IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 5, May 2021

DOI 10.17148/IJARCCE.2021.105156

An Investigative Approach intended for Foot Step Power Generation

Manisha Pandey [1], Shivani Bagde[2], Shubham Bokde[3], Hemant Bhagat[4], Vishal Manekar[5], Apoorva Dhuriya[6], Prof. Tushar Muratkar[7]

Final year Student, Department of Electronics and Telecommunication, J D College of Engineering and Management, Nagpur, India[1,2,3,4,5,6]

Professor and Head , Department of Electronics and Telecommunication, , J D College of Engineering and Management, Nagpur, India[7]

Abstract: Imagining the world without any use of electricity is very difficult these days. Small things like study lamp to big things like a plane requires electricity to operate. Human civilization has become very modern, and electricity is needed everywhere.In Today's modern era new forth thing is added in the basic need i.e. food, Shelter,cloths and Electricity. So the keeping that though in mind and a little contribution to humanity we have proposed electricity generation mechanism with the help of steps of Human being.This project is to develop a new source of renewable energy with low-cost budget with the help of Arduino Uno as the microcontroller. The footstep power generation system is to capture the typically wasted energy surrounding a system and transforming it into electrical energy.
Here force energy is produced by human footsteps and the force energy is converted into mechanical energy by rack and pinion mechanism, electricity is produced by generator. This power source has many applications as in home, agriculture application and street lighting and as energy source for sensors in remote locations. This paper is mainly all about generating electricity when people walk on the Floor.

Keywords:. Arduino Uno, rack and pinion mechanism, Generator, Rectifier, Voltage Sensor

I. INTRODUCTION

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 mobility of its masses will turn into boon in generating electricity from its footsteps. In India, places like roads, railway stations, bus stands, are all over crowded and millions of people move round the clock. As a result large amount of power can be obtained with the use of this promising technology. This process involves number of simple setup that are installed under the walking platform. When people walk on this platform their body weight compresses the setup which rotates a rack and pinion mechanism.To reduce the external compression, a responsive subflooring system is installed. And while the power producing platform is over crowded with moving population, energy is produced at larger levels. Greater movement of people will generate more energy.
This method of electricity generation can be divided into two parts. First, the conversion of waste energy that is produced by human into useful mechanical energy and then the mechanical energy into electrical energy. The pressure energy that is produced due to the walking or dancing on the floor is converted into mechanical energy by using of rack and pinion mechanism.

II. PRAPOSED METHODOLOGY

Our proposed system is to generate power from foot step. The user has to keep the instrument on the place where to generate electric power.Place such as Railway crossing bridges, Mall Steps, Public walking lobbies where lage gathering is used to happend.On the walking platform if we place these mechanisms this will defenetly figure out the deficiency of electricity. Below flow chart explain the projected Technnology,

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 5, May 2021

DOI 10.17148/IJARCCE.2021.105156

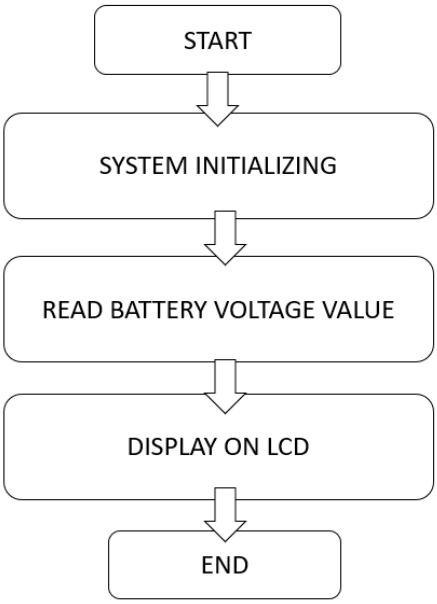

Fig. 1 Flow Chart

III. HARWARE IMPLEMENTATION AND WORKING

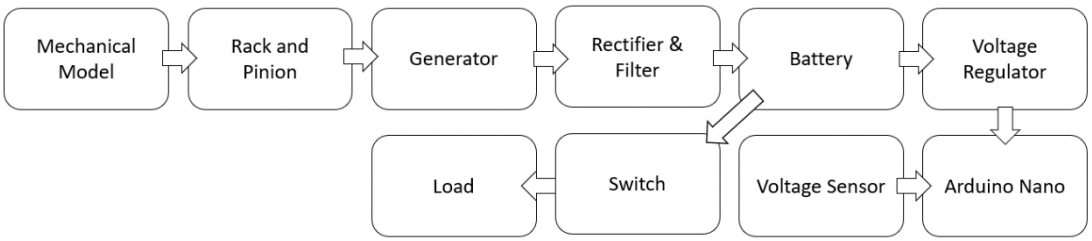

Fig. 2 Block Diagram

Foot Step power Generator works in the similar manner with the combination of sensors namely Rack and Pinion, Generator, Arduino Nano, Generator, Rectifier &Filter,Battery,Voltage Sensor, Voltage Regulator. All these sensors are interfaced according to requirement for making foot Step power Generator. The workings of each sensor are given below. As we know that ARDUINO UNO is the main brain of our proposed system through which all the other sensors are connected through it.A rack and pinion is a type of linear actuator that comprises a circular gear engaging a linear gear, which operate to translate rotational motion into linear motion.A generator is a device that converts motive power into electrical power for use in an external circuit. The power supply block diagram clearly explains that a filter circuit is needed after the rectifier circuitBattery is used for Storing Power.A voltage regulator is a system designed to automatically maintain a constant voltage.

IV. COMPONENT USED

A. Arduino UNO

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging 2.1mm centre-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 5, May 2021

DOI 10.17148/IJARCCE.2021.105156

B. LCD Display

Display device with 16x2 size. 16x2 translates a display 16 characters per line in 2 such lines.in this LCD each character is displayed in a 5x7 pixels matrix.

Fig. 3 LCD Display

Features of LCD Display

1. The operating voltage of this LCD is 4.7V-5.3V
2. It includes two rows where each row can produce 16-characters.
3. The utilization of current is 1mA with no backlight
4. Every character can be built with a 5×8-pixel box
5. The alphanumeric LCDs alphabets & numbers
6. Is display can work on two modes like 4-bit & 8-bit
7. These are obtainable in Blue & Green Backlight
8. It displays a few custom generated characters

C. Rack And Pinion

A rack and pinion is a type of linear actuator that comprises a circular gear (the pinion) engaging a linear gear (the rack), which operate to translate rotational motion into linear motion. Driving the pinion into rotation causes the rack to be driven linearly. Driving the rack linearly will cause the pinion to be driven into a rotation. A rack and pinion drive can use both straight and helical gears. Helical gears are preferred due to their quieter operation and higher load bearing capacity. The maximum force that can be transmitted in a rack and pinion mechanism is determined by the tooth pitch and the size of the pinion.

D. Rectifier and FilterCircuit

This circuit converts AC to DC. It uses bridge circuit along with filter and 7805 voltage regulator.AC from previous stage is provided to rectifier which give dc output which is further filter with the help of RC filter.output of filter is given to voltage regulator IC which is used to regulate the supply.

E. Voltage Regulator

The LM78XX series of three terminal regulators is available with several fixed output voltages making them useful in a wide range of applications. One of these is local on card regulation, eliminating the distribution problems associated with single point regulation. The voltages available allow these regulators to be used in logic systems, instrumentation, HiFi, and other solid state electronic equipment. Although designed primarily as fixed voltage regulators these devices can be used with external components to obtain adjustable voltages and currents. The LM78XX series is available in an aluminum TO-3 package which will allow over 1.0A load current if adequate heat sinking is provided. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistor is provided to limit internal power dissipation. If internal power dissipation becomes too high for the heat sinking provided, the thermal shutdown circuit takes over preventing the IC from overheating. Considerable effort was expanded to make the LM78XX series of regulators easy to use and minimizes the number of external components. It is not necessary to bypass the output, although this does improve transient response. Input bypassing is needed only if the regulator is located far from the filter capacitor of the power supply. For output voltage other than 5V, 12V and 15V the LM117 series provides an output voltage range from 1.2V to 57V.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 5, May 2021

DOI 10.17148/IJARCCE.2021.105156

V. HARDWARE IMPLEMENTATION

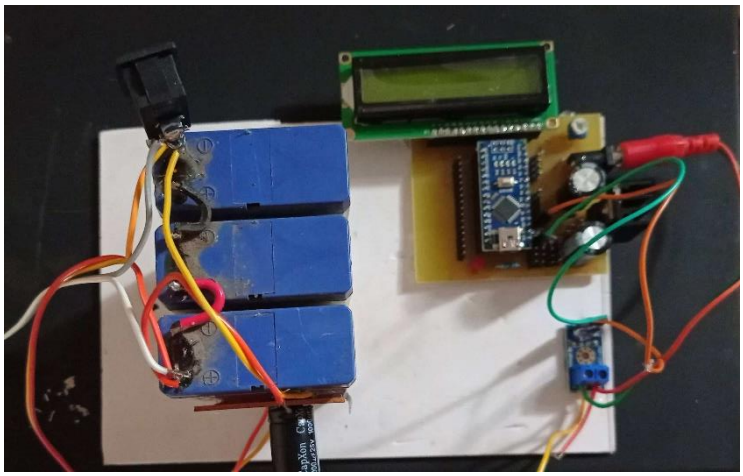

Fig. 4 Hardware Implementation

VI. ADVANATGES

- Low cost/simple
- Easy to operate – reliable
- End-to-end connectivity and affordability
- Easy to Install

VII. CONCLUSION

In proposed system of power generation there is no any fuel input requirement for the generation of electrical power. Thus it can also be concluded that this mode of power generation system is eco-friendly, i.e. no pollution is caused during the generation of power using this type of model. Hence due to such advantages, this system can be embedded at any of the public places like railway platforms, busy foot-paths, malls etc. Implementing this system, dependency on the conventional sources of energy can be reduced, thus it is considered as beneficial for nature and human life.

REFERENCES

[1]. N. S. Metalia, D. Khandwala, "Power Generation from Dance Floor", International Journal of Engineering Research and Technology, Volume 06 Issue 04, pp 853-856 April-2017.
[2]. Joydev Ghosh, Supratim Sen, Amit Saha, Samir Basak, "Electrical Power Generation Using Foot Step for Urban Area Energy Applications", International Conference on Advances in Computing, Communications and Informatics, 2013 IEEE.
[3]. Munaswamy, B. et al. (2018) „Mechanical Footstep Power Generation", 5(2), pp. 291–298.
[4]. Prabhavathi, K. (2017) „Foot Step Power Generation Using Piezoelectric Material 2016-2017", 1(1), pp. 595–600.
[5]. Tom Jose V, Binoy Boban, Sijo M T, (2013) "Electricity Generation from foot steps; A generative Energy Resources" International Journal of Scien tific and research publication, pp 1-3, March 2013.
[6]. Rao A.Padma, Kumar A.Kiran and S.Suresh, (2014) "Power Generation from Speed Breaker by Rack and Ratchet Mechanism", International Journal of Current Engineering and Technology, Vol. 1 No. 2, 2014. E–ISSN 2277 – 4106, P–ISSN 2347–5161
[7]. Sabarish R , Kumar Alok, (2017) "Design And Fabrication Of Foot Step Power Gentration" International Journal of Pure and Applied Mathematics Volume 116 No. 19 2017, 529-533 ISSN: 1311-8080 (printed version); ISSN: 1314-3395 (on-line version) url: http://www.ijpam.eu, Special Issue