

Production of Electricity Through Pressure Based Sensors

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Available online at: www.ijcseonline.org

Abstract— In this paper, we generate power through pressure based sensor. 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 and China where the roads, railway stations, bus stands, temples, etc. are all over crowded and millions of people move around the clock. This whole human/ bio energy being wasted if it can be made possible for utilization it will be great invention and crowd energy farms will be very useful energy sources in crowded countries. In this project we are generating electrical power as non-conventional method by simply walking or running on the foot step. Non-conventional energy system is very essential at this time to our nation. Non-conventional energy using foot step is converting mechanical energy into the electrical energy. Power generation using conservative method becoming deficient. There is a necessity arises for a different power generation method. At the same time the energy is was due to human locomotion and many ways. To overcome this problem, the energy wastage can be converted to usable form using the Piezoelectric sensor. This sensor converts the pressure on it to a voltage. So by using this energy saving method, that is the Footstep Power Generation System we are generating power.

Keywords—Pressure sensor, crowd farming,

I. INTRODUCTION

In this project we generate electrical power as non-conventional method by simply walking or running on the foot step. Non-conventional energy system is very essential at this time to our nation. Non-conventional energy using foot step is converting mechanical energy into the electrical energy.

Proposal for utilization of waste energy of foot power with human locomotion is very much relevant and important for highly populated countries like India and China where the roads, railway stations, bus stand, temple, etc are all over crowded and millions of people move around the clock.

This project uses piezoelectric sensors, the control mechanism carries the piezoelectric sensor, A.C ripples neutralizer, unidirectional current control and 12V, 1.3 Amp lead acid dc rechargeable battery and an inverter is used to drive AC/DC loads..

II. EXISTING WORK AND SYSTEM

Other people have developed Rack-pinion and pulley (mechanical-to-electrical) surfaces in the past, but the Crowd Farm has the potential to redefine urban space by adding a sense of fluidity and encouraging people to activate spaces with their movement. The Crowd Farm floor is composed of standard parts that are easily replicated but it is expensive to produce at this stage. This technology would facilitate the future creation of new urban landscapes

athletic fields with a spectator area, music halls, theatres, nightclubs and a large gathering space for rallies, demonstrations and celebrations, railway stations, bus stands, subways, airports etc. like capable of Harnessing human location for electricity generation.

III. PROPOSED SYSTEM

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 and China where the roads, railway stations, bus stands, temples, etc. are all over crowded and millions of people move around the clock. This whole human/bio energy being wasted if can be made possible for utilization it will be great invention and crowd energy farms will be very useful energy sources in crowded countries. Walking across a "Crowd Farm," floor, then, will be a fun for idle people who can improve their health by exercising in such farms with earning. The electrical energy generated at such farms will be useful for nearby application

A. Block diagram

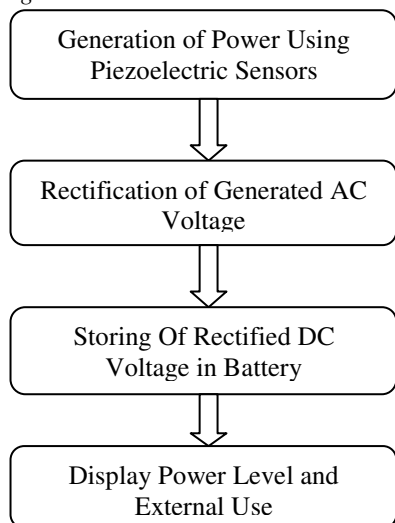


Figure 4.1: Basic Block Diagram

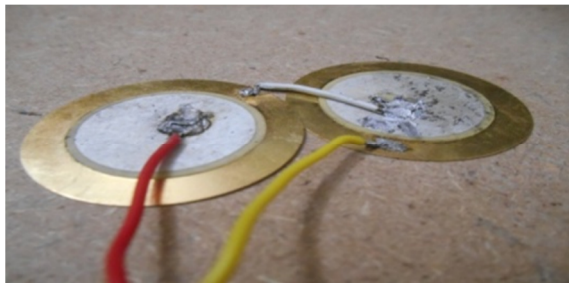
This shows the basic block diagram of our project. It is divided into three main blocks:

1. Generation of power from the piezoelectric material. This is the starting point of our project; here the power is generated by applying the pressure on piezoelectric sensors present in mat.
2. Rectification of generated AC voltage. As the power generated from the piezo material is AC is needed to be rectified.
3. Storage of rectified voltage OR DC voltage.
4. Power is used for external load and status of the battery.

B. Main blocks

I. Generation of power through piezoelectric sensors.

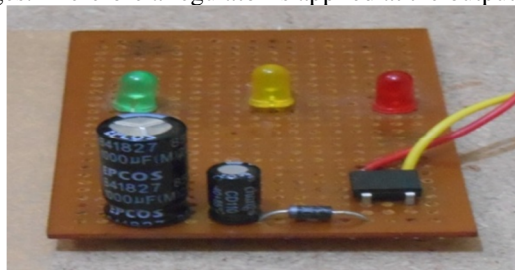
A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. For example, mercury converts the measured temperature into expansion and contraction of a liquid which can be read on a calibrated glass tube. At thermocouple converts temperature to an output voltage which can be read by a voltmeter. For accuracy, most sensors are calibrated against known standards.



II. Rectification and ripple nutilizer

The output from the transformer is fed to the rectifier. It converts A.C. into pulsating D.C. The rectifier may be a half wave or a full wave rectifier. In this project, a bridge rectifier is used because of its merits like good stability and full wave rectification. The Bridge rectifier is a circuit, which converts an ac voltage to dc voltage using both half cycles of the input ac voltage. The Bridge rectifier circuit is shown in the figure. The circuit has four diodes connected to form a bridge. The ac input voltage is applied to the diagonally opposite ends of the bridge. The load resistance is connected between the other two ends of the bridge.

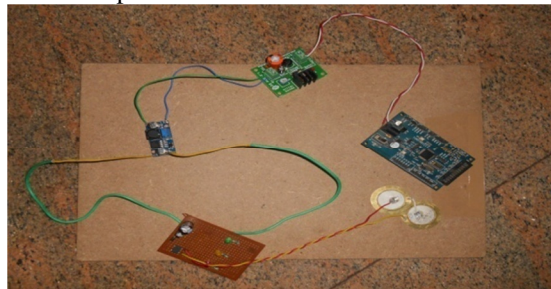
Capacitive filter is used in this project. It removes the ripples from the output of rectifier and smoothens the D.C. Output received from this filter is constant until the mains voltage and load is maintained constant. However, if either of the two is varied, D.C. voltage received at this point changes. Therefore a regulator is applied at the output stage.



III. Storing of dc power and external use.

Battery (electricity), an array of electrochemical cells for electricity storage, either individually linked or individually linked and housed in a single unit. An electrical battery is a combination of one or more electrochemical cells, used to convert stored chemical energy into electrical energy. Batteries may be used once and discarded, or recharged for years as in standby power applications. Miniature cells are used to power devices such as hearing aids and wristwatches; larger batteries provide standby power for telephone exchanges or computer data centers.

IV. Initial setup



C. Equations

As we know the pressure is directly proportional to amount of power generated

$$P \propto Wt$$

Here we take the constant of proportionality as K, then the equation becomes

$$P = K Wt$$

Where,

K- Constant of proportionality

Wt-weight

P-power

We know that for wt=50kg, we get the value of voltage

$$V=4v \text{ and } I=0.015A$$

Then $P=V*I=4*0.015=0.06w$, means we can say that for 50kg we get power

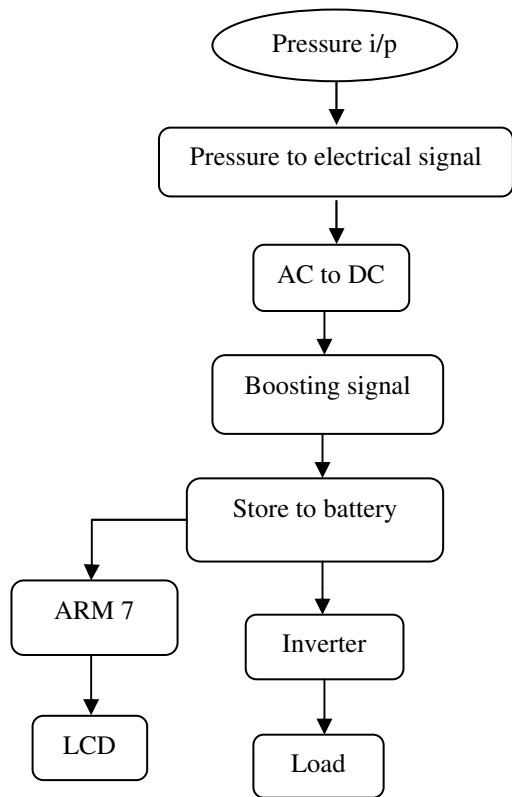
$$(P) = 0.06w$$

From this we can find the value of K

$$K=P/wt=0.06/50=0.0012$$

| Sl no | P in no | Wt in kg |
|-------|---------|----------|
| 1 | 0.012 | 10 |
| 2 | 0.024 | 20 |
| 3 | 0.06 | 50 |
| 4 | 0.09 | 70 |

D. Flow chart



IV. CONCLUSIONS AND FUTURE WORK

The project “**PRODUCTION OF ELECTRICITY THROUGH PRESSURE BASED SENSORS**” is successfully tested and implemented which is the best economical, affordable energy solution to common people. This can be used for many applications in rural areas where power availability is less or totally absence. As India is a developing country where energy management is a big challenge for huge population. By using this project we can drive both A.C. as well as D.C loads according to the force we applied on the piezo electric sensor. Our prototype demonstrates that a floor generator can be done A DC generator can illustrate the concept, but the reliability and durability are questionable, Newer technologies could make a very reliable generator 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 and China. The whole human/ bio-energy being wasted if can be made possible for utilization , it will be great invention and crowd energy farms will be very useful energy sources in crowded countries.

This can be used for many applications in rural areas where power availability is less or totally absence As India is a developing country where energy management is a big challenge for huge population. By using this project we can drive both A.C. as well as D.C loads according to the force we applied on the piezo electric sensor.

ACKNOWLEDGMENT

On the very outset of this paper, we would like to extend our sincere and heartfelt obligation towards all the personages who have helped us in this endeavour. Without their active guidance, help, co-operation and encouragement, we would not have made headway in this paper.

We are ineffably indebted to the Department of Electronics and Communication, K S Institute of Technology, Bangalore, for conscientious guidance and encouragement to accomplish this assignment.

We are extremely thankful and pay our gratitude to our faculty, Mr Sangappa S. B., Associate Professor and PRO, K.S. Institute of Technology, for his valuable support and guidance in completion of this paper in its present form.

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