

# Foot Step Electric Power Generation By Using Piezo Material With Advanced Microcontroller

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**Abstract:** Basically Man need energy sources at an increasing rate for his sustenance and wellbeing on earth few years ago. Because of this the energy resources are exhausted and wasted. In this the main intent is to restore the lost energy from surroundings and convert it into electrical energy. This energy will extend the life time of power supply. In this paper we proposed a technique where it is stressed on the harness of energy from piezo crystals. This Piezoelectric material will provide an ability which can convert mechanical strain into electric potential. This mechanical strain and electric potential allows the function of power harvesting medium.. In this paper electrical power is generated as a non-conventional method. the Non-conventional energy using foot step will convert the mechanical energy into the electrical energy.

**Key Words:** Piezoelectric material, battery, external pressure, led, microcontroller.

## 1. INTRODUCTION

For an alternate strategy to create power there are number of techniques by which power can be delivered, foot step energy generation can be a successful strategy to produce power. walking is the most widely recognized action in human life. At the point when an individual walks, he loses energy to the street surface as effect, vibration, sound and so on, because of the exchange of his load on to the street surface, through foot falls on the ground during each progression. This energy can be tapped and changed over in the usable structure, for example, in electrical structure. This gadget, whenever installed in the trail, can change over foot step energy into electrical structure. Ninety-five percent of the effort put into pedal power is changed over into energy. Pedal power can be connected to a wide scope of employments and is a straightforward, shoddy, and helpful wellspring of energy. Be that as it may, human active energy can be valuable in various ways however it can likewise be utilized to create power dependent on various methodologies and numerous associations are now executing human controlled advancements to produce power to control little electronic apparatuses.

Proposition for the use of waste energy of foot control with human headway is particularly applicable and imperative for very populated nations like India and China where portability of its masses will transform into aid in creating power from its footsteps. In India, places like streets, railroad stations, transport stands, are all stuffed and a large number of individuals move nonstop. Accordingly huge measure of intensity can be gotten with the utilization of this promising innovation. This

procedure includes number of straightforward setup that are introduced under the walking stage. At the point when individuals walk on this stage their body weight packs the setup which pivots a dynamo or Sanyo curl and current delivered is put away in dry battery. To decrease the outside pressure, a responsive sub - flooring framework is introduced. And keeping in mind that the power creating stage is packed with moving populace, energy is delivered at bigger dimensions. More noteworthy development of individuals will create more energy. In this subject we are producing electrical power as non customary strategy by basically strolling or running on the stride. Nontraditional energy framework is exceptionally basic as of now to our country.

As the accessibility of ordinary energy decays, there is need to discover substitute energy sources. All most all the state power offices in our nation, they can't supply the power as per the interest. The power delivered by these organizations isn't even adequate for household utilities; in such basic circumstance it is exceptionally hard to redirect the energy for other open needs. There by an elective source must be found, numerous individuals proposes for sunlight based energy, however it will be a costliest undertaking, in addition accessibility of sun oriented energy is poor especially in blustery and winter seasons, thus it isn't trustworthy. Subsequently an option least expensive strategy must be resolved for couple of uses; thus this undertaking work has been taken up, which is planned to create power from footstep system.

Out of the numerous elective energy assets, this innovation depicted in this undertaking report is a definitive wellspring of every single known type of

energy. It is clear, safe, and free, does not contaminate nature and in this way will be a very reasonable option in the days to come. As there is a colossal increment in the group, the heap connected on the strides by the general population, it produces constant energy, which can be put away and used to invigorate the road lights. Here the idea is to change over the mechanical energy in to electric energy. Man has required and utilized energy at an expanding rate for his sustenance and prosperity as far back as he went ahead the earth a couple of million years prior. Crude man required vitality fundamentally as nourishment. He inferred this by eating plants or creatures, which he chased. With the progression of time, man began to develop land for farming. He added another measurement to the utilization of energy by taming and preparing creatures to work for him. With further interest for energy, man started to utilize the breeze for cruising ships and for driving windmills, and the power of falling water to turn water for cruising ships and for driving windmills, and the power of falling water to turn water wheels. Till this time, it would not be right to state that the sun was providing all the vitality needs of man either specifically or by implication and that man was utilizing just inexhaustible wellsprings of energy.

Energy harvesting has been a point of talk and research since three decades. With the consistently expanding and requesting energy needs, uncovering and misusing increasingly more energy sources has turned into a need of the day. Energy harvesting is the procedure by which energy is gotten from outside sources and used to drive the machines specifically, or the energy is caught and put away for sometime later. With the approach of innovation, use of energy sources has expanded significantly. Piezoelectric Energy Harvesting is another and inventive advance toward energy harvesting. Relatively few specialists have been done till now in this field, thus it is a testing employment to remove energy from piezoelectric stones. In this examination paper, depiction of the essential working of a piezoelectric precious stone is referenced. At that point later in the paper, consolidating energy from various piezoelectric precious stones to acquire higher voltages is proposed.

## **2. LITERATURE SURVEY**

C.Nithiyesh kumar creator contemplated three techniques for foot step energy generation specifically piezoelectric strategy, rack and pinion technique and fuel cylinder technique relatively and found that the rack and pinion system is progressively effective with moderate expense of activity and support. Md.Azhar, creators utilized directed 5V control, 500mA power supply. Scaffold

type full wave rectifier is utilized during the air conditioner yield of optional of 230/12V advance down transformer. A rack and pinion is a sort of straight actuator including a couple of riggings which convert rotational movement into direct movement. The "pinion" connects with teeth on the rack. In this paper, since the power age utilizing foot step get its energy prerequisites from Non-sustainable wellspring of vitality. There is no need of intensity from outside sources (mains) and there is less contamination in this wellspring of energy. It is exceptionally helpful to the spots like all streets and just as all sort of stride which is utilized to produce the non-ordinary vitality like power.

Supratim Sen creators utilized 80 volts and 40 mA from one coil have been produced from a model as first innovation. The second creation gives 95 volts and 50 mA from one loop and this produced power can be utilized to light LED cluster and to pursue DC fan correcting the AC or can charge batteries. For high productivity in the axel of the second rigging, they fitted a solid magnet vertically, with the goal that when the apparatus will pivot because of human body weight the magnet additionally turn. The magnet is set in a circle type copper coil. At the point when the magnet begin turning as indicated by the Faraday's law of electromagnetic induction, there will be actuated emf in the coil. This is tied in with creating power when individuals stroll on the Floor in the event that we can plan a power producing floor that can deliver 100W on only 12 stages, at that point for 120 stages we can deliver 1000 Watt and in the event that we introduce such kind of 100 stories with this framework, at that point it can create megawatts a reality just 11% of sustainable power source adds to our essential energy. On the off chance that this task is conveyed, at that point not just we can defeat the energy emergencies issue however this additionally adds to make a solid worldwide ecological change. In this undertaking a rigging framework is connected with flywheel which causes to pivot the dynamo as the tile on the deck is squeezed The power that is made is spared in the batteries likewise we will almost certainly screen and control the measure of power produced When an individual passes it push the tile on the ground surface which turn the pole underneath the tile, turn is restricted by grip bearing which is supported by holders. Essential shaft is turn approx. twice by a solitary tile push. The development of the common shaft turn the. gearbox shaft which assembles it multiple times (1:15) at that point its development is smoothen by the assistance of fly wheel which impermanent store the development, which is pass on to the DC generator (it creates 12V 40 amp at 1000 rpm).

Binoy Boban creator fabricated a model produced using treated steel, reused vehicle tires and reused aluminum, likewise incorporates a light inserted in the asphalt that illuminates each time a stage is changed over into vitality (utilizing just 5 percent of the created vitality). The normal square of asphalt creates about 2.1 watts of power. Furthermore, as indicated by creator, any one square of asphalt in a high-pedestrian activity region can see 50,000 stages per day. In light of this information, just five units of Pavegen asphalt can be sufficient to keep the lights

on at a transport stop throughout the night. the utilization of ventures in each building is expanding step by step, since even every little building has a few stories. A lot of vitality is squandered when we are venturing on the floors by the dispersal of warmth and grinding, each time a man ventures up utilizing stairs. There is incredible probability of tapping this vitality and creating power by making each staircase as a power age unit. The produced power can be put away by batteries, and it will be utilized for insulating the building.

### 3. PROPOSED SYSTEM

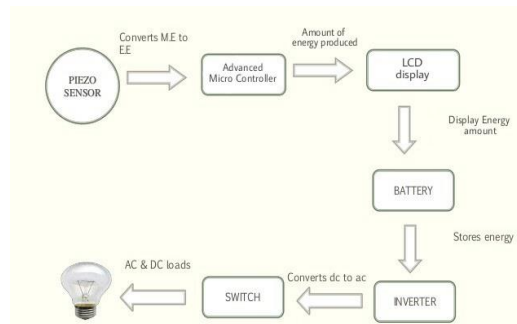


Fig. 1: PROPOSED SYSTEM

The above figure (1) shows the architecture of proposed system. In this system we use piezo electric sensor, microcontroller, LCD display, battery, inverter and ADC and DAC converters. Let us discuss each device in detail manner. A piezoelectric sensor is a gadget that utilizes the piezoelectric impact to gauge weight, speeding up, strain or power by changing over them to an electrical flag. Piezoelectric sensors have turned out to be adaptable apparatuses for the estimation of different procedures. They are utilized for quality affirmation, process control and for innovative work in a wide range of businesses it was just during the 1950s that

the piezoelectric impact began to be utilized for mechanical detecting applications. From that point forward, this estimating standard has been progressively utilized and can be viewed as a develop innovation with an exceptional characteristic unwavering quality. It has been effectively utilized in different applications, for example, in medicinal, aviation, atomic instrumentation, and as a weight sensor in the touch stack of cell phones. In the car business, piezoelectric components are utilized to screen ignition when creating interior burning motors.

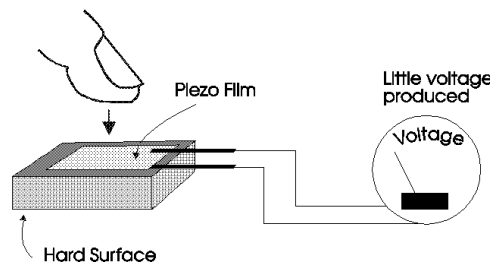


Fig 2:PIEZO SENSOR

The sensors are either specifically mounted into extra gaps into the chamber head or the sparkle/shine plug is furnished with an implicit little piezoelectric sensor. The ascent of piezoelectric innovation is

straightforwardly identified with a lot of innate preferences. The high modulus of versatility of numerous piezoelectric materials is tantamount to that of numerous metals and goes up to 10e6

Even however piezoelectric sensors are electromechanical frameworks that respond to pressure, the detecting components show just about zero redirection. This is the motivation behind why piezoelectric sensors are so tough, have an incredibly high characteristic recurrence and a fantastic linearity over a wide plentifulness run. Also, piezoelectric innovation is unfeeling to electromagnetic fields and radiation, empowering estimations under cruel conditions. This is the capacity to produce an electrical flag when the temperature of the precious stone changes. This impact is likewise regular to piezo earthenware materials. One burden of piezoelectric sensors is that they can't be utilized for genuinely static estimations. A static power will result in a settled measure of charges on the piezoelectric material. While working with customary readout gadgets, defective protecting materials, and decrease in inward sensor obstruction will result in a consistent loss of electrons, and yield a diminishing sign.

This paper is utilized to create voltage utilizing stride compel. The proposed framework fills in as a medium to create control utilizing power. This task is

helpful in broad daylight places like transport stands, theaters, railroad stations, shopping centers, and so on. In this way, these frameworks are set openly puts where individuals walk and they need to go on this framework to get past the passageway or exist. At that point, these frameworks may produce voltage on every single step of a foot. For this reason, piezoelectric sensor is utilized so as to gauge power, weight and speeding up by its change into electric signs. This framework utilizes voltmeter for estimating yield, drove lights, weight estimation framework and a battery for better exhibition of the framework. 1). at whatever point drive is connected on piezoelectric sensor, at that point the power is changed over into electrical vitality. 2). In that development, the yield voltage is put away in the battery. 3). The yield voltage which is created from the sensor is utilized to drive DC loads. 4). Here we are utilizing AT89S52 to show the measure of battery get charged. battery is most usually utilized in PV frameworks because of minimal effort and effectively accessible wherever on the planet.



Fig 3:LEAD ACID BATTERY

These batteries are accessible in both fixed and wet cell batteries. Lead corrosive batteries have high dependability because of their ability to withstand heat, over release and stun. The batteries have phenomenal charge acknowledgment, low self-

release and extensive electrolyte volume. Lead corrosive batteries are tried utilizing Computer Aided Design. These uses of these batteries are utilized in UPS Systems and Inverter and have the ability to perform under hazardous conditions.

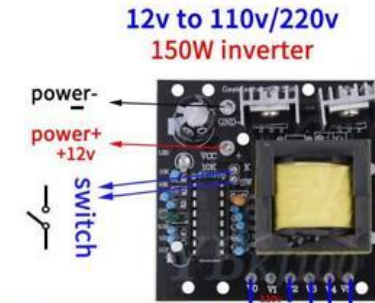


Fig 4:DC to AC inverter

An inverter is an electrical gadget that changes over direct flow to substituting flow; the changed over exchanging flow can be at any required voltage and recurrence with the utilization of material control circuits, transformers and exchanging. Strong state inverters are utilized in a wide scope of uses since they have no moving parts from little changing force supplies to vast electric utility high-voltage direct stride control age utilizing piezoelectric material that

vehicle mass power. Inverters are utilized to supply AC control from DC sources like batteries or sun based boards. These are ordered into two sorts The changed sine wave inverter's o/p is like a square wave o/p barring that the o/p goes to 0 V for a period before exchanging +Ve or - Ve. It is exceptionally basic and ease and is appropriate with different electronic gadgets, aside from touchy or specific hardware like laser printers.

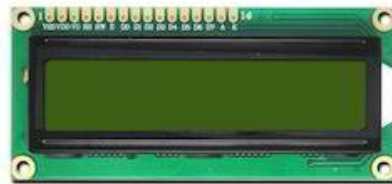


Fig 5: LCD display

A 16X2 LCD show is utilized in the stride control age venture to show the voltage status. It is additionally furnished with a differentiation altering pin. n ADC (simple to-computerized converter) is a gadget that changes over simple to advanced images. A simple to advanced converter may likewise offer a disconnected estimation. The switch task is accomplished by a DAC (advanced to-simple

converter). Commonly, this is an electronic gadget that changes a simple info like voltage or current to an advanced yield, which is identified with the size of the voltage or current. In any case, some in part electronic gadgets like revolving encoders can likewise be considered as ADCs.

#### 4. RESULTS



Fig 7: OUTPUT

## 5. CONCLUSION

A non-conventional, non-polluting form of energy can be harvested, maintaining the economic standards of common laymen. The electricity is produced from the mechanical stress on the crystals due to piezoelectric effect and thus it generates the energy needed for charging battery to light streetlights at night and also for the city consumption of electricity. Among these, the human population is one of the resources. Energy can be generated by walking down the stairs. The energy generated will be stored and then we can use it for domestic purpose. This system can be installed in homes, schools, universities, where people move around the clock. this mechanical energy applied in the glass in electrical energy. When there are some vibrations, the effort or effort force is exerted on foot on a flat platform.

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