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IOT Based Electric Vehicle Charging Station using RFID

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ABSTRACT: This project aims to develop a IOT based electric vehicle charging station in parking areas to facilitate the recharging of electric vehicles in communal parking areas. The smart power meter will enable users to monitor their energy consumption, select charging options, and make payments through a mobile app. The solar panels will generate clean energy to power the charging infrastructure, reducing the reliance on traditional power sources and minimizing carbon emissions. The system will also provide real-time data on energy usage and availability, allowing operators to optimize the use of the charging infrastructure. The proposed solution will address the growing demand for sustainable transportation in urban areas while improving the convenience and accessibility of EV charging, all while utilizing renewable energy sources

KEYWORDS: - IOT, Embedded C, V2G, EV Charging Station

I. INTRODUCTION

The rapid increase in the number of electric vehicles on the road has led to a growing demand for charging infrastructure. While many electric vehicle owners charge their vehicles at home, there is a need for communal charging infrastructure in public spaces, such as communal parking areas. One potential solution for communal parking areas is the installation of solar power meters that can recharge electric vehicles using clean energy from the sun. The use of solar power has the potential to reduce the carbon footprint of electric vehicle charging and provide a cost-effective and self-sufficient solution for communal parking areas. This paper proposes the design and implementation of a solar power meter for communal parking areas. The device would consist of a solar panel, battery storage, and a charging station. The solar panel would capture energy from the sun and store it in the battery. The charging station would then use this stored energy to recharge electric vehicles.

II. RELATED WORKS

As electric-vehicle demand looks increasingly likely to grow and EVs emerge as viable alternatives to ICE cars, an ecosystem of industries needs to stack hands on actions that can enable their broader use. Closing the charging gap is one such action, and resolving it will require a concerted, collaborative effort. That's why finding the answers to the questions raised here should top the agendas of all stakeholders across the EV ecosystem, especially if charging access becomes the number-one impediment to EV penetration...

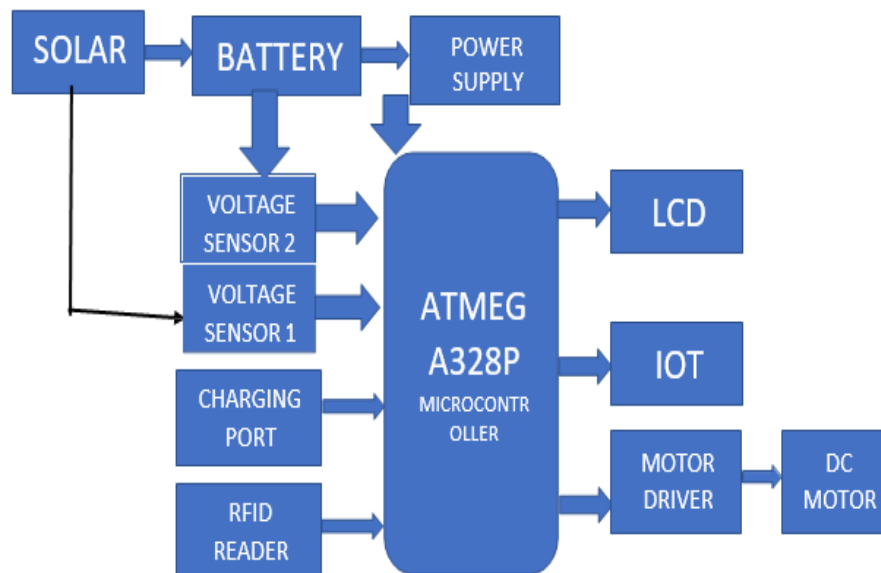
III. EXISTING METHOD

Electric vehicle charging station with charging port that charges electric vehicles and the charged voltage is displayed on LCD. In this system the bill payment is manual and informations are not stored. It is Not efficient, It requires human intervention and Bill payment is manual

IV. PROPOSED SYSTEM

Nowadays, fossil fuels are getting lesser and going to use up in future if continue consuming this high amount of fossil fuel. Other than that, environment is polluted because of greenhouse gas emission from the burning of fossil fuel. Therefore, renewable energy is introduced and emphasized in many fields to reduce the usage of fossil fuel. Electrical vehicle technology is one of the important ways to reduce the usage of fossil fuel and very important in future when fossil fuel is used up. So, in future when there are more electrical vehicles is used, many petrol stations will change to EV charging stations. Hence this system proposes an IOT based smart power meter to recharge electric vehicle. The solar panel takes the power through the sunlight and processes the vehicle process. The solar panel stores the sunlight energy. If the store is high to transfer the battery and solar panel stores the sunlight energy. The voltage sensors monitor the solar panel and battery voltages. In this system, a charging port is used to charge the electric vehicle and measure the energy consumed by the vehicle during charging. RFID is used to make payment easy. The amount details are collected and bill payment is done by RFID tag assigned to the person. The vehicle motor starts only after the bill payment. The measured charging voltage with charging cost is uploaded to the web server with the help of IOT and also displayed in LCD.

BLOCK DIAGRAM



V. EXPERIMENTAL RESULTS

The results for the project were gotten from LDRs for the solar tracking system and the panel that has a fixed position. The results were recorded for four days, recorded and tabulated. The outputs of the LDRs were dependent on the light intensity falling on their surfaces. Arduino has a serial that communicates on digital pins 0 and 1 as well as with the computer through a USB. If these functions are thus used, pins 0 and 1 can be used for digital input or output. Arduino environment's built-in serial monitor can be used to communicate with the NodeMcu board. To collect the results, a code was written that made it possible to collect data from the LDRs after every one hour.

EV Charging Speed on Level 1, 2, 3 Chargers			
Charging Level	Power Delivery	Range Added Per Hour	Time to Charge 60 kWh EV
Level 1	1-1.4 kW	3-5 miles	30-40 hours
Level 2	3.9-19.2 kW	12-80 miles	2.5-4.5 hours
Level 3	24-300 kW	75-1,200 miles	30-40 minutes

Power Levels	Nominal Voltage (V)	Max Current (A)	Power (kW)	Type of Charge	
AC	Level 1	120, 1-phase	≤16	1.9	Slow
	Level 2	240, 1-phase	≤30	≤7.2	Slow
		240, 3-phase	≤80	≤19.2	Slow
Level 3	400, 3-phase	>80	≤130	Slow	
DC	Level 1	200-450	≤80	≤36	Slow
	Level 2	200-450	≤200	≤90	Medium
		Level 3	200-600	≤400	≤240

VII.FUTURE SCOPE

The future potential of electric vehicles is enormous. The obvious starting point for these vehicles is the charging station. This is however only the first step in a potential journey which will see charge Banks and other industrial areas as well as homes and cities. The future scope of electric vehicles is therefore massive. We have already seen that technology for these vehicles is here and becoming far more advanced. We now know that such vehicles can provide us with great flexibility and we will soon see that potential. Some of the countries which have developed these technologies are Morocco, South Africa, Tanzania, Namibia, Zimbabwe and Brazil. It should be noted that these nations all have very low fuel costs and this means that it is very affordable to install a charging system on the cars.

VIII.CONCLUSION

We have implemented a complete system to supervise the charging of EVs in car parks, using small and cheap microcontrollers connected to the Internet wirelessly. The proposed system allows a user to access the information associated with the charging process (cost, effective elapsed time, estimated time to full charge, etc.), and a supervisor to manage different aspects of the process such as billing of consumed energy, charging priorities, etc. The use of a Wi-Fi connection dramatically reduces the wiring and the complexity of the installation, and simplifies the interaction with the

users of the system.

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