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Electric Vehicle Charging System

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Abstract: *Electric vehicles are a new and upcoming technology in the transportation and power sector that have many benefits in terms of economic and environmental. This study presents a comprehensive review and evaluation of various types of electric vehicles and its associated equipment in particular battery charger and charging station. A comparison is made on the commercial and prototype electric vehicles in terms of electric range, battery size, charger power and charging time. The various types of charging stations and standards used for charging electric vehicles have been outlined and the impact of electric vehicle charging on utility distribution systems is also discussed. The methodology presented here was time-and cost-effective, as well as scalable to other organizations that own charging stations. Electric vehicles (EVs) are becoming increasingly popular in many countries of the world. EVs are proving more energy efficient and environmental friendly. But the lack of charging stations restricts the wide adoption of EVs in the world. As EV usage grows, more public spaces are installing EV charging stations.*

Keywords: EVs, Charger Power, Charging Time, Scalable.

I. INTRODUCTION

1.1 Necessity

Since the early 2000, India's crude oil imports have risen exponentially. The demand for oil grew by 5.1% in 2016, higher than the world's largest net importers, the US (0.7%) and China (2.9%), making India the world's third largest crude oil consumer. India ranks as the third largest carbon emitting country in the world accounting for 6% of the global carbon dioxide emissions from fuel combustion. According to the WHO Global Air Pollution Database (2018), 14 out of the 20 most polluted cities of the world are in India4. Rising population –a sustainable mobility challenge India's current population of 1.2 billion is expected to reach 1.5 billion by 2030.India is the world's fourth largest producer of internal combustion engine (ICE) based automobiles. The growth in the automotive market in India has been the highest in the world, growing at a rate of 9.5% in 2017. An increasing uptake in electric vehicles is likely to pose a challenge to the existing automotive market if the country does not plan its transition towards newer mobility solutions and develop the required manufacturing competencies. Electric mobility a potential solution for India.

1.2 Need of Project

In 2017, Indian government pushed a major policy of selling at least 6-7 million EV's in India by 2020. They are planning to sell only EV's by 2030. But many experts in automobile industry criticized this plan and said that it might be fail. Only reason they have stated, is lack of infrastructure, and majorly lack of 'Charging stations'. Indian government is really trying to push electric vehicle in our ecosystem. But people are reluctant to buy an electric vehicle. Reason people are not buying electric vehicle is 'Range Anxiety'. Range anxiety is worry on the part of a person driving an electric vehicle that the battery will run out of power before the destination or a suitable charging point is reached. So what's the point in buying EV? Why would I, you will buy an electric vehicle? Here, charging station plays vital role.

1.3 Motivation

Electric vehicles are a new and upcoming technology in the transportation and power sector that have many benefits in terms of economic and environmental. Electric vehicles (EVs) are becoming increasingly popular in many countries

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of the world. EVs are proving more energy efficient and environmental friendly. But the lack of charging stations restricts the wide adoption of EVs in the world. This has motivated project all along so that it is user friendly system.

1.4 Objectives

1. To design IoT based Electric Vehicle Charging System.
2. To design user-friendly and reliable system.
3. To provide fast charging to electric vehicles.

1.5 Product Differentiation w.r.t Competition

Table I:

Existing System	Our System
Existing System does not provide battery status on consumers mobile.	Real time battery charging monitor.
Approximate cost of establishing charging facility is Rs. 10 lacs to Rs. 50 lacs.	Cost effective solution.
If battery is fully charged charger didn't stop charging.	If battery is fully charged then charging will stop automatically.
Multi charging points with different standards cannot be added in one system as per the requirement.	Multi charging points with different standards can be added in future as per the demand of Electric Vehicles.

II. METHODOLOGY

2.1 Block Diagram

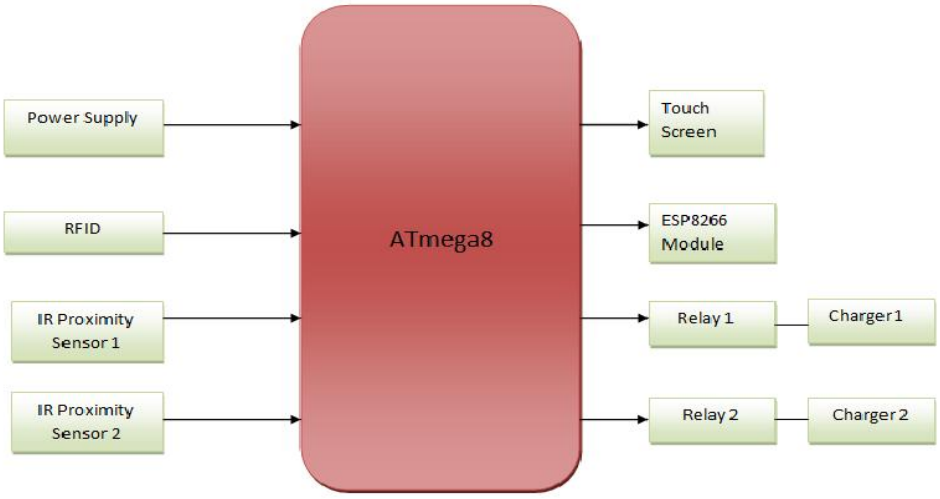

Figure 1: Block Diagram

A. Block Diagram Description

- Power Supply which is the 1st block is the decided to be the dual power supply of 12v, 5v. The 5v supply is for controller and the 12v is required for the relays.
- The RFID is used for the identification of the users.
- The IR Proximity Sensors are used to check the availability of charging slots.
- The Esp8266 module is used to send messages to the user and for collecting data and analyzing the data,
- The various messages are displayed to the user about charging status, amount, and time on Touch screen.

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2.2. Hardware Required

A. Atmega 8

It is an 8 bit CMOS technology based microcontroller belonging to the AVR family of microcontrollers developed in 1996. It is built on RISC (Reduced Instruction Set Computer) architecture. ATmega8 microcontroller consists of 1KB of SRAM, 8KB of flash memory, 512 bytes of EEPROM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible Timer/Counters, internal and external interrupts, a serial programmable USART.

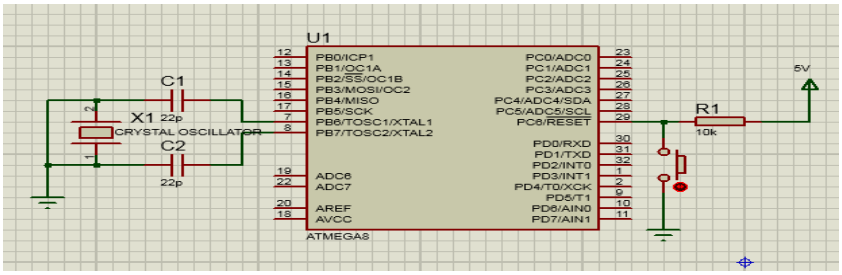

Figure 2: Atmega8 Microcontroller

B. Power Supply

Power Supply Units (PSU) do not supply systems with power - instead they convert it. Specifically, a power supply converts the alternating high voltage current (AC) into direct current (DC), and they also regulate the DC output voltage to the fine tolerances required for modern computing components.

C. RFID

Radio Frequency Identification is a type of communication between a transmitter (transponder or tag) and a receiver (reader). The system works fully automatically and is used for contactless communication, identification and localization of objects such as goods, medicines, vehicles or living beings.

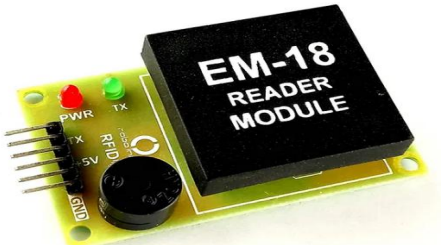

Figure 3: RFID Module

D. IR Proximity Sensor

Proximity Sensors are used to detect objects and obstacles in front of the sensor. Sensor keeps transmitting infrared light and when any object comes near, it is detected by the sensor by monitoring the reflected light from the object.

Figure 4: IR Proximity Sensor

E. ESP8266

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

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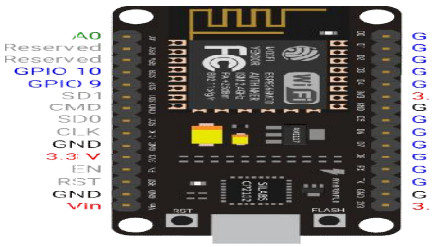

Figure 5: ESP8266 Module

F. Relays

Relays are electric switches that use electromagnetism to convert small electrical stimuli into larger currents. These conversions occur when electrical inputs activate electromagnets to either form or break existing circuits.

G. Touch Screen

The touch screen enables the user to interact directly with what is displayed, rather than using a mouse, touchpad, or other such devices (other than a stylus, which is optional for most modern touch screens).

Figure 7: Touch screen

2.3 Flowchart

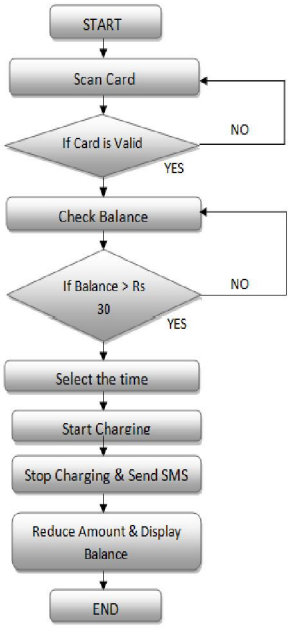

Figure 8: Flowchart

III. APPLICATIONS

1. Offer Employees and Guests EV charging provides EV charging stations to tenants, employees, and visitors.
2. Smart EV Charging for Fleets (Reduce your fuel costs and make sure your vehicles are charged 100%).

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3. Health care (Provide EV Charging for Patients, Guests, and Staff).
4. Schools and Universities (The Push towards Clean Transportation).
5. Utilities and EV Charging (The smart and genuinely open solution that supports all EV drivers).

IV. CONCLUSION

The total climate impact of operating an EV depends largely on the sources of electricity used to charge up the vehicle's batteries. In future adoption of wind and solar based charging for EVs could increase the adoption penetration levels of renewable energy sources, as well as will increase the green charging ratio of EVs.

REFERENCES

[1]. https://en.wikipedia.org/wiki/Charging_station
[2]. https://bit.ly/2NAmQRv
[3]. https://whatis.techtarget.com/definition/electric-vehicle-charging-station
[4]. https://www.slideshare.net/mobile/SarangBongirwar/charging-stations-for-electric-vehicle
[5]. Electric Vehicles Charging Technology Review and Optimal Size Estimation, Published: 02 October 2020
[6]. Smart Science volume 6 (2018), issue 1, A Comprehensive Review on Solar Powered Electric Vehicle Charging System by Saadullah khan, Aqueel Ahmad, Furkan Ahamd, Mahdi Shafaati Shemami, Mohammad saad Alam & Siddiq Khateeb , department of electrical engineering, Aligarah, India.
[7]. Engineering Science and Technology, an International Journal 21 (2018).Review of static and dynamic wireless electric vehicle charging system by Chirag Panchal, Sascha Stegen, Junwei Lu Griffith School of Engineering, Griffith University, Nathan Campus, Brisbane 4111, Australia.
[8]. Trivedi, N., Gujar, N. S., Sarkar, S., & Pundir, S. P. S. (2018). Different fast charging methods and topologies for EV charging. 2018 IEEMA Engineer Infinite Conference (eTechNxT). doi:10.1109/etechnxt.2018.8385313