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Generation of Power through Simple Foot Steps using Piezoelectric Sensor

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Abstract: This paper focuses on the idea of generation of electricity using non- conventional source. When a person walks, he loses some amount of energy. This source of energy instead of being wasted is converted into useful source that is in the form of electric power. The conversion is obtained using a sensor called piezoelectric sensor. The sensor helps in converting the applied mechanical force into electric voltage. The voltage thus generated by this method will be stored in battery and used for various applications.

Keywords: Piezoelectric sensor, mechanical energy, foot step, electrical energy, battery, inverter

I. INTRODUCTION

In this era, electricity acts as a lifeline to human beings. Electric power in huge amount is required for various operations of the modern world technology. The demand for electricity is increasing day by day and also there is a large growth in human population. Generation of power by means of increasing human population is an innovative idea and will not have any adverse effect on the environment. The idea is based on piezoelectric effect, which is certain materials have the capability to generate electric charge, when force is applied on these materials. Generation of electrical voltage by the application of pressure on certain quartz material is called as piezoelectricity. This method proves to be very useful when implemented in crowded areas like bus stand, malls etc.

II. PROPOSED METHOD

The block diagram of the proposed system is as follows

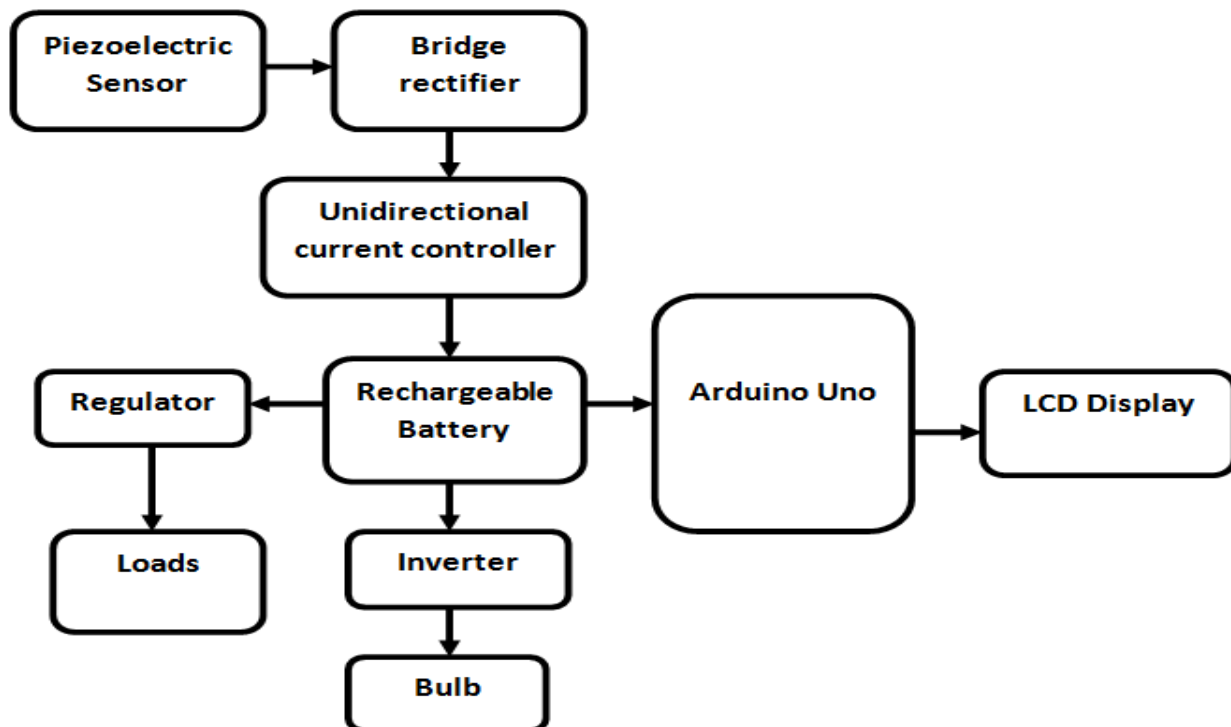


Fig.1 Block Diagram

A piezoelectric sensor is used so as to convert the applied pressure into electrical voltage. The sensor is followed by a bridge rectifier that converts the AC of the piezo sensors into DC.

A unidirectional current controller which is mainly a diode is used to ensure the flow of current is in one direction only in order to prevent the backflow of current from battery to sensors which may damage the sensors.

A rechargeable battery of 12V, 1Amp is used to store the generated voltage that is obtained by the application of pressure on the array of sensors.

A regulator 7805 IC is used in order to provide a stable 5V voltage to the loads and the controller Arduino Uno.

An inverter is used to convert DC to AC in order to drive the AC loads. Different loads such as mobile charging, fan, bulb are used in this project.

The controller Arduino Uno is used for reading the battery voltage and piezo sensors voltage status. These voltages are displayed using a LCD of 16x2.

III.RESULTS

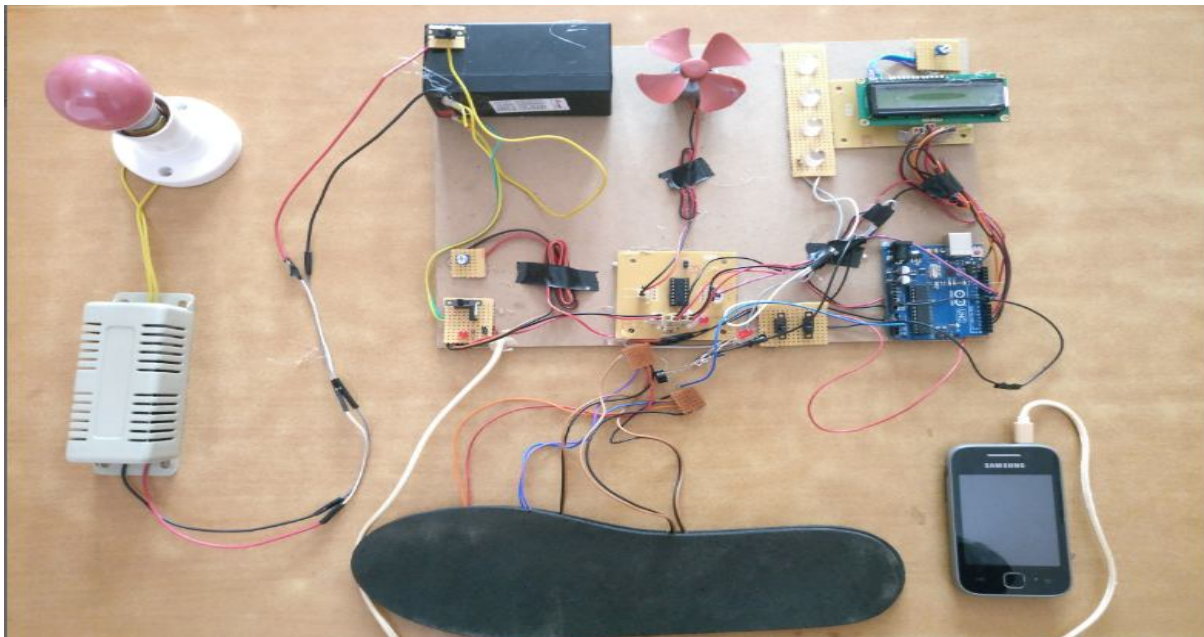


Fig.2 Experimental setup



Fig.3 Array of piezoelectric sensor

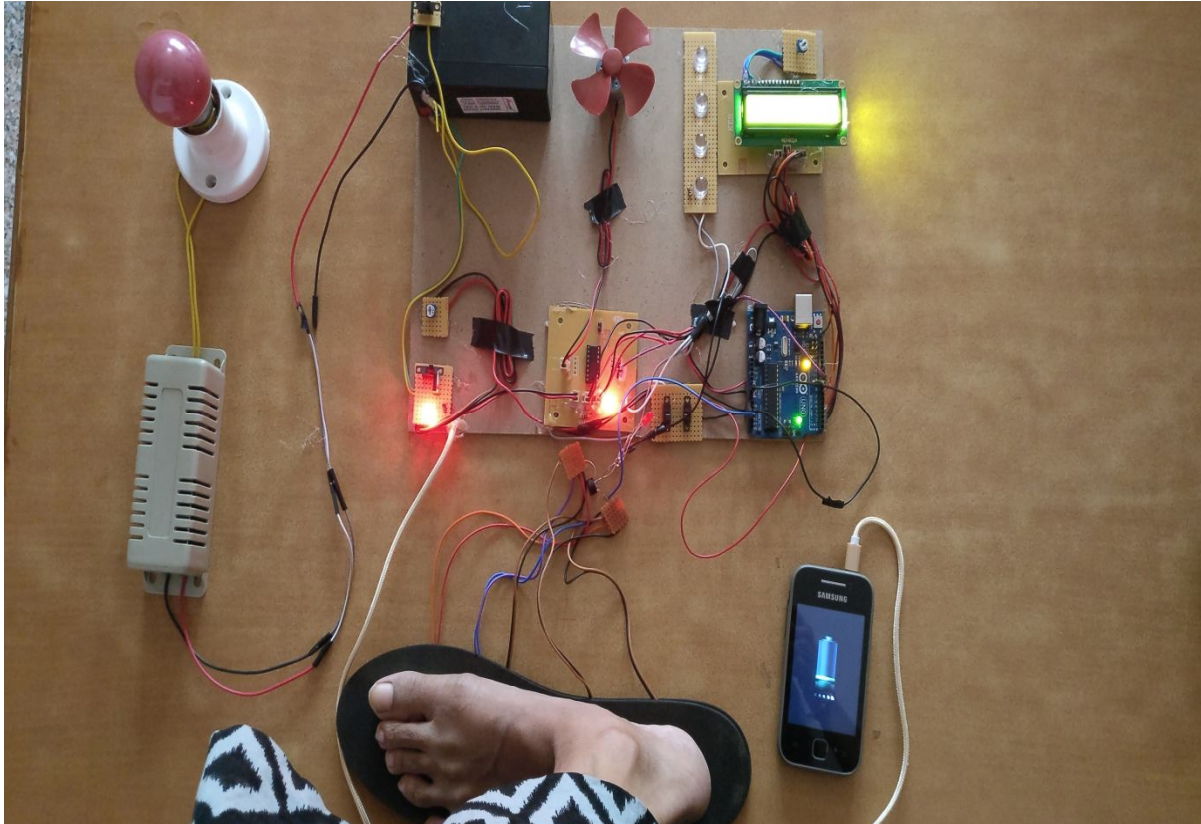


Fig.4 Mobile charging

During the experimental procedure the different voltages acquired when force is exerted on piezo sensors connected in parallel are 1V, -4V, 2V, 4V, -3V. A series combination of piezo sensors can also be used in order to achieve higher voltage values. Everytime a pressure is applied on the array of sensors electric voltage is produced. This produced voltage is stored in the battery. The stored voltage is used for applications like charging the mobile and to drive loads like fan and bulb.

IV. CONCLUSIONS

The project “Generation of power through simple footsteps using piezoelectric sensor” proves to be economical. The voltage generated by this method can be stored in battery and used for various applications like street lights. It provides modest solution to the energy crisis problems. Power generated through this method is eco-friendly as it causes no pollution and hence does not harm the environment.

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