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FOOT STEP POWER GENERATION USING PIEZOELECTRIC SENSORS

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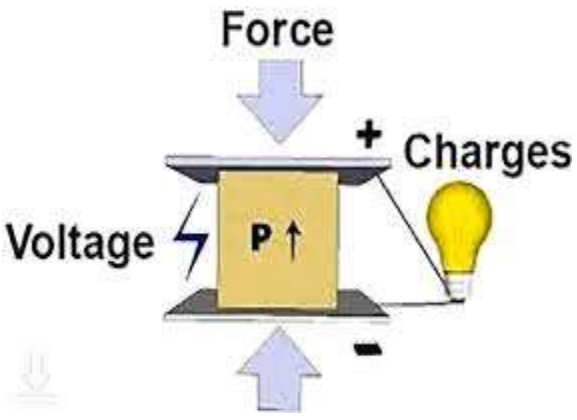
Abstract
Power is becoming increasingly important in today's world for all tasks. We currently have a variety of power sources, both renewable and nonrenewable, but we are still unable to meet our electricity needs. The human population is one of these resources. In this project, we generate energy by walking or jogging. Walking up and down the stairs burns calories. When people walk on steps or platforms, their weight is used to generate power. The generated energy will be stored in a battery and used for home purposes later. This method can be used in densely populated areas such as schools, colleges, temples, movie theatres, and other places where people walk around all day. When applied, piezoelectric sensors in the control mechanism convert pressure into electrical energy. Walking on the floor generates energy that is both noiseless and pollution-free. This technology's energy can be used to charge mobile phones, laptop computers, and other electronic devices.

INTRODUCTION

Walking is the most widespread kind of human activity. In this article, we'll look at a nontraditional approach of generating electricity by just walking or jogging on our feet. A person's energy is lost to the road when they walk. It is possible to harness energy and turned into something that can be used, such as electricity. The Piezoelectric effect is the foundation of this system.. This system's fundamental premise is as follows



LITERATURE REVIEW

1. According to Ratnesh Srivastava, in the last few years low power electronic devices have been increased rapidly. The devices are used in a large number to comfort our daily lives. For meeting this power demand, we introduce a foot step power generation. The main objective of this system is to capture the typically wasted energy surrounding a system and transforming it into electrical energy.
2. R.Jai Rajesh : this article it is suggested that voltage should be produced using footstep power. The proposed device acts as a tool by using pressure to generate electricity [7], [8]. For public locations like bus terminals, malls, train stations, shopping centers, etc., this article is very useful. Therefore, these devices are installed in public situations where people are walking, and they have to ride on this device in order to pass through or live. Such systems will then produce voltage about each and every move of a foot.
3. P.Venkatesh : In this paper, we have presented the design of power generation using footstep based on available piezoelectric sensors. Human race requires energy at very rapid rate for their living and wellbeing from the time of their arrival on this planet, because of this reason power resources have been worn out and enervated. Proposal for the employment and application of extravagant energy in foots of human is very much to the purpose for extremely populated nations like China and India.

NEED OF THE SYSTEM

In densely populated countries, making use of waste energy generated by human motion is critical.
India and China, where roads, railway stations, temples, parks, and other public spaces are overcrowded as millions of people walk around at all hours of the day and night.

PIEZO ELECTRIC SENSOR

The piezoelectric substance makes up a piezoelectric sensor (quartz-most used). It was previously utilised to transform mechanical tension into electrical charge. The Piezoelectric Sensor's output is AC. To convert it to DC, we'll need a full bridge rectifier. High-voltage generators, acoustic transducers, and other devices use these sensors.

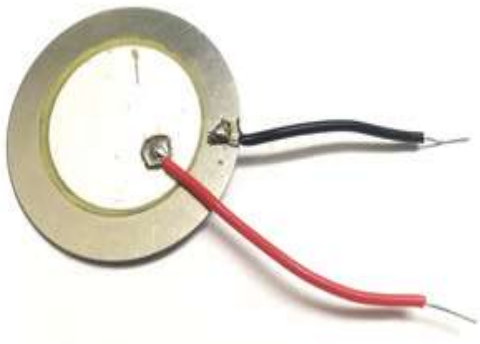
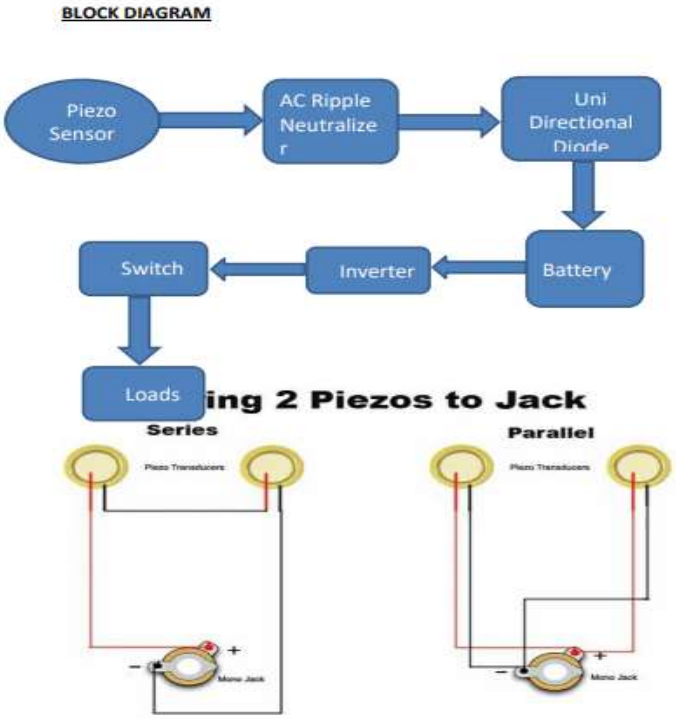


Fig 2 : Piezoelectric Sensor

RESEARCH METHODOLOGY

In this study, the kinetic energy from the footstep was collected using a piezoelectric sensor. The output voltage of a piezoelectric sensor is determined by the stress applied to its structure. The output voltage is typically between 0 and 12 volts. The piezoelectric transducer is available in two sizes: circular and square. A piezoelectric transducer's circular shape is better suited to absorbing stress than a

piezoelectric transducer's square shape. The piezoelectric sensors are wired in a series and parallel configuration..



FINDING AND DISCUSSION

If this project is implemented, we will not only be able to solve the energy crisis, but we will also be contributing to the creation of a healthy global environmental change. The generated energy is stored in batteries, and We will be able to monitor and control how much electricity is generated.

The piezoelectric sensor output is an alternating current waveform. The sensor's output must be rectified and filtered before it can be stored or directly applied to DC loads.

MAXIMUM THEORITICAL VOLTAGE GENERATED

In this project, we connect 4 piezo sensors in series. These 4 series connections are linked in parallel.

$$1/Ceq = 1/c1 + 1/c2 + 1/c3 + 1/c4$$

We know, $Q = C\,V$

$C = Q / V$

Hence,

$Veq/q = v1/q + v2/q + v3/q + v4/q$

$Veq = V1 + V2 + V3 + V4$

As a result, the net voltage generated in series is the sum of the individual voltages generated across each piezoelectric disc. The output voltage of one piezo disc is 12 volts.

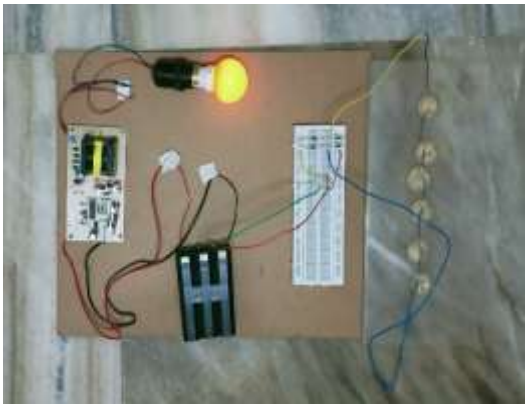
Thus $V_{eq} = V1 + V2 + V3 + V4$

$= 12 + 12 + 12 + 12$

V. CONCLUSION AND FURTHER RESEARCH

Here, Footsteps are the main source of power generation. In this type of power generation there is zero percent of pollution. This technique for generation of power can be utilized where accessibility of power is less or exceptionally low. India is a developing country with a large population, making energy management a major challenge. Using this project, we can derive both A.C and D.C drives based on the force we apply.

For getting more amount of electricity, generally we can increase the number of sensors. Our further study is to increase the amount of electricity by not increasing the piezoelectric sensors.



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