IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 13, Issue 5, May 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.317

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317| A Monthly Peer Reviewed & Referred Journal |

||Volume 13, Issue 5, May 2024||

|DOI:10.15662/IJAREEIE.2024.1305043|

Generating Electricity by Using Piezoelectric in Shoes

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ABSTRACT: In this area of technology advancement, the demand for electricity for industrial and services deliver is on the constant rise. The main challenge is the exponential increase in the demand for electricity and the lower rate of electricity generation to meet this higher demand. That notwithstanding, there is a need to design and develop new energy sources to meet the current market demand. One of the sectors that have attracted much interest is the generation of energy using devices such as Piezoelectric shoe device which can convert other types of energy into electrical energy. Electrical energy is important and had been demand increasingly. A lot of energy resources have been wasted and exhausted. An alternative way to generate electricity by using a population of human had been discovered when walking, the vibration that generates between the surface and the footstep is wasted. By utilizing this wasted energy, the electrical energy can be generated and fulfill the demand. The transducer that uses to detect the vibration is a piezoelectric shoe transducer. This transducer converts the mechanical energy into electrical energy. When the pressure from the footstep is applied to the piezoelectric shoe transducer, it will convert the pressure or the force into the electrical energy.

KEYWORDS: Piezoelectricity, Piezoceramic crystals,Shoe Power, Electricity generation.

I.INTRODUCTION

Over the years, electricity continues to be a significant determinant of the economic growth of a country. Its usage cuts across activities in residents for lighting and heating; and Industries to power machines in the industrial sector. Electricity is also essential in the sectors of education, mineral exploitation, effective communication, healthcare delivery, transport and many more; serving as the basis upon which a nation's economy successfully thrives. This draws critical attention to how indispensable electricity is for human existence in the 21st century. Power generation in Ghana comes with various challenges that need to be dealt with. These challenges are attracting the attention of scientists, economists, and engineers, who do not only understand the current trend of the impacts but also, plan for future challenges. Challenges plaguing the Ghanaian sector include high levels of distribution losses, lack of revenue due to the non-payment of bills and poor tariff structure, which makes it difficult for the power utility companies to make significant investments in the service they provide, to improve the sector due to financial constraints. Hence the project designs a power generation model with piezoelectric shoeity that can be utilized to produce electricity while storing the charges in a lithium battery for later distribution to support the power demand on campuses and when researched further can be used effectively to cut down the dependence on some of the expensive power-producing plants being used to supply power to devices in the Universities and the country.

II.EXISTING SYSTEM

"Renewable" assets of vitality, for example, Solar Cell Panel, Wind Energy can likewise be utilized to collect power. However, these sources are constrained to a specific region for e.g. we can say that SOLAR ENERGY can be utilized just at the spot where the sun focus is entirely great and continuous. Wind Energy can fundamentally be utilized as a part of the seaside territory's the place the wind pace and accessibility is all the time present. Aside from all their human movements such as nonstop driving of the hand wrenches and little generators can be additionally used to deliver power however all these wonders of producing power requires a consistent human exertion and checking. In addition, step by step because of expansion in the expense of the assets required to deliver power there is an awesome increment in the expense of electricity, due to this reason till today numerous weaker segment individuals of the general public can't get

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power and are not in any case ready to workeven little apparatuses.

III.PROPOSED SYSTEM

In the proposed system, substitute strategy for generation of power is finished by utilizing piezo plate. A tile made from piezo material is made. The voltage generated across a piezo tile is supplied to a battery for it to recharge and supply the dc loads. Voltage generated is also given to an inverter, from where it is supplied to all the ac loads. A LCDis interfaced to the tile using a PIC microcontroller to display the voltage generated across the piezo tile. The piezoelectric shoe material converts the pressure applied to it into electrical energy. The source of pressure can be either from the weight of the moving vehicles or from the weight of the people walking over it. The output of the piezoelectric shoe material is not a steady one. So a bridge circuit is used to convert this variable voltage into a linear one. Again, an ACripple filter is used to filter out any further fluctuations in theoutput. The output dc voltage is then stored in a rechargeablebattery. As the power output from a single piezo-film was extremely low, combination of few Piezo films was investigated. Two possible connections were tested - parallel and series connections. The parallel connection did not show significant increase in the voltage output. With series connection, additional piezo- film results in increased of voltage output but not in linear proportion.

The combination of both parallel and series connection is employed for producing 40V voltage output with high current density. From battery provisions are provided to connect dc load. An inverter is connected to battery to provide provision to connect AC load. The voltage produced across the tile can be seen in a LCD.For this purpose, Arduino microcontroller is used. The microcontroller uses a crystal oscillator for its operation. Theoutput of the microcontroller is then given to the LCD whichthen displays the voltage levels.

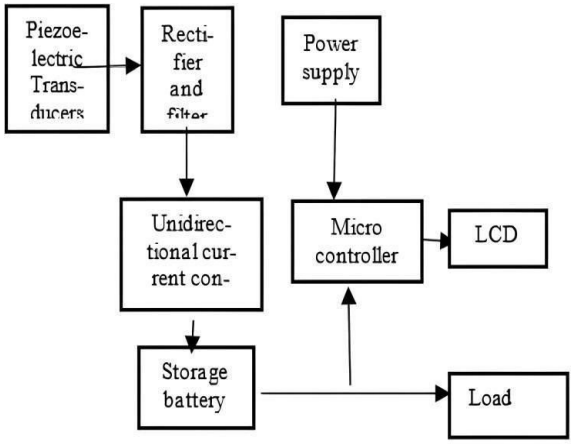

Figure.1. Block Diagram of the Proposed

Piezoelectric shoe sensors are versatile tools for the measurement of various processes. They are used for quality assurance, process control, and for research and development in many industries. Pierre Curie discovered the piezoelectric shoe effect in 1880, but only in the 1950s did manufacturers begin to use the piezoelectric shoe effect in industrial sensing applications. Since then, this measuring principle has been increasingly used, and has become a mature technology with excellent inherent reliability.

ARDUINO UNO R3 MICROCONTROLLER

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins(of which 6 can be used as PWM outputs), 6 analog inputs, a16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to acomputer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

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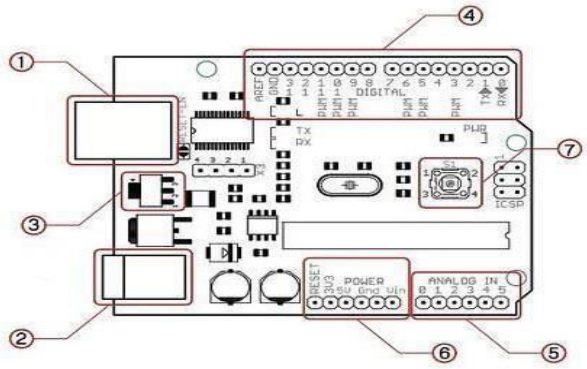

Figure.2. Arduino Uno R3

The Uno differs from all preceding boards in thatit does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB- to-serial converter. Revision 2 of the Uno board (A000046) has a resistor pulling the 8U2 HWB line to ground, making it easier toput into DFU mode. For our power generation, we are using a piezoelectric material which is a Piezo-ceramic plate. It has piezoelectric material coated on a circular copper disc, whichacts as one of the electrodes.

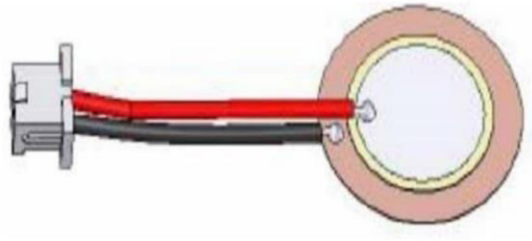

Figure.3.Piezoelectric chip

The ceramics reported here have simple construction and are easily available and gives sufficient power output. The key breakthroughs are the employment of soft piezoelectric ceramics that matches the elastic properties of regular shoe fillings and the new dc/dc conversion circuit

IV.HARDWARE RESULTS

This is the perfect tool for engineers to test their microcontroller designs before constructing a physical prototype in real time. This program allows users to interact with the design using on-screen indicators and/or LED and LCD displays and, if attached to the PC, switches and buttons.

Figure.4.Hardware Implementation

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V.CONCLUSION

The main aim of this project is to generate power in a nonconventional, nonpolluting form of energy can be harvested and maintain economically. The electric power is produced from the mechanical strain to electrical energyby piezoelectric shoe material (PZT). The PZT (Lead Zirconate titanate) has used to generate electric power, because it is easily polarized and low field strength, high coupling factor. The (PZT) is superior in all characteristicsthan other transducers. In future the piezoelectric shoe is main source to generate electric energy. With future development in the field of electronics better manufactured piezoelectric shoe crystals and better selection of place of installation to get more electricity can be generated. Though this is just an idea of us. The work model implementation and conceptualization would require someeffort and time on our part.

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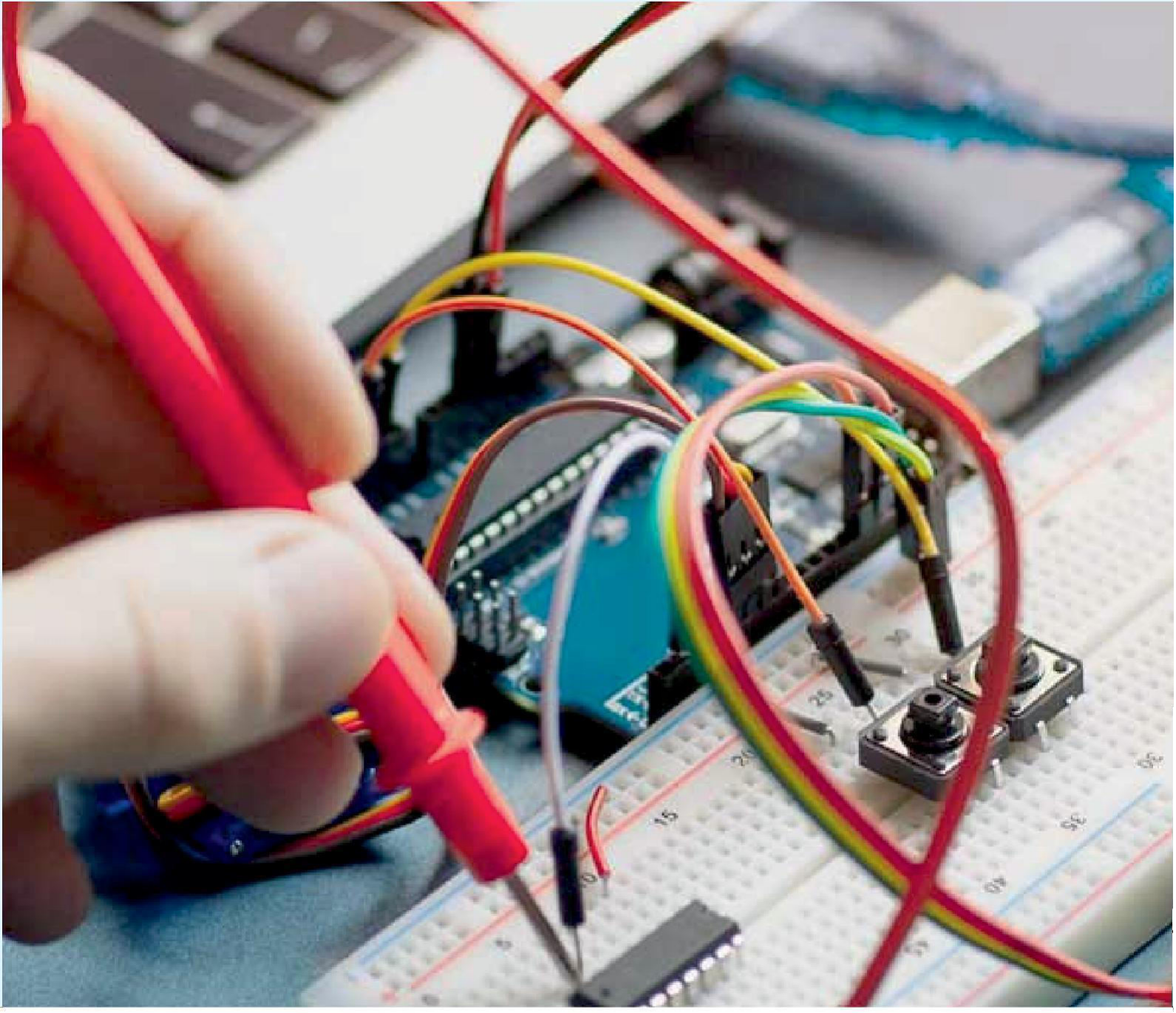

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