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A Review on Footstep Power Generation

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ABSTRACT: Now a day's electricity is a basic need of human life demand of electricity is increasing day by day. This paper provides a review on the alternate way of power generation by using human footstep, in the recent years many researchers attracted towards the Footstep Power Generation system. In the last years different researchers used different methods or technologies to generate the electricity or power like piezoelectric technology, some mechanical modules, transducers etc. Existing work of this paper provides the overview on different methods used in recent years.

KEYWORDS: Footstep, piezoelectric, mechanical modules, transducers.

I. INTRODUCTION

Electricity is a basic need of human life and the demand of electricity is increases. Traditional methods such as burning of coal, wood, diesel (generators) etc cause pollution as well as continuously depleting our natural resources such as fossil fuels. Mostly the electricity is generated by using the Generation of electricity burning of fossil fuels or the splitting of atoms, but this type of methods increases the pollution. The effect of this pollution increases the Global warming. There are many means of harnessing energy sources, which are not harmful to nature like Solar, Wind Power, Tides, and Hydroelectric. Footstep power generation system is new growing technology for power generation [1].

Foot step power generation system is nothing but the weight which acts on the foot step is used to generate electrical energy. In this type of system weight of human is used to generate the electricity or power. For this piezo-electric material or different methods are used to convert pressure into electrical energy, also required different circuit to stable the voltage, because voltage generated by piezo-electric crystal is not stable. This paper provides the survey on existing system and also gives the advantages and application of system.

II. EXISTING WORK

G. Dhanalakshmi et al [2] presents Footstep Power Generation System with the help of piezo transducers. This type of system is useful at public places like railway stations. Figure 1 show the hardware setup of proposed system, which consists of ARDUINO UNO (a microcontroller board based on the ATmega328), Piezoelectric Crystal Material (group of ferroelectric materials, which made up of crystals and has polar character without an electric field being applied), Relay (is used open and close circuits electromechanically), Inverter (convert the direct current (DC) to the alternating current (AC)), and MOSFET Driver (large amount of charge to drive the voltage up and down). When pressure applied to the piezo-electric material convert it into electrical energy, but this energy is Variable voltage and is converted into a linear voltage by using the Bridge circuit. If any fluctuations in output AC ripple filter is used to filter is used and is stored in a rechargeable battery.

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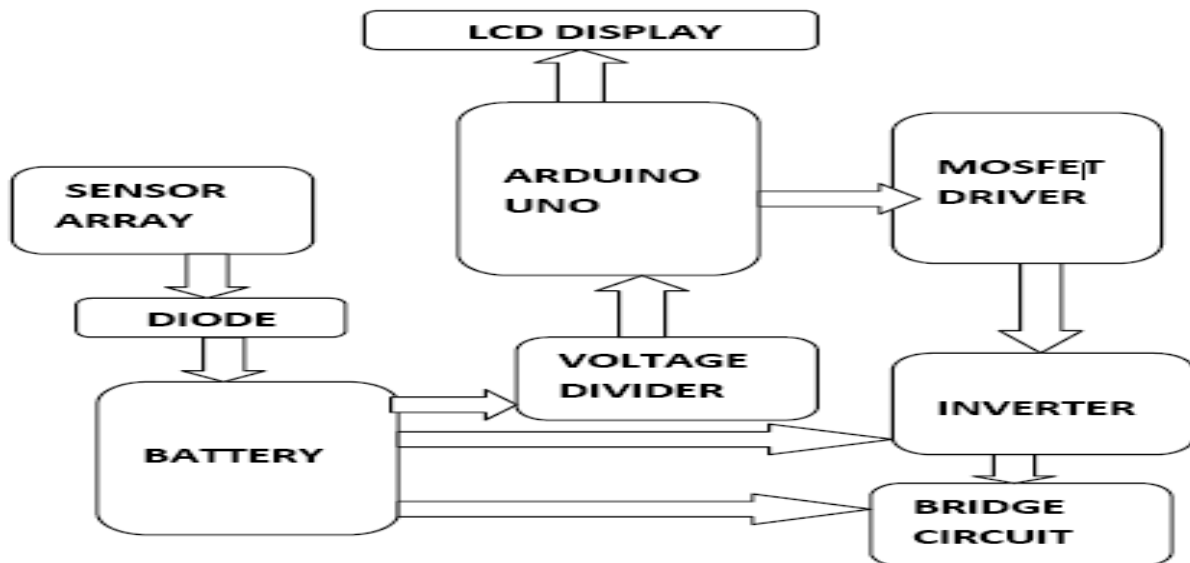


Figure 1 Hardware setup [2]

Manisha B. Kanawade et al [3] presents the Foot Step Power Generation Using PIC Microcontroller, in which the mechanical energy is converted into electrical energy. Figure 2 shows the block diagram of proposed system, in which the flooring is engineered with piezo electric technology and these piezo transducers, converts the pressure into the electric charge. This proposed system contains Microcontroller PIC16F877A (used to display battery voltage on LCD as well as to measure battery voltage), Piezo Electric Sensor (uses the piezoelectric effect to measure pressure, acceleration, strain or force by converting them to an electrical signal), A.C. Ripple Neutralizer (it used to remove the ripples from the output of rectifier) and Battery.

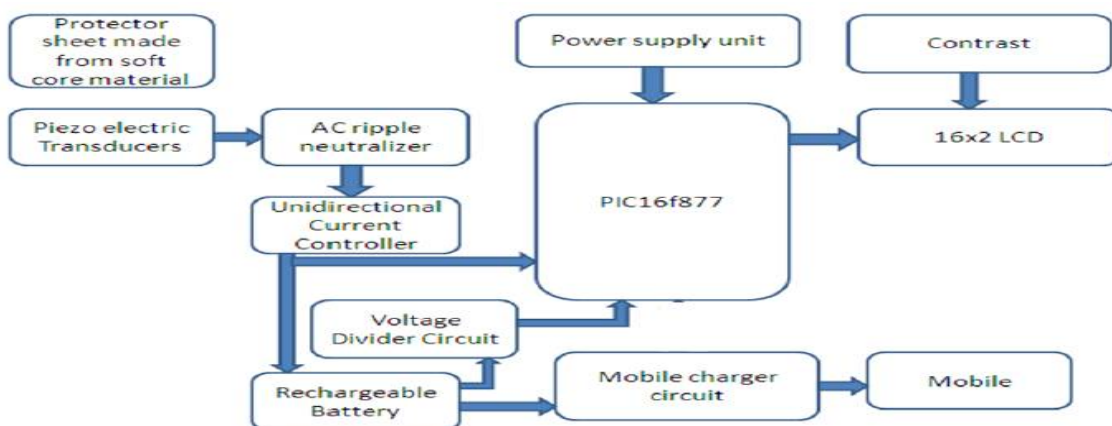


Figure 2 Block diagram of system [3]

Mr. A. Adhithan et al [4] proposed the power generation through footsteps as a source of renewable energy system. In this proposed system, generating of additional power by the heat and this heat obtained by the load using the peltier effect. The main purpose of this system is to charge battery through DC voltage. Then by inverting this stored DC

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voltage into AC and use in common way. Figure 3 shows the block diagram of the proposed system, which consists of Peltier Sensor (thermocouple consists of two conductors of different materials (usually metal alloys) that produce a voltage in the vicinity of the point where the two conductors are in contact), PIEZO ELECTRIC TRANSDUCER (is the ability of certain materials to generate an AC voltage when subjected to mechanical stress or vibration, or to vibrate), microcontroller (AT89S52 is used), Super capacitors (capacitance values greater than any other capacitor), Battery (is used to store the DC voltage), Inverter (used to convert direct current (DC) to alternating current(AC)), and Voltage Regulator (used to maintain automatically a constant voltage level).

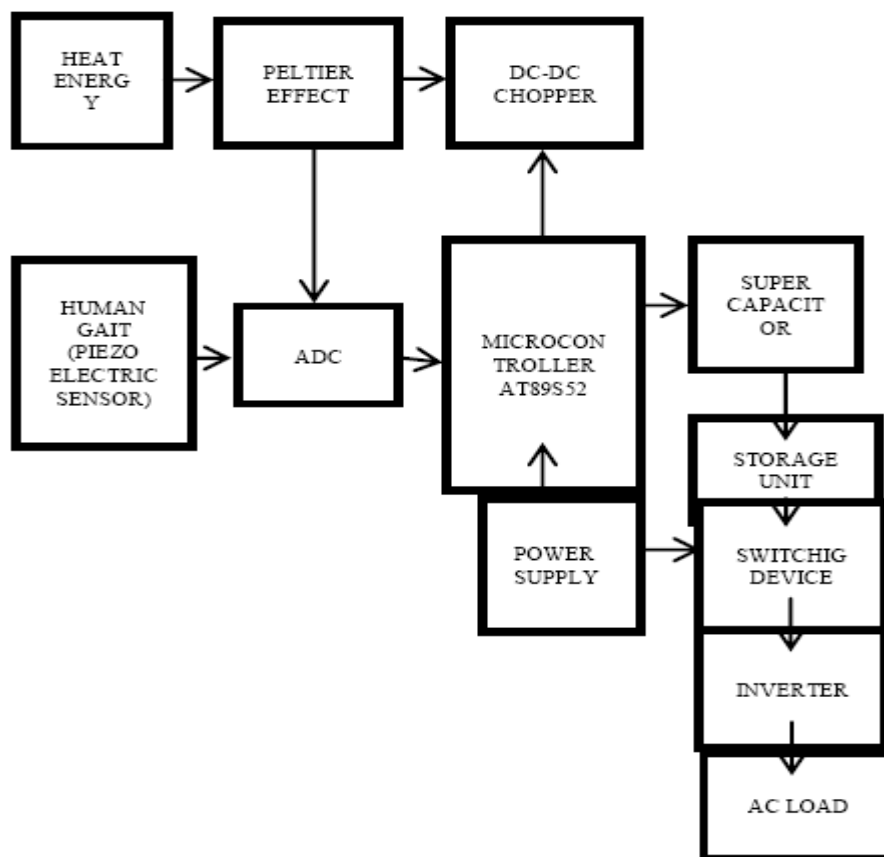


Figure 3 Proposed block diagram [4]

III. ADVANTAGES

The advantages of all above system discussed in exiting work provide the following advantages [5,7]:

- By walking or running Power generation is done
- Does not require any type of fuel.
- Very conventional system.
- Battery is required to store the generated electricity.
- Renewable source of energy.
- Saves agricultural land.
- No Environment pollution No smoke or ash or any toxic chemical is produced

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- Non harmful to atmosphere

IV. APPLICATIONS

This type of system is applicable in different areas; following are some example [6];

- Mobile charging
- Bus station
- School and colleges
- Cinema hall
- Shopping complex

V. CONCLUSION

Demand of electricity is increasing day by day because of increase of human population, and it becomes the basic need of human life. In this paper a new era of power generation is given i.e. Foot Step Power Generation, in which human walking or running is used to generate the electricity. This paper provides the overview of Foot Step Power Generation system also provides the advantages and application of this system.

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