

# Wireless Mobile Charging

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**ABSTRACT**—The main objective of Wireless Charger System is to charge the mobile battery by using wireless charger. The technology will replace cables and standardize on one interface, potentially being able to charge 1000mAh battery. This is done using charging a resonant coil from AC and then transmitting subsequent power to the resistive load. The project is meant to charge a low power device quickly and efficiently by inductive coupling without the help of wires. Wireless charging system described by using the method of inductive coupling. In this project, oscillation circuit converts DC energy to AC energy (transmitter coil) to transmit magnetic field by passing frequency and then induce the receiver coil. The properties of Induction coupling are wave (magnetic field-wideband), range (very short~cm), efficiency (height) and operation frequency. The project shows as a small charging for 5V battery of phone in this method. The system bases on coupling magnetic field, then designed and constructed as two parts. There are transmitter part and receiver part. The Ampere's law, Biot -Savart's law and Faraday law are used to calculate the inductive coupling between the transmitter coil and the receiver coil. The calculation of this law shows how many power transfer in receiver part when how many distance between the transmitter coil and the receiver coil. The system is safe for users and neighboring electronic devices. To get more accurate wireless charging system, it needs to change the design of the few keywords. Research was conducted to investigate the current and future applications of wireless power transmission. To understand the fundamental theory, progressive innovations, and detrimental effects of this technology within the environment and society, a comprehensive literature review was formed. Electronic questionnaires were distributed, and personal inter views were vi conducted to obtain detailed descriptions of modern implementation methods within different industries

**Keywords**—Wireless Mobile Charging Vehicle, Optimization, Routing path, Adaptive Decision System, Scalability, Wireless energy transfer, Wireless Sensor Network

## I. INTRODUCTION

Wireless charging technology enables wireless power transfer from a power source such as charger to a load such as a mobile device conveniently across an air gap by eliminating the bunch of wire. Wireless power transmission involves the exchange of power without the need for physical connections. The development of this technology started in the late 19th and early 20th centuries, when a number of important innovations in electromagnetic research were made. These advancements established the basic principles that served as the foundation for modern electrical power transport. During the past 20 years, improvements in wireless technologies have led to a revival of related research. Public interest in wireless power has also increased with the application of Nikola Tesla ideas and inventions. As a result of this, the feasibility of technological implementation merits examination. Various scientists and inventors contributed to the development of wireless power. Examining their backgrounds reveals the sources of their motivation and the methods by which they conducted research. The inventions developed during this time were more advanced than anything that had been seen before, solving challenging problems and developing the basic theories that yielded modern technology. These inventors patents, papers, and experiments effectively describe the practicality and utility of wireless power propagation. Three prominent forms of power transmission are conduction, induction, and radiation. There are various formulas that explain how electrical power can be transmitted without the use of a physical conductor. Each mode of power transport has theories that govern how the electromagnetic waves carry power from a transmitter to a receiver.

### B. Problem Statement

Nowadays, electricity is very important in daily life. Without any electrical appliance, the world will stop working. Some electrical and electronic appliances require charging, some examples been mobile phones, cameras, Bluetooth headsets and also car phone charging systems. A copper wire is used to transfer the current from the supplier to the load. With so many appliances in one place there will be so many wires at that place to supply each appliance. The crowdedness of the cables produce mess which will produce other problems such as trip and fall and unplugging perplexity caused by intertwined of gadget cords. The need to constantly plug and unplug the device also poses problems as there is significant wear and tear on the socket of the device and the attaching cable. There is also cost associated with maintaining mechanical connectors and the usage of separate chargers will be eliminated too as it does not require wire for charging. The study is therefore aimed at eliminating the above problems as well as the sparks and debris associated with so many wires or cables in contact and also promoting greater convenience and ubiquity for charging everyday devices. By designing and constructing a method by circuit to transmit wireless electrical power (to transmit voltage) wirelessly from source to device (through space and charge a designated low power device) will eliminate the use of cables in the charging process thus making it simpler and easier to charge a low power device. It would also ensure the safety of the device since it would eliminate the risk of short circuit.

### C. Motivation

Wireless Charger Project is develop to obtain the aim of power transmission system for mobile phone without wires **connectivity**. This transmission is applicable for low power devices like mobile phones, tablets, laptops and IPod. Inductive coupling is commonly use for designing Wireless-Charge-Project.

## II. LITERATURE SURVEY

### A.Introduction

Surveillance robot is the robot used for the surveillance purpose. The remote areas are watched using the surveillance robots. A mobile robot is a machine that is basically place or mounted on a movable platform and can be with the help of certain instructions. In today's world a lot of fields use mobile robots. Many of the complex robots that we now see have originated from the simpler mobile robots. This technology has increased many new applications in the industry. The combination of mobile devices and robots are leading to new ideas in lots of fields. The mobile devices are now being used

in many of the industrial applications this is mainly because of the reason that they are portable and have a longer battery life as compared to a laptop. Also, they have a data plan through a cell phone carrier which is convenient as we can interact with the mobile robot once the connection is established.

### B. Wireless Charging Using Microwave

The microwave charging set up consists of two sections: the first section is the transmitter and the other, located in the mobile phone side, is the receiver section. To carry out the mobile phones recharging anywhere you want without traditional charger this is achieved only when there is utilization of microwave signal which is transmitted from transmitter at a frequency of 2.45GHz. Typically, the transmitter design includes generation of a carrier signal, which is normally sinusoidal, optionally one or more frequency multiplication stages, a modulator, a power amplifier, and a filter and matching network to be connected to an antenna compared to a laptop. Also they have a data plan through a cell phone carrier which is convenient as we can interact with the mobile robot once the connection is established.

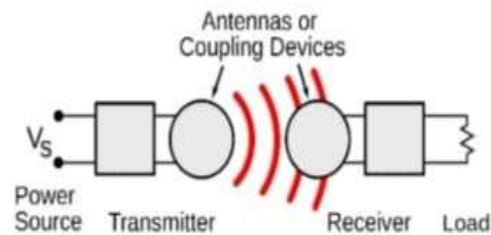


Figure 1: Wireless charging simplified diagram

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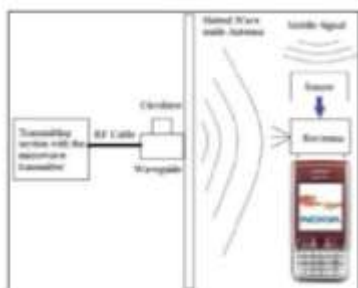


Figure 2: Wireless charging using inductance

### III. PROPOSED METHODOLOGY

The principle of the electrical transformer is used in inductive charging. With the help of inductively coupled coils, the electrical transformer transfers the electrical energy from one circuit to the other circuit. The varying current in the primary winding creates magnetic flux which is also varying in nature and then magnetic field within the secondary winding. A varying EMF (electromotive force) is then induced in the secondary coil. This phenomenon is known as “Mutual Induction”. Several other devices which work on the principle of mutual induction are induction cookers, electric toothbrushes etc. The disadvantage of induction is the short range that is why the receiver should be placed close to the transmitter coil.

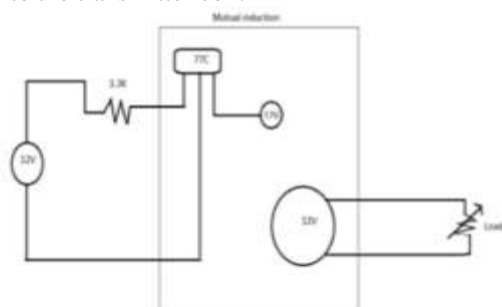


Figure 3: Block Diagram

#### A. Hardware Requirements

- **TTC 5200 transistor:** The TTC5200 from Toshiba is a through hole NPN silicon transistor in TO-3P package with high collector voltage. This device is commonly used for power amplification.
- **Heat sink - Heat Sinks** Passive heat exchangers that transfer the heat generated by an electronic component to a fluid medium, often air or a liquid coolant, dissipating it away from the device to maintain an optimal operating temperature.
- **Resistors:** A resistor is a passive two terminal electrical component that

implements electrical resistance as a circuit element

- **Round shape coil:** It means that when the current flows in a circular wire (coil), the magnetic field produced has straight lines of force near the centre of the coil. The parallel lines are in a plane perpendicular to the plane of the coil. Their direction is marked by the arrows.
- **Power Supply-Battery 12V:** A 12VDC power supply is a device that supplies electrical energy to a load. In other words, a power supply's primary purpose is converting electric current from the source into the required voltage, frequency, and current, which powers the load.
- **IN4007 Diode :** IN4007 is a rectifier diode, designed specifically for circuits that need to convert alternating current to direct current. It can pass currents of up to 1 A, and have peak inverse voltage (PIV) rating of 1,000 V.

### IV. CONCLUSION

Wireless charging can be as efficient as a wired charging. Based on the reviewed literature and collected data, suggests that wireless power transmission could be feasible. Modern science has now made it possible to use electricity without having to plug in any wires for charging. There are three techniques for wireless power transfer. Inductive charging has lower efficiency and increased resistive heating in comparison to direct contact. Implementations using lower frequencies or older drive technologies charge more slowly and generate heat within most portable electronics. Magnetic microwave has also some limitations signal absorption by the atmosphere. Microwaves suffer from attenuation due to atmospheric conditions and towers are expensive to build. Researchers developed inductive charging using resonance where energy is transmitted between two copper coils that resonate at the same frequency. Of these two coils, one is the power transmitter and the other, the receiver. This is more feasible than other techniques and is safer than wired charging system. In this project, wireless charging of 1050mah battery has been focused. The circuit for this purpose has been designed, fabricated, implemented and tested. This circuit consists of transformer, rectifier, oscillator tank circuit, transmitter coil, receiver coil, current amplifier. Initially, output current is 13ma so there is a need to amplify current by using a transistor based current amplifier whose gain is 0.93. Thereafter the output current found to be 450ma at 5v dc and it charges 100% battery in 30mins within the range of 6cms. wireless power transmission has been the subject of many studies in the past, and will continue to be so in the future. This system demonstrates the

concept of wireless mobile charging system. The system allows user to wirelessly charge his mobile phone without plugging in the mobile adapter. We demonstrate the system using a charging pad where user just needs to place his adapter circuit to charge the mobile phone.

#### A. Future Scope

The circuit design can be implemented by replacing the Electronic components with the other components of high Standards. Several experiments can be done so as to reduce

The loss in the process of wireless power transfer which will definitely enhance the efficiency of the system. The Methodology of inductive coupling can be replaced with the Microwave technology or with some other methods so as to increase the output and reduce the loss. This will increase the efficiency of the wireless phone charging system. The Receiver coil can be integrated within the mobile phone only so that the mobile phone can directly be charged by just keeping it on the charging pad, which is the transmitter section.

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