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WIRELESS CHARGING SYSTEM FOR EV VEHICLES

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ABSTRACT
Typically, electric vehicle systems are founded on multiple modules that ought to provide the high power and stability of the vehicle on the test track. Most of these components are connected to the charging mechanism. On this front, dynamic wireless power transfer is an effective solution to overcome electric vehicle range anxiety and lower onboard battery cost. Wireless recharging has been prevalent with electric vehicles that are purely electric and is intended to enable recharging even while the vehicle is moving. But it is challenging to study this technique because its operational philosophy is complicated, especially with the presence of multiple variables and parameters. Additionally, the condition of the vehicle, whether moving or stationary, determines various parameters like the speed of the vehicle as well as dimensions and sizes of the coil receivers. This paper discusses a new approach to enhancing the performance of the dynamic wireless recharge system. In the suggested system, receiver coils have been incorporated to achieve maximum charging power by providing a dynamic mathematical model that can explain and quantify source-to-vehicle power transmission despite the fact that it is moving. In the suggested mathematical model, all physical parameters like solar charging and wireless coil attached to the vehicle. Therefore, two types of charging will be transferred to battery vehicle. Experimental tests verified the correctness of the simulation results yielded through offering two coil receivers underneath the vehicle. Results indicated the efficacy of the suggested model.

Keywords:
Embedded-Systems, Real-Time Systems, Wireless Charging, Electric Vehicles (EVs), Dynamic Wireless Power Transfer (DWPT), Coil Receiver Design, Power Transmission Efficiency, Battery Management, Renewable Energy Integration, Solar Charging Technology, Onboarding charging systems, Energy Transfer Optimization, Vehicle Electrification, Industrial Automation, Smart Transportation.

INTRODUCTION

An Bedded System is an admixture of computer tackle and software, and perhaps some other mechanical or factors, to be used for a certain purpose. The microwave oven roaster is a high illustration. virtually every ménage possesses one, and knockouts of millions are employed daily, yet veritably many individualities are apprehensive that a processor and software are part of the timber of their lunch or regale.

This is in opposition to the particular computer in the living room. It too consists of computer tackle and software and mechanical corridor (fragment drives, for case). Yet a particular computer isn't made to do one thing rather; it can do numerous colorful effects. multitudinous individualities use the term general- purpose computer to define this distinction. As it vessels, a general- purpose computer is a tabula rasa; the company can not conceivably know what the buyer will want to use it for. One buyer will use it for a networked train garçon, another will only use it for games, and a third will use it to compose the great American novel.

frequently, an bedded system is part of some larger system. For case, moment's motorcars and exchanges have multitudinous bedded systems. One of the bedded systems manages the anti-lock thickets, another observers and regulates the emigrations of the vehicle, and a third shows the information on the dashboard. occasionally these bedded systems are linked through some form of a communication network, but that's surely not necessary.

At the possible threat of confusing you, it's important to point out that a general- purpose computer is itself made up of multitudinous bedded systems. For illustration, my computer consists of a keyboard, mouse, videotape card,

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modem, hard drive, droopy drive, and sound card- each of which is an bedded system. Each of these bias contains a processor and software and is designed to perform a specific function. For case, the modem sends and receives digital information through analog telephone line. That is it and all of the rest can be described in a single judgment as well.

still, the presence of the processor and software might be completely unapparent to the stoner of the device, If an bedded system is duly designed. This is true for a microwave oven roaster, VCR, or alarm timepiece. In other cases, it would indeed be doable to produce an original device that lacks the processor and software. This would be achieved by substituting the combination using a custom IC chip that provides analogous functions in tackle. numerous aspects of inflexibility, however, are lost whenever a design gets hard- cooled this way. Changing a sprinkle of lines of law is extensively easier, and less precious, than redesigning an point of custom tackle.

LITERATURE SURVEY

Supriyadi and Edi Rakhman (1) show the effect of line periphery (AWG) and a number of turns used is directly commensurable to the quantum of power that can be transferred. further the number of windings, further the power will be transferred. When we use the enameled bobby line of periphery 0.5 mm and maintain the number of turns as 26, and use the input frequence of470KHz. The effectiveness of power attained at a distance of 1 cm is roughly 1.51. This result can switch on 1 Watt LED beacon.

Uthaya Banu and U. Arunkumar. (2) This exploration is an illustration of the different technologies involved in Wireless Power Transfer System, which is employed to help the flux leakage while transmitting the power and to run the buses efficiently and enhance the quality parameters. This design also indicates the development of generating power source using renewable energy.

METHODOLOGY

System Overview

The wireless charging system for electric vehicles (EVs) to be proposed uses an AT89S52 microcontroller to regulate movement of the vehicle powered by L293D motor motorist modules. A transmitter (TX) coil is fitted in the parking lot and a receiver (RX) coil fitted in the underpart of the vehicle. The system is DC power grounded with a voluntary 220V AC power converted to DC by an AC to DC appendage

Circuit Diagram Explanation

The circuit includes a power force section, control unit, motor motorist module, and charging system. The microcontroller AT89S52 regulates the entire operations, taking input signals and controlling vehicle movement through the L293D motorist. also, resistors are used in the proper positions to control voltage and avoid charging overflow or underflow for battery protection.

Elementary Specifications

- AT89S52 Microcontroller 8- bit microcontroller for effective control of the vehicle and charging system.
- L293D Motor motorist Can drive two DC motors at a time with bidirectional control.
- TX and RX Coils For inductive coupling with maximum power transfer effectiveness.
- TV Display 16x2 character display to display real- time battery voltage situations.
- Solar Panel 12V, 10W panel mounted on the vehicle for supplementary charging.
- Battery 12V rechargeable battery to store power for vehicle stir.
- Resistors Employed in voltage regulation and current balancing to give safe battery charging

Working Algorithm

1. Initialization: The microcontroller starts the system, monitoring the battery voltage and the solar panel status.

2. Wireless Charging Mode: While the car is stationary, the TX coil transfers power wirelessly to the RX coil by inductive coupling. The rectified DC is supplied to the battery for charging.

3. Solar Charging Mode: While the vehicle is in motion, the solar panel charges the battery. Resistors avoid overcharging by controlling voltage.

4. Motor Control: The user enters commands for vehicle movement, and the microcontroller provides appropriate signals to the L293D driver for motor operation.

5. Battery Monitoring: LCD shows battery voltage, warning users when battery levels get low.

Wireless Power Transfer Process Wireless charging is made possible by electromagnetic induction. The TX coil creates an alternating magnetic field when it is supplied with current. The RX coil, laid exactly above it, induces voltage. This induced voltage is rectified and regulated to charge the battery.

Solar Charging Mechanism

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The solar panel produces DC power when it comes into contact with sunlight. This power is supplied directly to the vehicle battery. The resistors regulate the amount of current so that overcharging is avoided and safe and constant charging is provided during driving.

Battery Management System

A basic battery management system (BMS) is incorporated to check battery health. It has voltage regulation through resistors and sends real-time data to the microcontroller. The system automatically engages wireless charging when the car is stationary, maintaining a steady power supply.

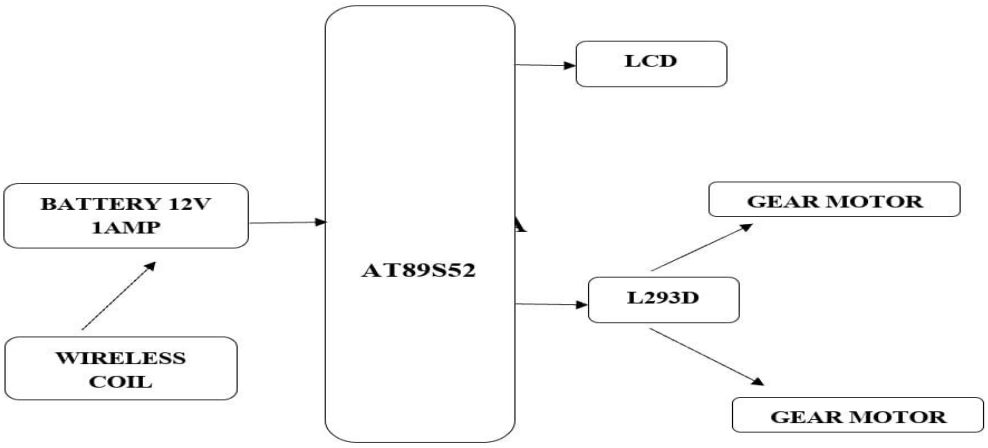

Figure 1 Block Diagram

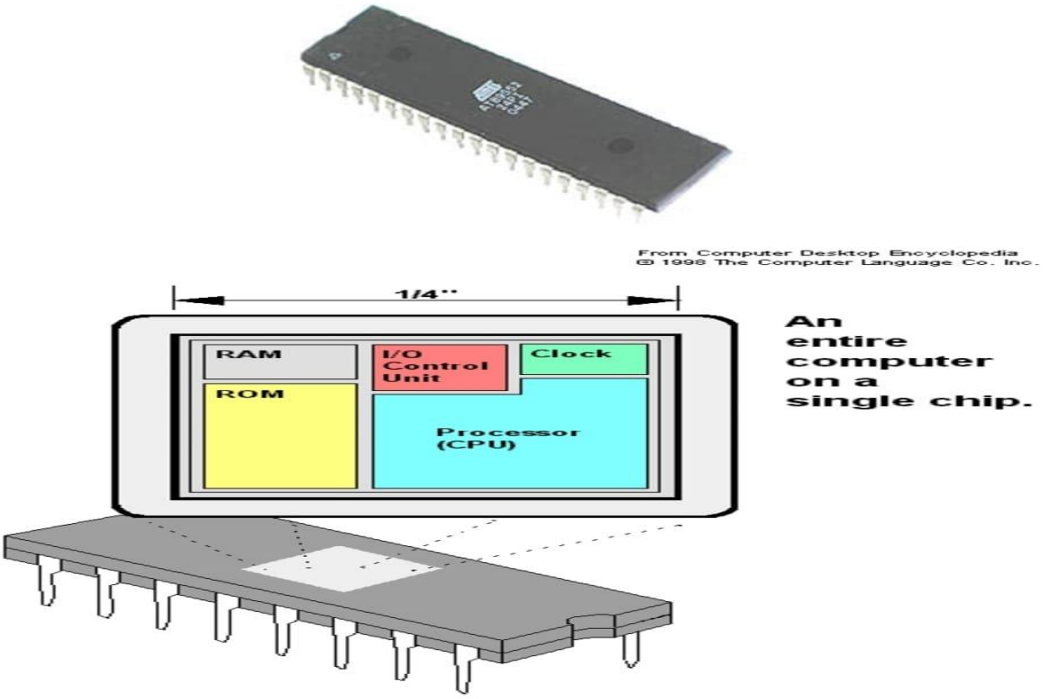

Figure 2: AT89652 micro controller

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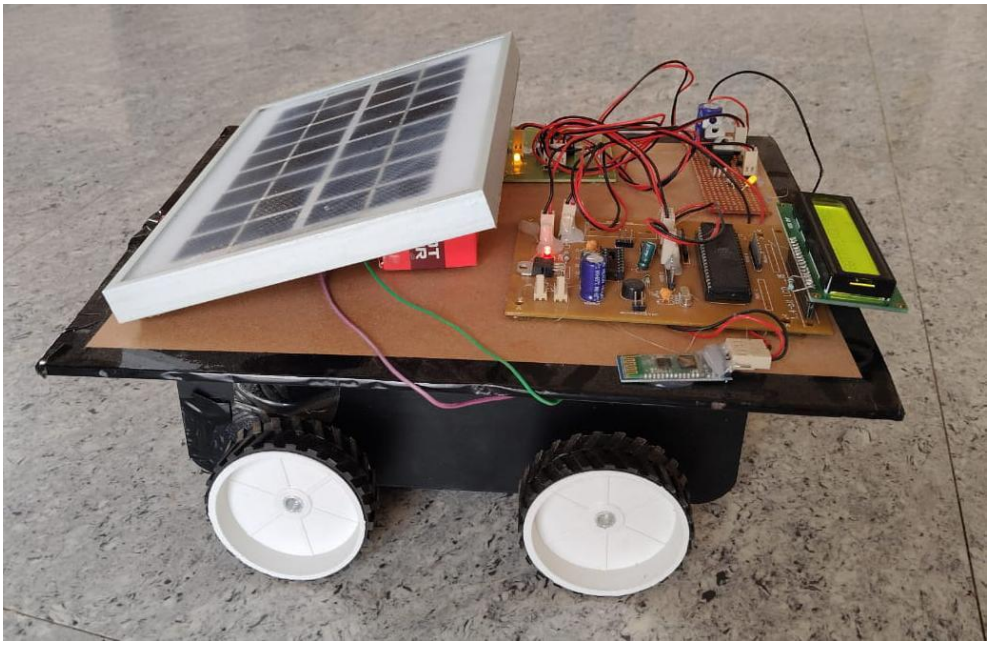
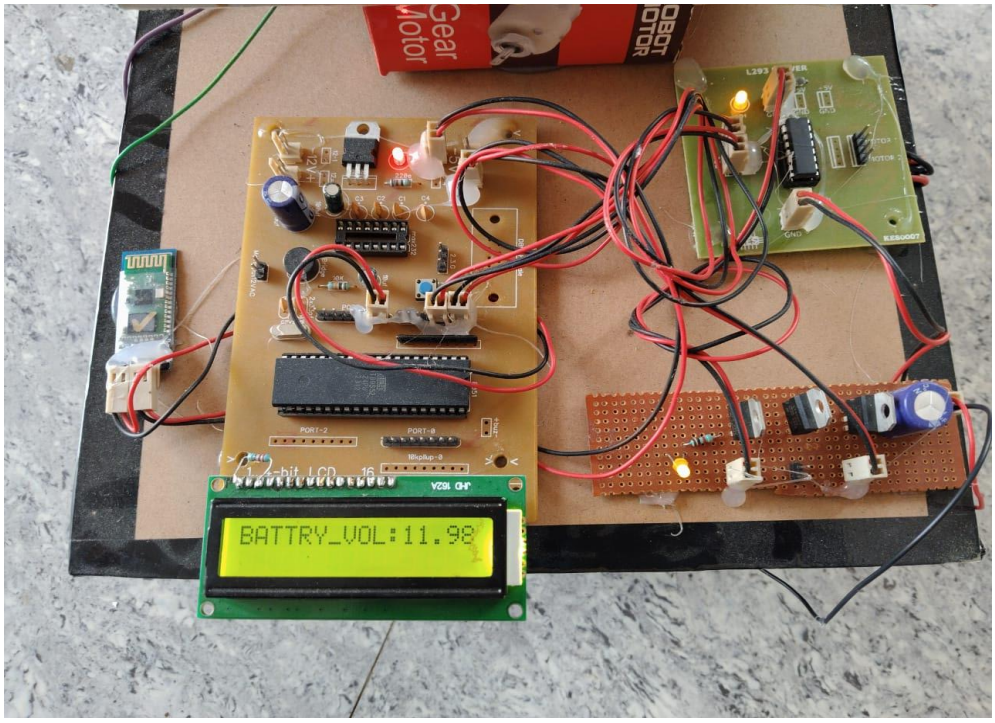
RESULTS AND PERFORMANCE ASSESMENT

The use of the solar panel as an auxiliary charging source was effective in keeping the battery charged even while in transit. The inductive wireless charging efficiently supplied enough power when the car was parked. This double-charging system reduces range anxiety and provides a more consistent power supply for EVs.

The system performed stable motor control and smooth operation, with accurate battery voltage readings displayed on the LCD. Furthermore, the pairing of wireless and solar charging systems presents a green and user-friendly option to traditional charging systems





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FUTURE SCOPE

The perpetration of wireless charging systems on electric vehicles (EVs) is set to transfigure the transport assiduity. unborn inventions in this area are

• Dynamic Wireless Charging The use of coils on roads to charge EVs enroute, barring the burden of huge batteries and regular charging sessions.

• Advanced effectiveness inventions to give increased power transfer rates, conceivably over to 350 kW for ultra-fast charging purposes.

• Standardization and Interoperability enterprise to produce global norms, like the SAE J2954, to grease comity between colorful vehicle models and charging systems.

• Integration with Renewable Energy Integrating wireless charging with renewable energy sources, similar as solar panels, to foster green transportation results.

CONCLUSION

The new wireless charging system for EVs adequately solves the problem of conventional charging systems. Through the use of a solar panel for fresh charging, the system guarantees constant battery conservation. The invention increases the usability and eco-friendliness of EV technology. unborn advancements would include solar panel effectiveness enhancement and extension of the system to cover vehicles with longer ranges

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