

Live Pace Charger

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Abstract— When a person with this device walks, pressure is relieved from the ground and this pressure to be converted to electrical potential energy and that can be used to charge power electronic devices. In this Research paper, a smart charging system is made for smart gadgets. A piezoelectric generator is placed in the shoe. The power which is generated by piezoelectric sensor when a human wearing shoes walks is being transferred to the gadgets by using blue tooth coupling technique. Piezo electrical sensor through we can generate pressure and that pressure we can store in battery and that storable power we can directed to the Arduino for store information/record about the graph chart for time vs voltage. Using Bluetooth HC-05 through we can display that increasing ratio for voltage in mobile device.

Key words: Arduino, Piezo Electric Generator, Bluetooth (HC-05) Module, Bluetooth Power Transfer (BPT), Resonance, And Mobile Charging

I. INTRODUCTION

In the recent years, it is seen that an increasing interest in research as well as development of advanced smart phone technology. But as technology involves so are the problems which are associated with it, and one among those is the fast draining of battery. Almost every smartphone user wishes he had longer battery life. Now, imagine your phone getting charged where ever you go. It should be made possible by use of Piezoelectric generator smart gadgets charging technique. The keys to this method is the piezoelectricity device and Bluetooth power transfer using Bluetooth. generating mech. energy from motion of human being is a very good approach to obtaining totally clean and environmental as well as sustainable electric power. Piezoelectricity is an electrical energy converted from mechanical pressure on shoes. When we made pressure to an object or shoes, a specific -ve charge is produced on the one side and a +ve charge on the other side of the piezoelectric crystal. Once the mechanical pressure is made from piezo electrical sensor, electrical current pass through the material. Bluetooth power or Bluetooth power transmission is the transmission of electrical power from a Power source (piezoelectric Power) to a load (such as any electrical device) without any physical connector such as wires or conductors. Energy is converted from the human body movements and is transmitted wirelessly through Bluetooth module and is used to charge the smart electronics gadgets.

A. Aim of Project

The main aim of our project is to give wireless charging facility to any electronic device to anywhere without any extra device and cost very easily with improvement of health.

B. Significance

This project is very useful in our day to day life and adds extra features in our gadgets. It's like a virtual assistant at the place where no electrical supply is possible in emergency condition. This charger is not only useful in smart phones only we can also use it for the charging of other electronic gadgets. Use of this project widely makes our Mobile's life secure at crucial times, especially when we are at an unknown place, where there is no electricity is available and we need to use electronics gadget urgently.

II. ARDUINO MEGA 2560

Arduino Mega 2560 is a microcontroller type board which is based on the ATmega1280 chip. Mega board has total 54 digital input/output, 16 analog input/output, 4 UARTs ports, a 16 MHz crystal oscillator inbuilt, a USB connection for programming, a power jack supply, an ICSP header for additional interfacing, and a reset button. It contains everything needed to support the microcontroller board, simply connect it to a computer or laptop with a USB cable or power it with a AC-to-DC adapter (5V) or battery to get started. The Arduino Mega is compatible with almost all shields designed for the Arduino Duemilanove or Diecimila.

The Arduino Mega 2560 has a number of facilities for communicating with a computer or laptop, another Arduino, or other microcontrollers as well. The ATmega1280 chip provides four hardware UARTs for TTL for serial communication. An FTDI FT232RL on the board channels one of these over USB and the FTDI drivers provide a virtual com port to Arduino IDE on the computer or laptop. The Arduino Software includes a serial monitor printer which allows simple data to be sent to and from the Arduino MEGA 2560 board. The RX and TX LEDs on the board will flash when data is being transmitted via to the computer or laptop. An Arduino IDE Serial library allows for serial communication on any of the Mega's digital pins to device. The ATmega1280 chip also supports I2C and SPI communication as well.

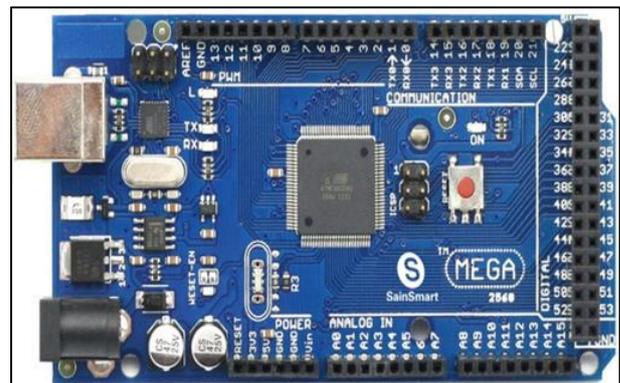


Fig. 1: Arduino Mega 2560

III. PIEZO ELECTRICAL SENSOR

The Piezo electric generator is placed inside a Shoe. A shoe has two points where the pressure exerted in maximum and they are the heel and the toe, and this is the exact place where the piezo electric unit is placed. The design consists of a pair of array of piezo electric generator units connected in series. The Front panel has the array of piezo electric generator in a linear arrangement and the rear panel with a circular arrangement. The starting and ending side of sensor collects continuous energy input from the piezo generator and efficiently stores their energy in the capacitor bank. During the charging process, the capacitor voltage is continuously monitored. When it reaches 5.2V the module output is enabled to supply power to a Rectifier and charging unit

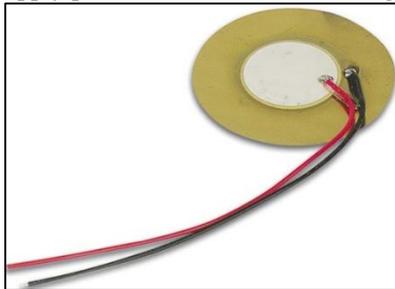


Fig. 2: Piezo Electrical Sensor

IV. BLUETOOTH HC-05

Bluetooth HC- 05 module is an easy to use Bluetooth Serial Port Protocol module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR 3Mbps Modulation with complete 2.4GHz radio trans receiver and baseband. It uses CSR Blue core 04- External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mm x27mm. Hope it will simplify your overall design/development cycle.



Fig. 3: Bluetooth HC-05

V. WIRELESS POWER TRANSFER

In the early 20th century, before the electrical- wire grid, Nikola Tesla devoted much effort towards transferring power wirelessly. However, typical embodiments (e.g., Tesla coils) involved undesirably large electric fields. The past decade has

witnessed a surge in the use of autonomous electronic devices. As a result of this development, interest in wireless power has reemerged. In recent years, there has been increasing interest in research and development of wireless power technology to eliminate the “last cable” after Wi-Fi becoming widely accepted. Wireless electricity technique used here is based on strong coupling between electromagnetic resonant coils to transfer energy wirelessly between them. This differs from other methods. The system consists of transmitter section and receiver section that contain magnetic loop antennas critically tuned for the same frequency. Electromagnetic induction works on the principle of a primary coil generating a predominant magnetic field and a secondary coil being within that field so a current is induced within its coils. This causes a relatively lower range due to the amount of power required to produce an electromagnetic field. Over greater distances the non-resonant induction method is inefficient and wastes much of the transmitted energy just to increase range. Bluetooth transmission is done where the resonance phenomenon comes in the scenario and try to helps the efficiency drastically using "tunneling" the magnetic field to a receiver coil that resonates at the same frequency. Theoretical analysis shows that by sending electromagnetic waves around in a highly angular waveguide, evanescent waves are produced which carry no energy. But as we know that the electromagnetic waves would dramatically tunnel, they would not propagate through the air to be absorbed or be dissipated, and would not disrupt electronic devices or cause physical injury

VI. BLOCK DIAGRAM

Fig-4 shows block diagram of this system.

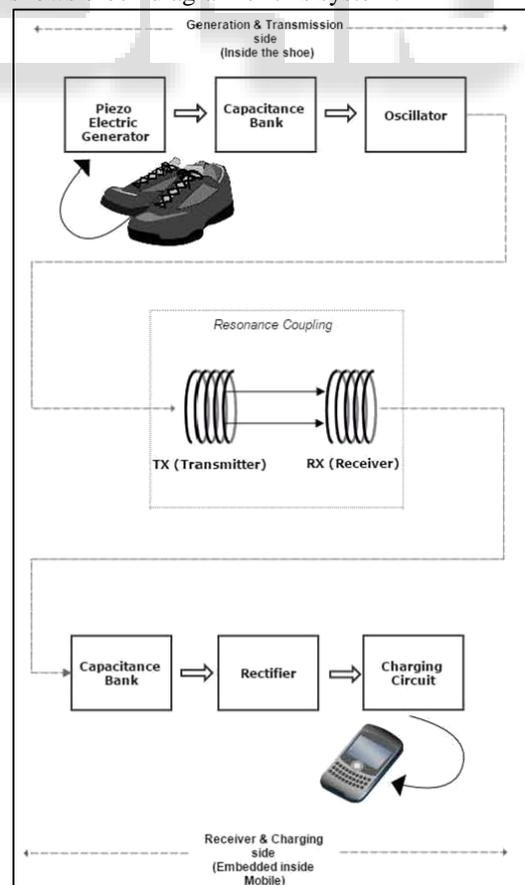


Fig. 4: Block Diagram

VII. APPLICATION

- Useful for Traveler.
- Useful for remote area
- Help to save electricity.
- Number of cases of short circuit in smart phones reduced
- Help to Save Precious smartphone damages occur due to charger.

VIII. CONCLUSION

In this paper, a study on the use of piezo electrical sensor plate in a wireless charging environment has been presented. The effect of the EM shield on signal reception and transmission under the worst-case scenario has been identified. Bluetooth can enhance signal reception and transmission without adversely sacrificing energy efficiency. Dual polarization passive array repeaters can be fabricated in flexible P.C.B sheets and placed on the top of the gadget charging pad. Contactless energy transfer is higher system availability because the system is essentially maintenance free

IX. FUTURE SCOPE

In future if there is a large demand of this type of live pace charger we can manufacture the whole PCB circuit in printed circuit board, so that circuit becomes smaller and can be easily fitted into small shoes. This type of charging technology we can be implemented for some other charger used by the traveler working under extreme Remote area.

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