CHARGING AUTOMATION FOR ELECTRIC VEHICLES

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Abstract — Many manual works are done by automated systems with the help of advancement of technologies. In our project we develop a digitized Car parking Wireless Power Transmission (WPT) is thus an approach to noiseless, cost efficient and convenient charging. Hence WPT attempts to minimize these losses along with reduction in pollution levels caused due to resources used presently.and charging units which can be used and monitored using IOT. Wireless Power Transmission can be used to charge electronic portable devices.In this project the Transmitter aspect consists of a wireless power transmitter that transmits the electric power to the automotive .The arduino microcontroller is interfaced with the IR device to look at the empty slots of the automotive parking. The automotive aspect receives the electric power to store energy at intervals from the battery. Microcontroller calculates the electric power consumed via the voltage device thus showing the worth then sent to IOT cloud. If the number is paid then the Bluetooth module that is interfaced with the microcontroller sends the message to parking slots to undo the automotive.

Keywords—Digitized car parking,Wireless power transmission(WPT), Arduino uno.

1. INTRODUCTION

Interest in electric vehicles (EVs) has recently grown due to calls for eco friendly transportation. Battery-powered electric buses or plug-in EV buses, which produce zero tailpipe emissions, offer significant potential in improving sustainability and an eco friendly environment in urban areas. EV-based transit buses require a large battery for a long service time. For instance, a long-range all-electric bus manufactured by BYD Auto Company has a 324-kWh lithium iron phosphate (LFP) battery. Unfortunately, the large capacity of the batteries of current EV buses prevents them from gaining popularity as a mainstream mass transit solution. The current problems of plug-in EV buses are the long operational idle during the battery charging time, the high cost of the battery, and the great weight of the battery. Dynamic wireless charging (DWC) systems have emerged as an alternative to address the challenges caused by the current battery technology.However, inductive charging requires that the secondary, receiver, coil has to be precisely positioned above the primary, transmitter, coil in order to achieve a high power transfer and efficiency. Thus, new solutions that can help the driver position the car sufficiently accurately for inductive charging are needed.

2. NEED FOR WIRELESS CHARGING

On implementing the Wireless inductive charging of electric vehicles could potentially change user behavior from “going somewhere to refuel” to “recharge whenever parked”, thus giving electric vehicles yet another competitive advantage over fossil-driven vehicles therein users rarely or ne'er ought to suppose provision.. It is also used to achieve a high power transfer and efficiency.

3. PROBLEM DEFINITION

In the study, the users found this to be a hard task, especially since the charging equipment was mounted at the rear of the vehicles and even more so when victimisation public parking areas, despite the accessible guiding support.From a user perspective, the parking downside might be compared with the problems many folks expertise nowadays once driving into a automotive wash. Thus, new solutions that can help the driver position the car sufficiently accurately for inductive charging are needed.. Thus, new solutions that can help the driver position the car sufficiently accurately for inductive charging are needed.

4. CONTRIBUTION MADE IN THIS PROJECT

In this project,we develop a digitized car parking and charging unit which can be used and it is monitored using IOT. And also WPT attempts minimize the fuel losses along with reduction in pollution levels caused due to the resources used presently.

a. OBJECTIVE

The major objective of their work is to develop a prototype model that can automatically:

i. Maintain parking status in public places by using IR sensors

ii. Reduce driver work in the charging process.

iii. Monitor the parking and charging status. And to ensure a high power transfer and efficiency.

5. LITERATURE REVIEW

In ORNL Experience and Challenges Facing Dynamic Wireless Power Charging of EV's Adoption of Electric Vehicles [14]John M. Miller, P.T. Jones proposed to reduce the greenhouse gases and global warming effects. Wireless charging for vehicles reduces the space constraints and waiting time of consumers to recharge Factors affecting the wireless charging are following .How many drivers are going to use the charging-in motion services, In which locations, and At what time frame; What level of power demand to the grid is expecting in locations, An optimal operation plan for electric power distribution to respond the demand.

In the paper Optimal deployment of charging lanes for electric vehicles in transportation networks[7] the authors Zhibin Chen, Fang He b, Yafeng Yin proposed the system to rapidly reduce the waiting time of passengers to recharge their vehicle. It increases the range of travelling of electrical vehicles, because power consumption of EVs is lower than Fuel powered vehicles. But Rate of speed of vehicles affects the charging rate. Complex traffic management system required to control when the number of vehicles increases. In Optimal Deployment of Charging Stations for This system uses a genetic programming approach and finds a virtually-optimal charging station deployment which convergence is very much dependent on initial solution. Rate of speed of vehicles affects the charging rate of Illhoe Hwang, Young Jae Jang.

6. PROJECT PROPOSAL

a. Automatic Parking System

The Figure1.1 shows the schematic view of in the projected system, in which automotive parking is managed by microcontroller arduino UNO and charging of power within the automotive is calculated mechanically by microcontroller and hosted in IOT cloud...Driver can even transfer WPT devices area unit used for charging vehicles.IR detector is employed to notice the vehicles parking status .

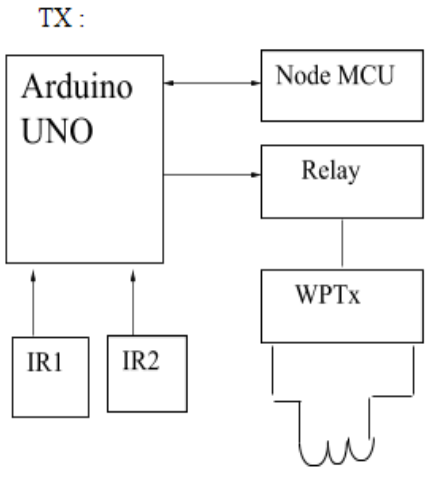

Figure6.1 Block diagram of automatic parking system.

b. Charging system

However, the wireless charging could be attractive compared with manual conductive charging and thus,in this proposed system the inductive charging requires that the secondary, receiver, coil has to be precisely positioned above the primary, transmitter, coil in order to achieve a high power transfer and efficiency.Thus Figure 6.1 shows the automotive aspect receives the electric power to store energy at intervals of th battery.The Microcontroller arduino UNO calculates the electric

power consumed via the voltage device thus showing the worth then sent to IOT cloud. If the number is paid then the Bluetooth module that is interfaced with the microcontroller sends the message to parking slots to undo the automotive.

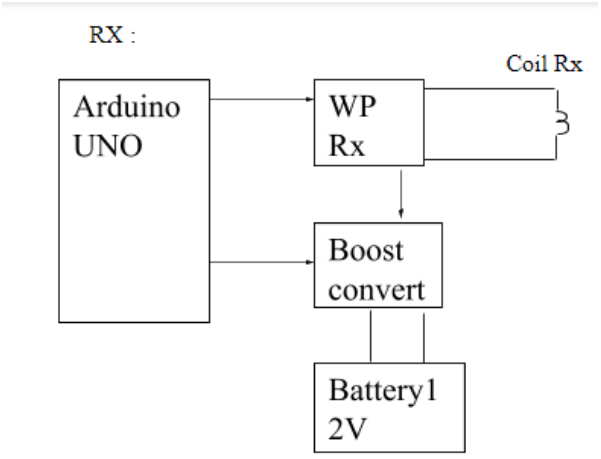

Figure 6.2 Block diagram of charging system

7. HARDWARE REQUIREMENTS

a. NODE MCU

The NODEMCU is an open source platform which includes firmware which runs on the ESP8266 and it runs on a 12 pin ESP module.

b. ARDUINO UNO

The Arduino Uno is a sixteen MHz ceramic resonator, a USB affiliation, Associate in Nursing influence jack, Associate in Nursing ICSP header, and a button.

c. IR SENSOR

Infrared technology addresses a good sort of wireless application The frequency range of infrared is above microwave and lesser than light.For optical sensing and optical communication, photo optics technologies are utilized in the near infrared region because the light is a smaller amount complex than RF when implemented as source of signal. Optical wireless communication is completed with IR data transmission for brief range applications.An infrared sensor emits and/or detects infrared to sense its surroundings.

d. RELAY

The Relay are very useful devices and permit one circuit to modify another one while they're completely separate. They often want to interface an electronic circuit (working at a coffee voltage) to a circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to modify a 230V AC mains circuit. Thus alittle sensor circuit can drive, say, a lover or an electrical bulb.A relay switch is often divided into two parts: input and output. The input section features a coil which generates magnetic flux when alittle voltage from an electronic circuit is applied thereto . This voltage is called the operating voltage. Commonly used relays are available in several configurations of operating voltages like 6V, 9V, 12V, 24V etcThe output section consists of contactors which connect or disconnect mechanically. In a basic relay there are three contactors: normally open (NO), normally closed (NC) and customary (COM).When the operating voltage is applied the relay coil gets energized and therefore the COM changes contact to NO. By using a proper combination of contactors, the circuits are often switched on and off..

8. SOFTWARE REQUIREMENT

a. ARDUINO IDE

The Arduino Software (IDE) contains buttons for the common functions and a series of menu functions. It connects to the Arduino and Genuino hardware to upload programs and communicate among them.

9. RESULTS AND DISCUSSIONS

Overall front view of the implemented system is shown in Figure 9.1

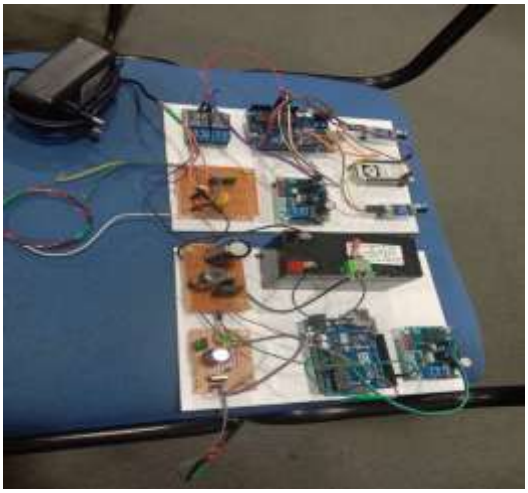

Figure 9.1 Overview of the proposed model

10. CONCLUSION AND FUTURE SCOPE

Thus in this article we viewed the various technological solutions for WPT, their limitations and totally different applications. It conjointly includes the advances created within the field like RPEV, OLEV and SPS. RPEV and OLEV square measure still mistreatment information lowers calendar SPS can be fully functional by 2040. There has been tons of analysis on short vary power transmission however analysis continues to be occurring to limit the losses in middle vary power transmission. Hence, WPT can lead the planet to a sophisticated, greener and property future.This work thus it is further extended to include the following

- **Cloud :** Where all the data that is to be used to monitor the parking and charging status is updated in the cloud and the automatic rating is done.
- **App development :** An application can be developed where the user can monitor the parking status,charging status and bill status.

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