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Advanced Footstep Power Generation System using RFID

P.P.Patil[1], A.S. Patil[2], R.S.Desai[3], S.A.Bhosale[4]

Professor, Dept. of ENTC, Ashokrao Mane Group of Institution, Vathar, Maharashtra, India[1]

UG Student, Dept. of ENTC, Ashokrao Mane Group of Institution, Vathar, Maharashtra, India[2]

UG Student, Dept. of ENTC, Ashokrao Mane Group of Institution, Vathar, Maharashtra, India[3]

UG Student, Dept. of ENTC, Ashokrao Mane Group of Institution, Vathar, Maharashtra, India[4]

ABSTRACT: Here we propose an advanced footstep power generator system that uses piezoelectric sensors to generate power from human footsteps .The system allows for a platform for placing footsteps. The piezo sensors are mounted below the platform to generate voltage from footsteps .The sensors are placed in such an arrangement so as to generate maximum output voltage. This is then provided to our monitoring circuitry .The circuit is a microcontroller based monitoring circuit that allows user to monitor the voltage and charges a connected battery by it. It also displays the charge generated and displays on an LCD display. Also it consists of a USB mobile phone charging point where user may connect cables to charge mobile phone from the battery charge. Thus we charge a battery using power from user footsteps, display it on lcd using microcontroller circuit and allow for mobile charging through the setup.

KEYWORDS: Piezoelectric , Pressure, Sensing, System Security.

I.INTRODUCTION

This project includes number of simple setup and component that is installed under the walking or standing platform.. When person walk or stand on this platform their body weight compresses the setup of system which tends to rotates a dynamo and current produced is stored in dry battery And while the power producing platform is over crowded with moving population, energy is produced is high. More movement of people will generate more energy. This whole human foot energy being wasted, if it can be made possible to use this energy, it will become great power producing platform and will be very useful energy sources in crowded places. This method generates the electricity without polluting environment. The source of energy is continuous and renewable.

Energy is nothing but the ability to do the work. In day to day life, Electricity is most commonly used energy resource. Now-a-days energy demand is increasing and which is life-line for people. Due to this number of energy resources are generated and wasted. Electricity can be generated from resources like water, wind etc. to generate the electricity from these resources development of big plants are needed having high maintenance cost. Some other energy resources are also costly and cause pollution. They are not affordable to common people. Electricity has become important resources for human being hence, it is needed that wasted energy must have to utilize, walking is the most common activity done by human being while walking energy is wasted in the form of vibration to the surface. And this wasted energy can be converted into electricity. Using the principle called piezoelectric effect. Piezoelectric effect is the effect in which mechanical vibrations. Pressure or strain applied to piezoelectric material is converted into electrical form. This project gives idea about how energy is used on stepping on stairs. The use of stairs in every building is increasing day by day even small building has some floors when we are stepping amount of this wasted energy is utilized and converted to electricity by Piezoelectric effect. Piezoelectric effect is the effect of specific materials to generate an electric charge in response to applied mechanical stress. From this system we are generating energy by human footsteps using the piezoelectric effect. Piezoelectric effect is the effect which coverts mechanical stress, stain, pressure into electrical energy. This idea not only overcome the energy crises problem but also helps to maintain the eco-friendly environment for generating energy. When we stored power in battery then we want to use this power so that we are here using RFID security

II.WORKING

Piezoelectric material converts pressure into electrical energy. The pressure can be either from weight of moving vehicles or from the weight of people walking on it. The produced output is in the variable form .so bridge rectifier circuit is used to convert variable voltage into linear voltage. An AC filter is used to filter out this output voltage and it is stored in rechargeable battery. We are using arduino uno . Arduino is open source electronic prototyping platform based on flexible, easy to use hardware and software. When system is on it display a message on LCD then it is RFID based security system allows only authorized people to use this system. Here we are using RFID TAGS .this are comprises a microchip containing identifying information and an antenna that transmits this data wirelessly to the reader. RFID READER is active device that is used to read information stored in tags or transmit information to the arduino . it`s consists of an antenna either internal or external which continuously emits radio wave so that RFID tag can respond to it by sending back their information .this information is generally known as electronic product code(EPC). After that this system give time slot to user the charge phone. The time slot is it display on the LCD at the same time arduino turn on Relay switch and it makes path between storage battery our application after finishing time slot .arduino turn off the Relay switch there is disconnection between battery and application. From this system we are generating energy by human footsteps using the piezoelectric effect. Piezoelectric effect is the effect which coverts mechanical stress, stain, pressure into electrical energy. This idea not only overcome the energy crises problem but also helps to maintain the eco-friendly environment for generating energy

The 16×2 LCD is used to display various status system. When system turn on, controller unit is display. First is so message on the LCD " Register Mode' ' after register in .it display message to user tag your RFID TAG after tagging it display time slot for this time slot duration our application comes to use after completing time slot. It display message again tag your RFID TAG.

Piezoelectric sensor is a device that uses the piezoelectric effect to measure change in acceleration ,pressure , strain, temperature or force by converting this energy into an electrical charge. A transducer can be anything that convert one form of energy to another. The piezoelectric material is one kind of transducers. When we squeeze this piezoelectric material or apply any force or pressure, the transducer convert this energy into voltage. This voltage is a function of the force or pressure applied to it.

RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC) . AIDC methods automatically identify objects, collect data about the and enter those data directly into computer systems with little or human intervention . RFID methods utilize radio waves to accomplish this. At a simple level , RFID systems consist of three components : an RFID tag or smart lab l, an RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader. The reader then converts t radio waves to a more usable form of data. Information collected from the tags is then transfer through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time . An RFID tag consists of an integrated circuit and an antenna. The tag also composed of a protective material that holds the pieces together and shields them from various environmental conditions. The protective material depends on the application. For example , employee ID badges containing RFID tags are typically made from durable plastic , and the tag is embedded between the layers of plastic. RFID tags come in a variety of shapes and sizes and are either passive or active . Passive tags are the most widely used ,as they are smaller and less and expensive to implement . Passive tags must be by the RFID reader before they can transmit   data. Unlike passive tags , active RFID tags have an onboard power supply thereby enabling them to transmit data at all times. For a more detailed discussion, refer to this article: Passive RFID Tags vs. Active RFID Tags. Smart labels differ from RFID tags in that they incorporate both RFID and barcode technologies. They' re made of an adhesive label embedded with an RFID tag inlay, and they may also feature a barcode and/or other printed information. Smart labels can be encoded and printed on-demand using desktop label printers, whereas programming RFID tags are more time consuming and requires more advanced equipment.
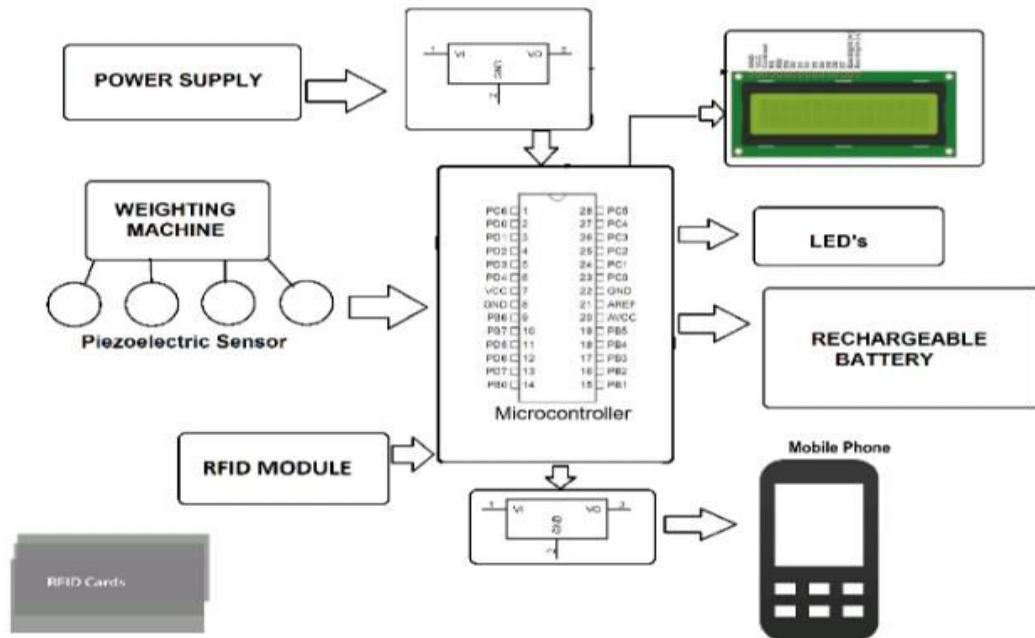
III.COMPONENT

A.Arduino :-The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, 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 a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started Arduino is open source prototyping platform based on easy to use hardware and software "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions

B. Piezoelectric sensor :-Piezoelectricity is the electric charge that accumulates in certain solid materials in response to applied mechanical stress. The word piezoelectricity means electricity resulting from pressure.A piezoelectric sensor is a device that uses the piezoelectric effect tomeasure pressure, acceleration, strain or force by converting them to an electrical signal.
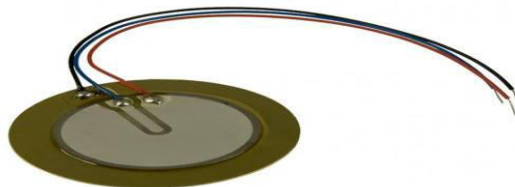
C. LCD :-A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of a LCD.

D. Voltage Regulator 7805 :- The LM78XX/LM78XXA series of three-terminal positive regulators are available in the TO-220/D-PAK package and with several fixed output voltages, making them useful in a Wide range of applications. Each type employs internal current limiting, thermal shutdown and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output Current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

E.RFID:-Radio Frequency Identification, or RFID, is a rapidly-emerging identification and logging technology. Whether or not you have come across RFID systems in your work, you have probably encountered RFID in your daily life, perhaps without even being aware of it. At their simplest, RFID systems use tiny chips, called "tags," to contain and transmit some piece of identifying information to an RFID reader, a device that in turn can interface with computers.

To begin understanding RFID, think of a conventional Point-of-Sale barcode reader scanning grocery barcodes. In its simplest form, an RFID system is much the same: it also can identify a package. However, unlike barcodes, RFID tags don't need a direct line of sight: within limits, we can now scan an unpacked skid of boxes. Next, think of RFID tags as mini databases, or as barcodes that can accumulate information as they travel. At this point, RFID diverges qualitatively from barcoding, givingit great new potential.


F. Battery :- An electrical battery is a combination of one or more electrochemical cells, used to convert stored chemical energy into electrical energy. The battery has become a common power source for many household and industrial applications. 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. RESULT AND DISCUSSION

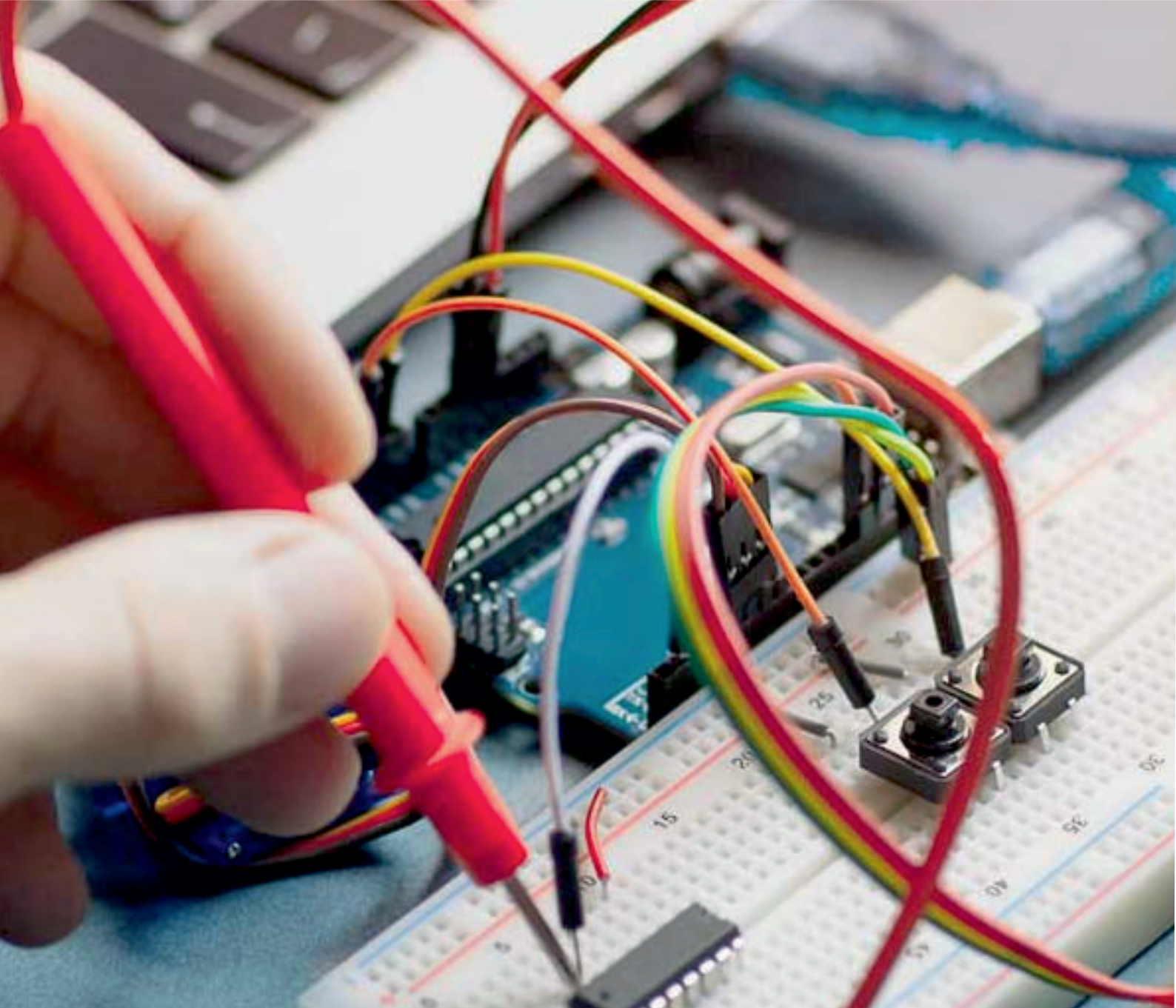| Sr. No	No of foot steps	Current (Amp)	Voltage (v)	Power (Watt)
1	1	0.010	12	0.032
2	100	1	12	1.2
3	500	5	12	60
4	1000	10	12	120
5	1500	15	12	180
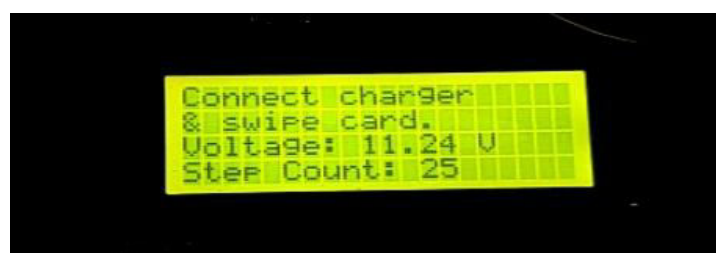
V.CONCLUSION

The project " FOOT STEP POWER GENERATION" is successfully tested andimplemented which applications in rural areas where power availability is less ortotally absence. As India is a developing country where energy management is a bigchallenge for huge population. is the best economical, affordable energy solution to common people.This can be used for many By using this project we can drive both A.C. as well as D.Cloads according to the force we applied on the piezo electric sensor. Our prototypedemonstrates that a floor generator can be done

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