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ADVANCED FOOTSTEP POWER GENERATION

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ABSTRACT:

Man has needed and used energy at an increasing rate for the sustenance and well being since time immemorial. Due to this a lot of energy resources have been exhausted and wasted. Proposal for the utilization of waste energy of foot power with human locomotion is very much relevant and important for highly populated countries like India where the railway station, temples etc., are overcrowded all round the clock. When the flooring is engineered with piezo electric technology, the electrical energy produced by the pressure is captured by floor sensors and converted to an electrical charge by piezo transducers, then stored and used as a power source has became a efficient solution for increasing power needs.
KEYWORDS: Atmega 328 Microcontroller, Peizo Electric Sensors, Power Generation, Renewable Energy Source.

1. INTRODUCTION

Electricity is generally generated from resources like water, wind, coal, etc. for generating the electricity from these resources development of big plants that are needed having high maintenance and high cost. In like manner, it is the target of the present development to give the technique for electrical power generation from which regularly expanding human populace that does not adversely affect the natural resources. This innovation depends on a rule called the piezoelectric effect impact, in which certain materials can develop an electrical charge from having weight, the strain applied to them. The piezoelectric effect is the effect of specific materials to generate the electric charge in response to applied mechanical stress on it. It is the effect in which mechanical vibrations, pressure or strain applied to the piezoelectric material are converted into electrical form. Further in paper we have explained how we used this piezoelectric phenomenon for generation of renewable energy.

2. OBJECTIVE OF PROJECT

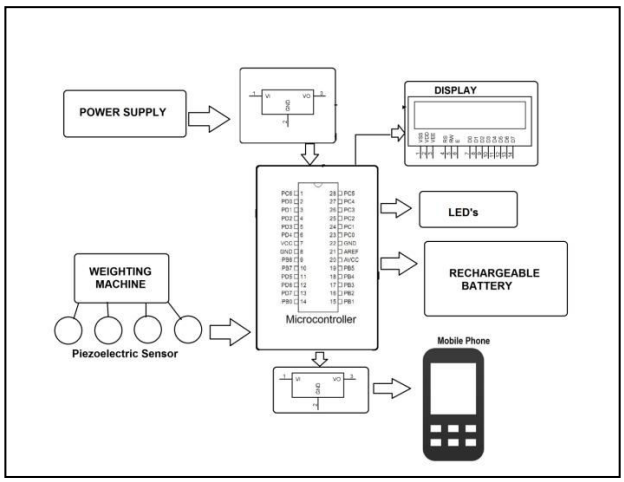
The main aim of this project is to develop much cleaner cost effective way of power generation method, which in turns helps to bring down the global warming as well as reduce the power shortages by the conversion of the force energy in to electrical energy.

3. WORKING PRINCIPLE

The Footstep power generator works on the principle of piezoelectric effect impact. Piezoelectric Effect is the ability of certain materials for generating electric charges in response to applied mechanical stress on the piezoelectric plate. Thus, squeeze certain crystals and you can make electricity flow through them. In most crystals, the unit cell is symmetrical in piezoelectric crystals. Normally, the piezoelectric crystals are electrically neutral and atoms inside the piezoelectric plate may not be symmetrically arranged, but their electrical charges are perfectly balanced, the positive charge in one place cancels out a negative charge nearby them. However, if you squeeze or stretch the piezoelectric crystal, you deform the structure, negative, and causing net electrical charges to appear. This effect carries through a whole structure so net positive and negative charges appear on the opposite, outer faces of the crystal. Normally, the charges in the piezoelectric crystal are exactly balanced, even if they are not symmetrically arranged. If you squeeze the crystal, you force the charges out of balance. Now the effects of the charges are no longer eliminated one another out and net positive and negative charges appear on opposite crystal faces. By squeezing a crystal, you have produced the voltage across its opposite faces and that's piezoelectricity. In this project, we have used the same phenomenon of producing piezoelectricity from the piezoelectric crystal.

4. HARDWARE IMPLEMENTATION

After applying weight on piezoelectric plates voltage is developed across the plates. That voltage is applied to the battery for charging purposes. This is then provided to our monitoring circuitry.LCD is interfaced with a piezo sensor using a microcontroller that allows the user to monitor the voltage and charges a connected battery by it. Also, USB mobile phone charging point where the user may connect cables to charge the mobile phone from the battery charge.



5. CIRCUIT WORKING

When one steps on a weighing machine the piezoelectric disc gets compressed. After the leg is lifted a crystal is decompressed. Thus a full vibration is sensed by a crystal disc and a voltage across it is produced. This voltage is sensed by a voltmeter and displayed on its display. Also, at the same time, this voltage is used to charge the 12V DC Battery. LED's have been mounted under the weighing machine that is switched on by relay whenever a voltage is generated. This event is notified by a glowing LED on the PCB. Thus, whenever a person walks through a weighing machine the battery gets charged due to the voltage which is also displayed on the voltmeter. This event is notified by a glowing LED beneath the weighing machine.

6. APPLICATIONS

1. Can be broadly utilized as the part of colleges, Schools, public transport places and universities.
2. This can be actualized in air terminals, transport stations, railroad stations.
3. Street lights can be actualized utilizing this strategy instead of solar in the rainy season.
4. This framework can be actualized in swarmed places like shopping centers, pathways and so forth.

7. CONCLUSION

The project is successfully tested which is the best economical, affordable energy solution to common people. This can be used for many applications in city areas where want more power. By using this project we can drive D.C loads according to the force we applied on the piezoelectric sensor. The final prototype design does fulfill the objective of generating electricity from piezoelectric disk. Due to the low cost design of the piezoelectric system it is a practical product which could increase the operating period of most common products. The data collected is capable of extending the operational lifespan per charge of portable electronic devices.

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