ELECTRIC VEHICLE WITH WIRELESS CHARGER

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ABSTRACT:

Electric vehicles with wifi are common, and the acquired technology has several uses. Without the necessity for connections, power is delivered from the source to an electrical hold. Since fossil fuels are becoming less and less abundant, it is crucial to pick alternative cars. Out of all the available options, a battery-powered electric automobile is the best choice. In this approach, a wireless power source will be used to manufacture an electric vehicle and charge its battery. To move electricity from a magnetic coil through an air gap charger to a second magnetic coil installed in the automobile, a method known as inductive charging can be employed. All we need to do is position the moving vehicle correctly so that the coils are lined up and charging may start. It is built with tiny DC motors that can move the mechanism in all directions when controlled by a remote control made of RF modules. This compact vehicle is referred described as an electric car since it is powered by a rechargeable battery, and the battery has to be charged using a wireless power source. We needed a specifically created wireless power source to do this so that the battery would automatically charge anytime the vehicle was in close proximity to the power transmitting coil. The car may be moved using a remote control unit, and if it is precisely parallel to the power transmitting coil, the power receiving coil gets the greatest amount of electricity, allowing the battery to charge more quickly. The 89C2051 microcontroller chip used to build the embedded system is configured to drive motors via relays.

KEYWORDS: Construction of basic module of electric car, Power transmitting coil, Power receiving coil, 1.5 Amps power source designed for power transmitter, 89C2051 microcontroller chips, Remote control unit, relays, DC motors, RF modules, etc.

INTRODUCTION:

An electric traction motor is used to propel an electric vehicle. High power rechargeable batteries that can be charged either by a primary power source or by a solar power source will power an electric car. a battery inside a car or any other vehicle has to be charged in general.

The front part of a car's "bonnet," which must be opened, must then be opened in order to connect the wires from the battery charger to the battery's terminals using sturdy power clips. This is a difficult task, therefore to avoid it and save time, a novel wireless charging technology has been devised. As a result, the battery of our car is automatically charged while the vehicle is parked. This approach eliminates the need to physically connect the cables or open the bonnet. The battery automatically starts charging constantly once the automobile is at its designated location.

Wireless charging reduces the need for the wires often used to charge wireless gadgets, cell phones, and automobile batteries. By merely positioning the device close to a wireless power transmitter or a specified charging station, wireless chargers may recharge the battery of battery-powered gadgets. The outcome is a totally sealed and waterproof gadget body. Besides Due to the inherent convenience it provides, wireless charging may also be considerably enhanced. Faraday's well-known rule of induced voltage, which is frequently applied to motors and transformers, forms the basis of wireless charging. Therefore, this electric vehicle uses wireless energy, which generates an electromagnetic field that allows energy to be transported from coil to coil without the use of conducting cables.

Both the power transmitting coil and the power receiving coil must be positioned parallel to one another at a certain distance. This implies that while the car is parked, the power receiving coil inside must be positioned parallel to the power transmitting coil outside, or at the parking space. Power transmission range can be extended to a maximum of 2 to 3 centimetres depending on the power source. The size of the transmit and receive coils affects this. The coil's radius, which determines coil size; as radius rises, so does power transmission range. The limited range power transmission coil is constructed in such a way that the distance must be kept to less than 5 cms since the electric car with wireless charger being studied here is intended to demonstrate the fundamental idea. This means that the distance between the transmission coil and the reception coil must be set up as closely as possible to one another when the moving vehicle is positioned over the power transmitting coil.

Since this is a prototype module, the range should be less than 5 cm since the transmitter is built with limited power. This mains driven power source may be used to charge a power rechargeable battery installed within the moving vehicle, and

the stored energy can then be used to power the vehicle. This vehicle's design allows it to travel in all directions, including backwards, so that it may be positioned above or parallel to the power transmitting coil. In this case, synchronisation is necessary to maximise the power coming from the wireless power source. Since any nonconducting material may be utilised to transmit this wireless power source, acrylic sheet is chosen here as the electric vehicle's chassis. Since acrylic is transparent, the aim is to utilise it to look through the electronics in this electric car's wireless charger.

Two types of wireless power technologies are becoming more and more popular: nonradiative and shine. Energy is transported across short distances in certain devices utilising short-range or non-radiative techniques, such as magnetic fields using inductive transmission coupling between wire coils or electric fields using capacitive coupling between electrodes. Applications of this kind include inductive power supply, charging electric trains and buses, RFID tag and smart card chargers, and implanted medical devices like pacemakers.

The development of wireless systems for powering mobile and portable computer equipment, such as laptops and cell phones, is now the key area of study. Regarding the RF communication system, the RF transmitter that is employed here is designed to broadcast the command code in digital form. This data will be communicated since the controller in use here creates digital data in the form of 8 bits. For the car to be driven in all directions, four straightforward command codes are formed and sent here. With the use of 4 control keys connected to the 89C2051 microcontroller chip included in the remote control unit, the remote control's basic operation involves driving the vehicle in the desired direction by individually controlling the 2 motors that power the moving mechanism.

LITERATURE SURVEY:

A ride that is powered by one or more electric or traction motors. A collector system that draws electricity from an external power source can be used to power an electric vehicle. It can also be fitted with batteries, solar panels, fuel cells, or a generator that produces power from fuel. When electricity was one of the main means for motor vehicle propulsion in the middle of the 19th century, electric vehicles were developed. These vehicles provide gasoline automobiles of the era previously unheard of levels of comfort and simplicity of use. The internal combustion engine has been the main form of propulsion for cars for almost a century, but electric propulsion is still widely used in trains and other sorts of small vehicles.

Electric cars are sometimes referred to as "electric vehicles." Due to technology advancements, a greater emphasis on renewable energy, and the possibility to lessen transportation's influence on climate change and other environmental challenges, electric vehicles have witnessed a resurgence in the twenty-first century. Electric cars are included as one of the top 100 modern climate change solutions in the electric vehicle with wireless charger. Lithium ion is typically used in electric cars (Li-Ion or LIB). Compared to the majority of other usable batteries, lithium-ion batteries have better energy densities, longer cycle lives, and higher power densities. Safety, durability, and heat deterioration are complicating elements. cost. For optimal performance and safety, Li-ion batteries should be used within acceptable voltage and temperature limits.

Increasing battery life lowers the overall cost. One method is to operate a portion of the battery cells at a time and alternate between those portions. In the past, certain electric automobiles, including those built by General Motors, used nickel-metal hybrid battery cells. Because of their propensity to self-discharge in the heat, certain battery types are regarded as being out of date. A further obstacle to the widespread development of these batteries was Chevron's ownership of a patent for them. Due of these qualities and their high price, lithium-ion batteries are now the most common kind of battery used in electric cars. The cost of lithium-ion batteries is continuously falling, which lowers the price of electric cars.

ELECTRIC VEHICLE:

The vehicle's electric motor power is measured in kilowatts, like all automobiles (KW). However, electric motors can provide their maximum torque across a wide speed range. 100 KW is about equivalent to 134 horsepower. Accordingly, a vehicle with a 100 KW electric motor will perform better than a 100 KW internal combustion engine, which can only provide maximum torque over a narrow speed range. energy lost during the conversion of electrical energy to mechanical energy. 90% of the battery's energy is transferred to mechanical energy, with the motor and drive train suffering the losses. Typically, a three-phase AC motor is linked to an AC power source that has been converted from direct current (DC) to alternating current (AC) by a DC/AC inverter. In forklifts, electric vehicles, and trains, DC motors are frequently utilised. In rare circumstances, a universal motor combined with AC or DC can be used. Different types of engines are available in brand-new manufacturing vehicles. Induction motors in Tesla vehicles and permanent magnet engines in the Nissan Leaf and Chevrolet Bolt are two examples.

PLUG IN ELECTRIC MOTORS:

A vehicle that can be powered by energy stored in a rechargeable battery and charged from an external power source, such as an outlet, is referred to as a plug-in electric car. A subtype of electric cars known as a plug-in electric vehicle comprises battery electric vehicles, plug-in hybrid vehicles, and electric vehicle conversions of conventional internal combustion engine and hybrid electric vehicles. Light-duty pure electric cars with highway compatibility had cumulative global sales surpass 1,000,000 units in September 2016. By the end of 2016, over 2,000,000 plug-in cars and commercial vehicles had been sold globally cumulatively, with 38% of those sales occurring in that year. As of November 2017, that number has increased to 3,000,000. As of January 2018, the Nissan Leaf was the best-selling electric car in the world, selling more than 300,000 units globally. Following the all-electric Tesla model, almost 129,400 have been sold globally since June 2016. Together with its sibling, the Opel/Vauxhall Ampera, the plug-in hybrid Chevrolet Volt has generated close to 117,300 sales globally. The Prius Plug-in Hybrid has sold more than 75,400 units, and the Mitsubishi Outlander P-HEV has roughly 107,400 units.

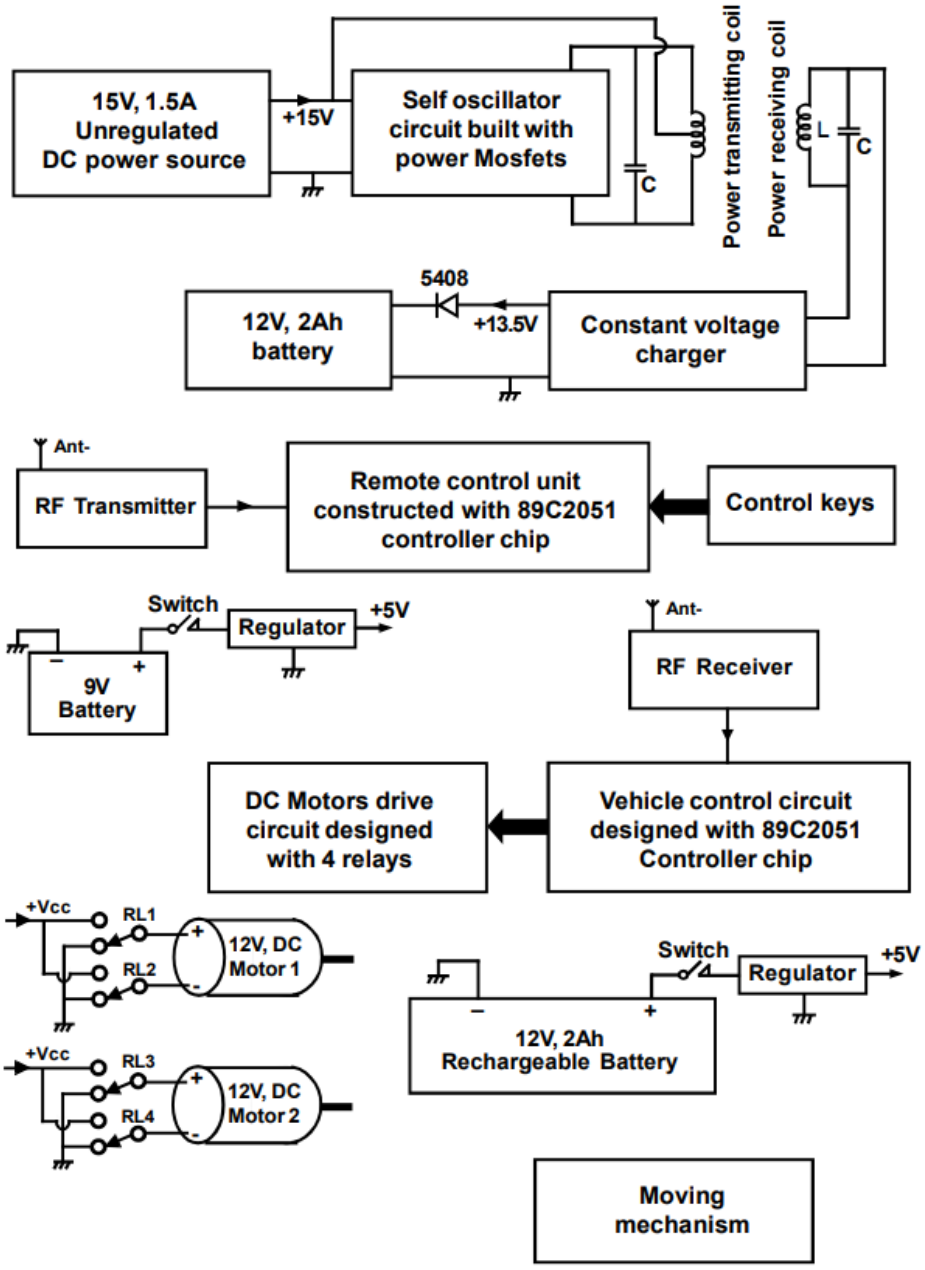
CHARGING STATIONS:

Typically, electric cars hey. Charge A procedure that often takes hours can be completed overnight from a conventional outlet or specialised charging station, frequently giving enough energy for regular daily use. However, with the widespread adoption of electric vehicle networks in major cities around the UK and Europe, owners of electric vehicles may plug in their vehicles while they are at work and allow them to charge all day, potentially extending commute times and removing range anxiety.

2012 from The innovative charging mechanism developed by Dr. Gordon Dower does away with the necessity for cables on curbs. The equipment is mounted on the curbs of electrical connections, like the parking lots at street corners. The curb contacts get activated and charging takes place when a licenced vehicle is parked with the front end over the curb.

A standardised inductive charging technology, such as plug less power, is another suggested remedy for daily recharging. Parking conveniently above the charging station and less cabling and connection equipment are advantages. In the beginning of 2012, Qualcomm is testing similar systems in London. "Rapid charging," such as the environment Posi Charge line, is still another suggestion for the infrequent, long-distance trip (up to 250 KW). Nissan has collaborated with Ecotality, a charging station manufacturer, on a number of installations. Replacement of the battery is also suggested as a solution, despite the fact that no OEMs, not even Nissan/Renault, have any intentions to build any vehicles. Standardization across platforms, models, and manufacturers was necessary for swapping. Additionally, several times more battery packs must be in the system for snapping.

PROPOSED METHODOLGY:



The remote control unit is where the functional description of the CPU starts, according to the block diagram. The 89C2051 microcontroller chip used in this device's architecture is configured to create 4 separate command courts based on the control keys that have been depressed. When one of these four control keys is depressed, an 8-bit digital code corresponding to that key's activation is created and sent through the data output pin of the microcontroller. This IC has a pin for data transmission. The device is also configured to produce four distinct codes, and depending on the active key, it can recognise it because the specific key input pin will briefly become grounded. The processor chip creates 8 bits internally as it attempts to encode the input.

The input pin of the RF transmitter receives the output of the controller chip. The device produces a high frequency of 433 MHZ, which is utilised as the carrier frequency. The controller output is now sent to this high frequency as a modulated signal, which is mixed with the carrier signal and delivered by an antenna. When a signal is broadcast via an antenna, the digital signal is overlaid over the carrier and sent as a modulated signal, which means the carrier delivers the digital code signal to its destination. A tiny electrical component called an RF module is used to transmit and receive radio signals

between two devices. Embedded Cortana systems frequently connect wirelessly to another device. RF communication can be used to carry out this wireless communication. many applications

The complexity of constructing radio circuits has led to the widespread usage of RF modules in electrical design. The sensitivity of radio circuits and the accuracy of parts and placement necessary to operate at a certain frequency hamper the design of an electronic radio receiver. To prevent negative RF performance effects, reliable RF communication circuits also need carefully monitored manufacturing procedures. Finally, radio circuits must undergo testing and certification by organisations that set standards, such the Federal Communications Commission, and are often subject to radiated emissions limitations. For these reasons, designers frequently use pre-designed radio modules to save money and time throughout the development process.

In small- and medium-sized consumer applications, RF modules are often employed. There are several uses for the system; in this case, it is utilised to remotely drive an electric car. Commercial RF modules used in industrial, scientific, and medical radio bands including 433.92MHz, 915MHz, and 2400MHz frequently employ several carrier frequencies. These frequencies are employed because radios can only be used for telecommunications in accordance with national and international rules. The unlicensed frequencies of 315MHZ and 868MHZ are also usable for short-range devices.

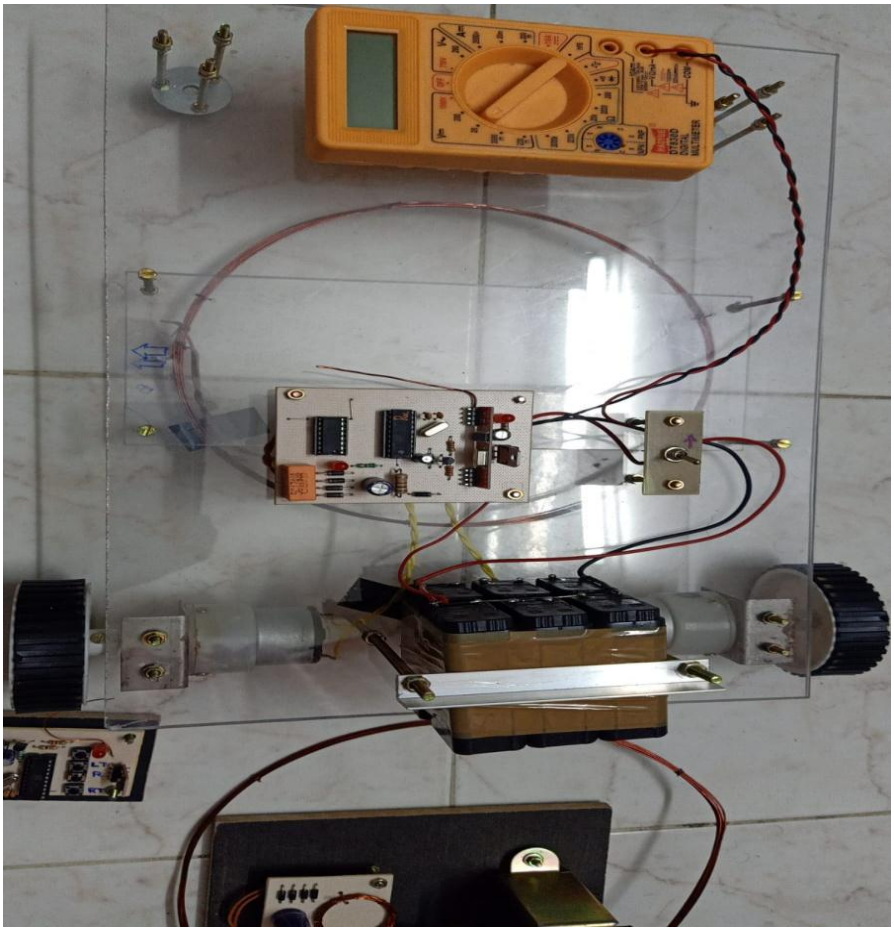
PRINCPLE OF OPERATION:

Chassis is a key component of any motorised moving body's driving mechanism since it transports all the parts needed to move the vehicle. An automatic vehicle requires numerous subsystems, such as an engine, frame, clutch, gearbox, steering assembly, rear and front axle assembly, brake assembly, fuel tank, etc., but here the cheapest motorised moving mechanism is designed without using any of the most expensive devices mentioned above and instead using a straightforward mechanism. Battery, DC motors, and control circuits are the only electrical and electronic components that the system requires. It can be referred to as an electric car because it is a battery-powered vehicle. A 12V DC lead acid battery is employed and mounted above the vehicle's chassis since the whole moving mechanism is intended to function at this voltage.The car is powered by a 2Ah or 200mah battery, which can be charged using a mains-operated wireless charger set up at the base of the parking space. The battery located over the moving mechanism begins charging through power receiving coins as soon as the car is parked in its spot. The distance between the power transmitter coil and the power receiving coil will be greatly reduced by placing this power receiving coil beneath the chassis of the moving machine.

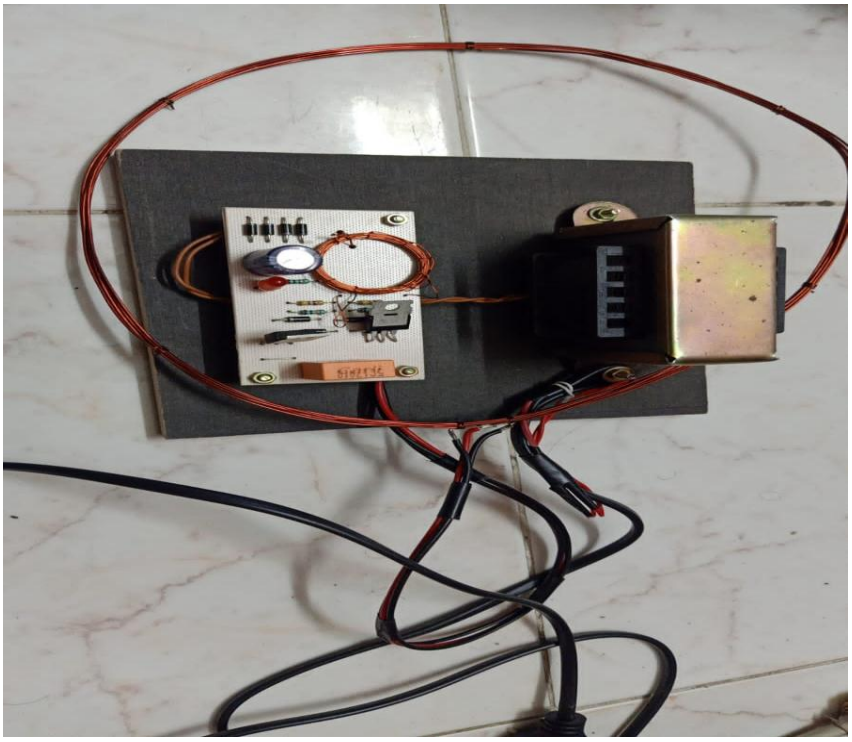
Acrylic sheet aluminium angles are used to build the chassis construction. These parts are meticulously cut to the necessary sizes and assembled to form a rectangular frame. This structure can fit any mechanical and electrical component. Two comparable sorts of metal plates are fitted to the chassis's bottom side to fix DC motors. Hard plastic moulded wheels are connected to the motor shafts on the back side after the motors have been fixed to the chassis. The chassis is home to other components including a control circuit, battery power supply, a receiving coil, etc. Copper conductors are used to link electrical items to the main processing unit once everything has been carefully put together. Relays are used to drive DC motors; in this case, two DC motors are operated individually by four relays.

RESULT:

The electric vehicle with wireless charger completed successfully and results are found to be satisfactory. We achieved the main aim of the project that is to make the wireless charging of electric vehicle.



Electric Vehicle



Charger

Remote Control Unit

FUTURE SCOPE:

Electricity is the future, and towns and nations must get ready to refuel it. It is based on new technologies and directed police. With their dynamic electric cars that are strong, safe, and affordable, electric vehicles have the potential to transform road transportation. Electric car dynamic charging is crucial. Additionally, the technology will allow for humanoid robots, supersonic hyperloop transportation, and wirelessly powered biomedical implants. Technical difficulties are really fascinating and provide countless opportunities. The inventories of electric automobiles are now rapidly growing. Materials and theory might make WEVC even more competitive when new technologies are developed. Advanced materials can help even powerful electronics. Switching losses are another significant contributor to lost energy in the WEVC systems, along with flux leakage.

CONCLUSION:

The wireless charger electric car model has been successfully finished. Because the major side power supply is constrained because it is a prototype module, a low power transmitter is built. Economy is a factor in addition to power supply, however after carrying out so many trials, we are extremely certain that we can construct a high power transmitter and enhance range proportionately. Resonant circuits made of inductance and capacitance must be turned off in order for this project to function. These two devices determine the outcome, and another crucial factor is the frequency at which these devices are operating efficiently. To be precise, we discovered that formulae are ineffective and the only thing that matters is to keep using them.

REFERENCES:

1. Energy Efficiency in Wireless Networks - by Oswald Jumira, Sherali Zeadally
2. Measuring the electromagnetic field in the vicinity- by Hubert Trazaska
3. Electromagnetics for engineers- by steven E.Schwarz
4. Fields from electric power- by Prof. M. Granger Morgan.