pulse and then given to microcontroller. The microcontroller used is ARDUINO which is a type of reprogrammable microcontroller programmed. Driver circuit consists of relay, which acts as a switch to turn ON and turn OFF .The relay output is directly given to the mobile charger pin The solar power application to battery charging has been studied properly. Solar chargers convert light energy into DC current for a range of voltage that can be used for charging the battery. They are generally portable but can also be mounted as per required place .In this design of coin based mobile charger is a fixed solar panel of size 18 cell, 3 WP is used to charge the battery upto maximum 100 mAmp in bright sun light. Development of a coin based universal mobile battery charger based on main power and solar power is discussed and this is primarily for rural areas where the mobiles are basic needs for communication and the main power is not available all the time.

The coin-based mobile charger designed in this paper is providing a unique service to the rural public area. Where grid power is not available for partial/full daytime so we use coin based mobile charger using radio frequency identification and a source of revenue is provided . The coinbased mobile battery charger can be quickly and easily installed outside any business purpose. The mobile phone market is a vast industry, and has spread into rural areas, public places and railways etc. as a essential means of communication. While the urban people use more complex mobiles with good power batteries lasting for several days, the rural people buy the mobile phones that require charging instantly. So many times battery becomes dead in the middle of conversation particularly at inconvenient times when access to a standard charger is not possible, so we use this coin-based mobile battery chargers are made to solve this huge problem. The user has to plug the mobile phone into one of the adapters and insert a coin or RFID reader then phone will then be given a power for charging

Grant sanders published paper on "Recharging system for personal electronic devices", This invention relates generally to the recharging of personal electronic devices, such as cell phones, lap top and palm top computers, personal digital assistants, and the like, and more particularly to a facility for securely receiving and recharging such devices upon the receipt of a prescribed fee. The invention further relates to the recharging of personal electronic devices in hotel rooms, motel rooms, and similar venues

Block Diagram Description:





Working of project:

- The RFID tag number id set into the program and if the tag is matched then the relay will switch ON the charging circuit for 10 sec as a demo.
- After 10 sec the relay will OFF so charging will stop.
- The RFID program is set such a way that the money will deduct from the Tag wallet for every charging of the mobile.
- The Solar panel use to recharge the battery.
- For demo we use mobile to check the charging using this system

HARDWARE USE

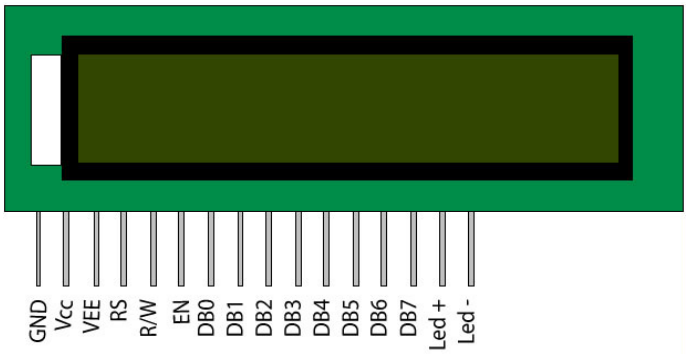
Arduino Nano circuit board with Arduino IDE is capable of reading analog or digital input signals from different sensors, activating the motor, turning LED on/off and do many other such activities. All functionalities are performed by sending a set of instructions to the ATtmega328 main microcontroller, on the board via Arduino IDE. The Arduino board also includes Power USB, Power (Barrel Jack), voltage regulator, crystal oscillator, voltage pins (3.3v,5v,gnd,vin), A0 to A5 analog pins, icsp pin, power led indicator, tx and rx leds, 14 digital input/output pins, Aref, and Arduino reset
The Arduino Uno is a microcontroller board , based on the ATmega328.The Uno board functioning is different from all other boards in that it does not use the FTDI USB to serial driver chip. Instead, the Atmega328 is programmed as a USB to serial converter. The ATmega328 is a low power CMOS 8 bit microcontroller based on the AVR enhanced RISC architecture structure

The Arduino project started in 2003 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy,[2] aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats and motion detectors

LCD
LCD (Liquid Crystal Display) screen is an electronic display module and finds a wide range of applications. A 16x2 LCD display is a very basic module that has 2 controllers with 16 Pins which is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi-segment LEDs as they are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations. The status of the system is displayed using LCD.

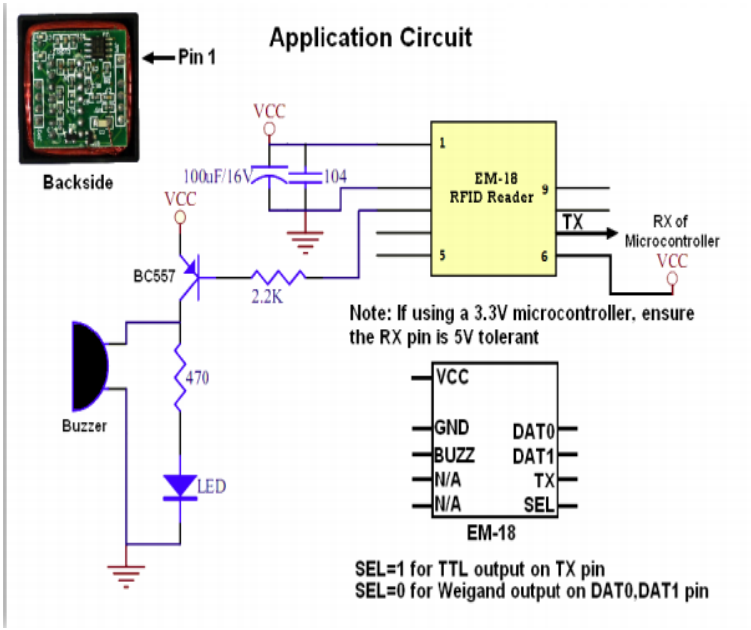
A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.[1] LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and seven-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements. LCDs can either be normally on (positive) or off (negative), depending on the polarizer arrangement. For example, a character positive LCD with a backlight will have black lettering on a background that is the color of the backlight, and a character negative LCD will have a black background with the letters being of the same color as the backlight. Optical filters are added to white on blue LCDs to give them their characteristic appearance.
A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of a LCD.



RFID AND EM18

Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. This RFID Reader is a Tiny, simple to use RFID reader module. With a built in antenna, the only holdup is the 2mm pin spacing. Power the module, hold up a card, and get a serial string output containing the unique ID of the card. It has TTL output

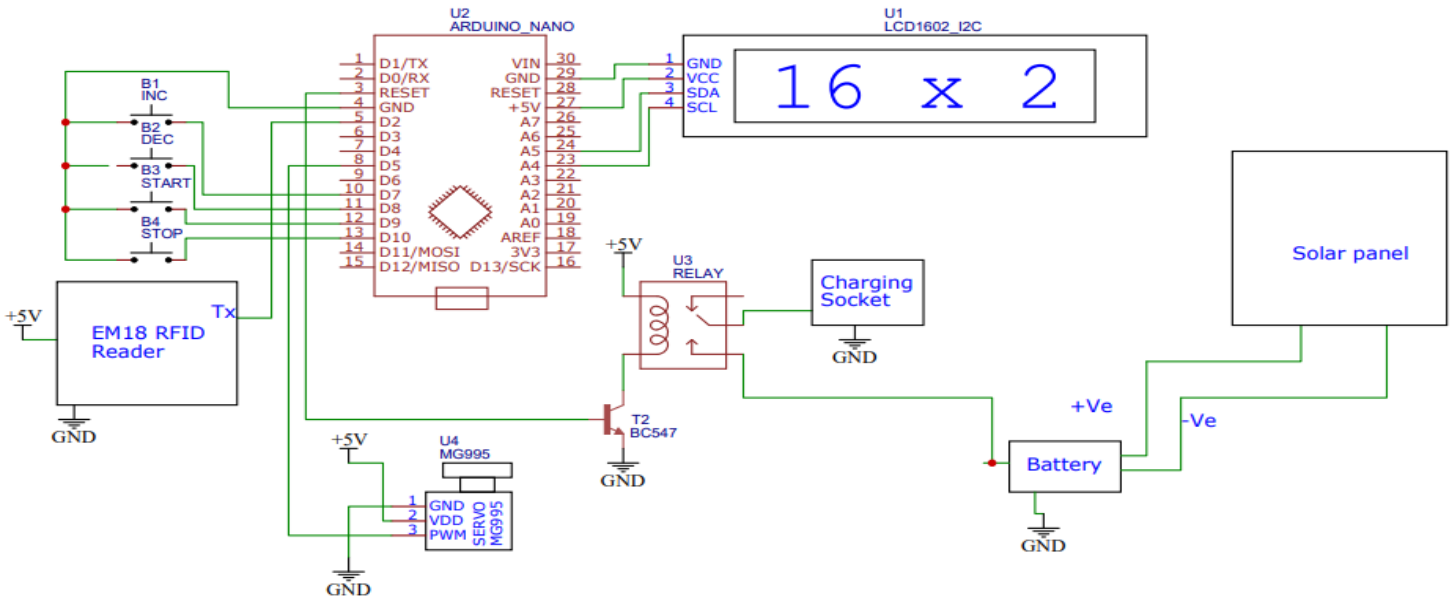


SOLAR PANEL

By the end of this century, it is expected that crude oil will be over. Newspaper will miss out of the headlines on petrol price hike. No oil spillage in oceans, no loss of marine bio diversity. Artifact collectors would save a gallon of oil as souvenir of crude oil era. School essays wouldn't have petro products as reason for global warming. But will life stop if crude oil is over?

Humans have shifted from wood to coal, coal to oil, and oil to gas. This shift was due to better performance, efficiency and feasibility of the new fuel. In simple words new fuel were better than the previous one. And now it's time for shifting from crude oil to renewable energy source. And one of the most abundant available sources of energy on earth is solar energy. In fact crude oil, coal etc. are in a way forms of solar energy. Solar energy is inexhaustible source of massive energy. According to recent estimates earth receives an average irradiance of 1367W/m2 which is also known as solar constant. When this power density is averaged over the surface of the earth's sphere, it is reduced by a factor of 4. A further reduction by a factor of 2 is due to losses in passing through the earth's atmosphere. This value varies throughout the year and also from place to place. Now solar energy isn't just a way of generating power but also for generating money. The world market shares of renewable sources are rising steadily. And today with the development of technology solar energy is a growing market providing ample employment opportunities.

Circuit Diagram of contol panel:



Advantage and Application:

As worlds resources are diminishing, govt. agencies and nongovernment organization are pushing greener solution through the use of renewable energy's sources.

vehicles through the Electric vehicle smart charging station which is the promising alternative and environmentally sustainable solution to meet up the energy crisis.

electric vehicles are being invented and in order to run the electric vehicle the fuel required is the electricity

As a consequence of finite petroleum original resources, renewable energy sources became indispensable for our daily life energy demand.

In this perspective we intended to give an efficient, applicable and cost-effective model of PV based EV charging station using RFID

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