isrjournals

International Journal of Advanced Research in Computer Science Engineering and Information Technology

Volume: 4, Issue: 3,Special Issue: 3 ,Apr,2016 ,ISSN_NO: 2321-3337

Wireless Mobile to Mobile Charge Transfer Using WPT Technology

Keerthana.R, Pragadeshwar.A.M

Department of Computer Science, St.Joseph's College of Engineering, India.
Department of Information Technology, Paavai Engineering College, India.

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ABSTRACT— *Charging the devices has become an essential task in our day to day life. Whatever may be the devices, all have common need to recharge their internal battery. In order to do so, we must get back to our wired chargers. It becomes impossible if there is no source for power supply. In this project transfer of charge from one mobile to another mobile in wireless medium with bidirectional dc to dc converter is proposed. Bidirectional dc to dc converter transfers the power in both directions, it wirelessly charges the mobile from utility and energizes the utility from the mobile while the power supply is blackout. The transmitter mobile uses Bluetooth to trigger the transmitter circuit for transferring charge. Once the transmitter section is triggered the coil get heated and when the receiver mobile is brought near to it, it induces the coil in the receiver mobile and receiver mobile gets charged via the wireless medium. This transfer of charge in wireless is due to the WPT used in the transmitter side. WPT has the potential to disrupt and revolutionize the traditional portable device, making mobile devices more convenient by eliminating the need for a physical power supply. So, if both mobiles have transmitter and receiver being built in it they can easily transfer the battery charge. This is very helpful to transfer the charge from one mobile to another in case of urgency and difficult situations.*

1. INTRODUCTION

Cell phones, laptops, tablets, even smart watches are found all over the globe and are owned and used by billions of people. All devices have some common need, that is recharging their internal battery so that the device can be used wherever we want. Such is the paradox of portable devices, they provide convenience by running off internal power so they can be used anywhere, but always must return to the power cord in order to charge. WPT has the potential to disrupt and revolutionize the traditional portable device, not only by making mobile devices more convenient by eliminating the need for a physical power supply, but also safer (power cords carry risk of shock and can cause fires), as well as a reduced cost for consumers. Research has even been done into multi-hop WPT systems, wherein a generator transmits power wirelessly to targets, which can then in turn become

sources for other targets, and transfer power wirelessly to those targets. Thus, a network of WPT can be created to support several devices.

One of the major issue in power system is the loss occurs during the transmission and distribution of electrical power. As the demand increases day by day, the power generation increases and the power loss is also increased. The major amount of power loss occurs during transmission and distribution. The percentage of loss of power during transmission and distribution is approximated as 26%. The main reason for power loss during transmission and distribution is the resistance of wires used for grid. The efficiency of power transmission can be improved to certain level by using high strength composite overhead conductors and underground cables that use high temperature super conductor. But, the transmission is still inefficient. Any problem can be solved by state of the art technology. The above discussed problem can be solved by choose an alternative option for power transmission. Here we are going to transfer charge from one mobile to another mobile through wireless power transfer system in which one mobile act as transmitter and other act as receiver.

II, PROPOSED MODEL

To overcome the disadvantage of the wired charging system we use wireless charge transfer between two devices which one act as transmitter and other act as receiver. Android app and Bluetooth is used to control the other device. If we press the button ON in transmitter device, it indicates that the charge is transferring to the receiver device. if we press the button OFF in transmitter device, it indicates that there is no transferring of charge. Liquid Crystal Device is used to display the information regarding the receiver device whether charge is transferring or not from transmitter to the receiver.

- It is easy to implement
- It has more efficiency
- No need for grids and substations
- It produces low maintenance cost
- More effective when the transmitting and receiving points are along a line of sight.
- It can reach the places which are remote

III, Wireless Power Transfer technology(WPT)

Wireless power transfer (WPT) or wireless energy transmission is the transmission of electrical energy from a power source to an electrical load, such as an electrical power grid or a consuming device, without the use of discrete man-made conductors. Wireless power is a generic term that refers to a number of different power transmission technologies that use time-varying electric, magnetic, or electromagnetic fields. In wireless power transfer, a wireless transmitter connected to a power source conveys the field energy across an intervening space to one or more receivers, where it is converted back to an electrical current and then utilized. Wireless transmission is useful to power electrical devices in cases where interconnecting wires are inconvenient, hazardous, or are not possible.

Wireless power techniques fall into two categories, non-radiative and radiative. In non-radiative techniques, power is typically transferred by magnetic fields using magnetic inductive coupling between coils of wire. Applications of this type include electric toothbrush chargers, RFID tags, smartcards, and chargers for implantable medical devices like artificial cardiac pacemakers, and inductive powering or charging of electric vehicles like trains or buses. A current focus is to develop wireless systems to charge mobile and handheld computing devices such as cellphones, digital music players and portable computers without being tethered to a wall plug. Power may also be transferred by electric fields using capacitive coupling between metal electrodes. In radiative far-field techniques, also called power beaming, power is transferred by beams of electromagnetic radiation, like microwaves or laser beams. These techniques can transport energy longer distances but must be aimed at the receiver.

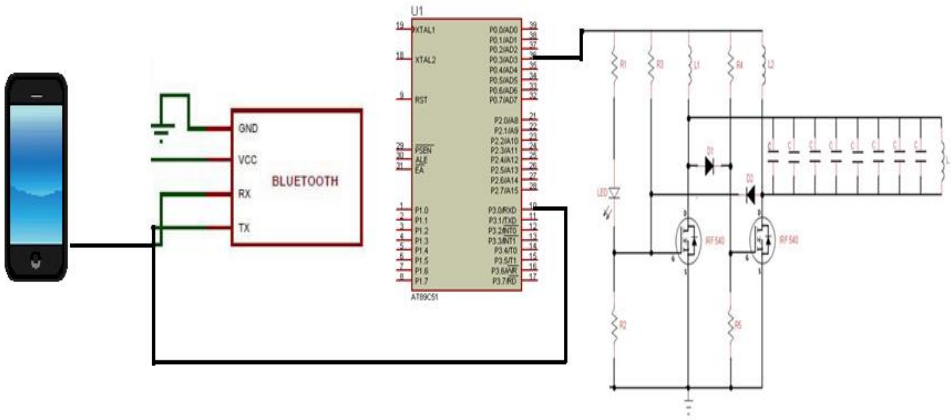
IV SYSTEM ANALYSIS

Existing System

The MOBILES cannot get ready immediately if they have run out of battery energy. To overcome this, what the owners would most likely do is to find any possible opportunity to plug-in and charge the battery. It really brings some trouble as people may forget to plug-in and find themselves out of battery energy later on. The charging cables on the floor may bring tripping hazards. Leakage from cracked old cable, in particular in cold zones, can bring additional hazardous conditions to the owner. Also, people may have to brave the wind, rain, ice, or snow to plug-in with the risk of an electric shock.

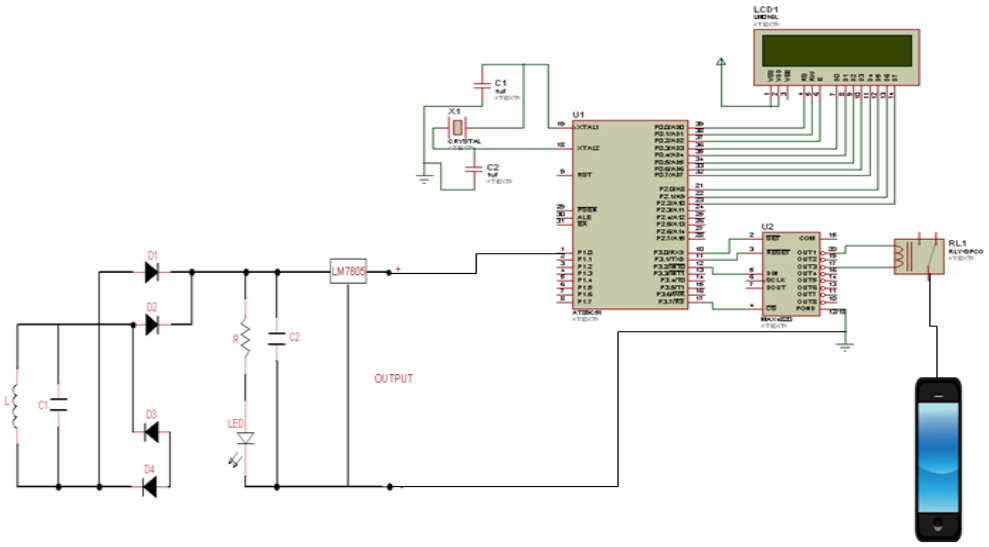
Volume: 4, Issue: 3,Special Issue: 3 ,Apr,2016 ,ISSN_NO: 2321-3337

V, Transmitter Section:



- The transmitter is a mobile from which the charge is to be transferred.
- Once the circuit is initiated , the charge from the transmitter mobile is converted into DC using Diodes and Capacitors . This DC current is given as an input to microcontroller.
- Here we use a Crystal oscillator of 10MHz to tune the microcontroller kit.
- We have a relay and a relay driver which is used to transfer the required charges to the WPT section.
- This WPT in-turn heats up the primary coil in the transmitter section.
- RS232 interface is used in he transmitter section in order to make efficient interface for transferring of data over the components

VI, Receiver Section:



- In the receiver mobile , The secondary coil is induced when the primary coil
- (transmitter mobile) is brought near to it.
- The current produced due this induction is given as an input to the receiver module.
- This current in-turn initiates the receiver circuit , a voltage regulator is used in order to tune the required voltage.
- We use a PIC Microcontroller to interface with the external peripheral devices.
- We made output port as the USB port , so when the current is regulated and supplied by the circuit the mobile at the other end of the USB gets charged.

VII, Implementation:

- We just developed an application using XAMARIN which is used to communicate the user interface and the hardware chip.
- We made an app that uses Bluetooth and searches for the nearby devices.
- It has two simple buttons ON and OFF that is used to switch on and off the transmitter circuit.
- In our case we had an external Bluetooth in the TX section we need a bluetooth to search the TX bluetooth. (in future enhancement we do not require Bluetooth searching).
- Once we click on ON button the circuit gets started and transfer of charge from the source mobile to the device that is brought near to it.
- It is advisable to develop an app that is independent of platform so that mobiles having different OS can transfer the charge.

VIII. CONCULSION AND FUTUREWORK

"**Wireless Power Transfer for Mobile Phone Applications"** has been successfully design and implemented. The wireless power transfer provides an industry standard between power transmitters and receivers based on inductive coupling at proximity with well aligned coils. The standard provides a high design freedom for receivers and the means to control power transfer; this allows meeting the requirements of various mobile device applications both commercially as well as functionally. Confidence in achieving interoperability is achieved by limiting the design freedom for transmitters in the early phases of releasing the standard.

The component that we developed, can be used in 2 ways, i.e., either as external component or as internal component. This entire circuit when designed and made Nano it will be hardly in the size of 6cmx3cm. So it can easily be made as a design in the backside of the mobile (internal component). This can also be used as an external device that has a USB output port, the input for this device will be the charge from the mobile from which charge is to be transferred. Whatever may be the device that is connected at the other end of the USB port gets charged easily.

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