



Energy Generation Using Foot Steps & Other Resources

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ABSTRACT:

The energy is very important thing in every country for growth of the country. Coal is generally used to generate electricity in India, but due to increase of demand this is not sufficient to provide required power. So solar, windmills, and other resources are used to provide additional generation. But it requires more cost. So we are doing a project to generate electricity using footsteps at crowded places, it is useful and can generate electricity. In this project we are generating electrical energy by means of a non-conventional method just by walking on the footsteps. Non-conventional system for energies are very much require at this time. Energy generation using footsteps mechanical foot paddle to generate electricity. In this Project we are generating electricity just with the help of Mechanical paddle and Piezoelectric sensor. The power generation is much worthy but it has little initial cost effective factors.

Keywords: Arduino, Piezoelectric Sensor, DC Battery, Generator, Mechanical Foot Paddle, LCD Display, Inverter.

Introduction:

Now a days, due to increase in population in country is increased and therefore the requirement of the power is increased. At an equivalent time the wastage of energy also increased in some ways. So reforming this energy back to usable form is that the major solution. As technology is developed and therefore the use of gadgets, electronic devices also increased. Power generation using conservative methods becoming deficient. There is a necessity arises for a special power generation method. At an equivalent time the energy is wasted thanks to human locomotion and lots of ways.

Nowadays energy and power are the one of the basic needs in this modern world. Energy demand is increasing day by day. On the other hand, the many energy resources are getting exhausted and wasted. Proposal for utilization of waste energy of foot power with human locomotion is very relevant in populated countries like India where roads, railway stations, bus stands, temples, etc. are overcrowded and millions of people move around.

This whole energy is wasted. If this energy made possible for utilization it will be a great invention. In this project we are converting non-conventional from just walking foot step into electrical energy. This project uses simple drive mechanism such as rack and pinion assembly. The control mechanism carries the rack & pinion, and D.C generator to output. In this project we are generating electrical power as non-conventional method by simply walking or running on the footsteps. Non-conventional energy system is very essential at this time to our nation.

Non-conventional energy using foot step needs no fuel input power to generate the electrical power. In this project the simple drive mechanism such as rack and pinion assembly and chain drive mechanism is used for generating power by utilization of force which is obtained during the walking on steps is converted in to electrical energy with the help of mechanical systems. The generated power is stored by means of battery and this is used for activating the connected loads. This is one of the compact and efficient systems for generating electricity which can be easily installed in many regions.

We are using electric generator with mechanical system so that when any person goes through the system his/her footstep operates the mechanical generator so by rotating generator electricity will be available at output Arduino is used to display voltage generated by generator and also provide pulses to inverter so that output of 230 V AC is available.

Proposed System:

In the proposed system, the production of electric power from the foot step movement of the peoples and the pressure exerted during walking which is fritter away is the main theme of this project. The mechanical power transform into electric power because the pressure induced by the footstep and by using transducers and sensor is essentially called as "Foot step power generation system". The main aim is to beat the facility crisis throughout the planet. We can also know the battery stored voltage status and the solar panel output voltage by sending a request message to the GSM modem. Then the microcontroller will send the reply to the user mobile with the battery voltage status and the solar panel output voltage.

Methodology:

A working model of Footstep Power Generation is demonstrated in this project, the basic working of this model has been presented as a block diagram. To implement this model four piezoelectric sensor that are connected in series to increase the voltage output, this sensor generates AC voltage which is transferred to the bridge rectifier. The output voltage transferred to the bridge rectifier. The output voltage from the sensor can be of two types because

it produces AC voltage:

Positive: When positive voltage is received then it is passed into the forward bias mode which will in turn charge the battery.

Negative: When a negative voltage is received then it is transferred to the reverse bias of the bridge rectifier.

This way no voltage loss is observed during a complete cycle. An additional resistor of 470 Ohm is placed in series along with a capacitor of 4.7 mF with the LED to make the glow more noticeable.

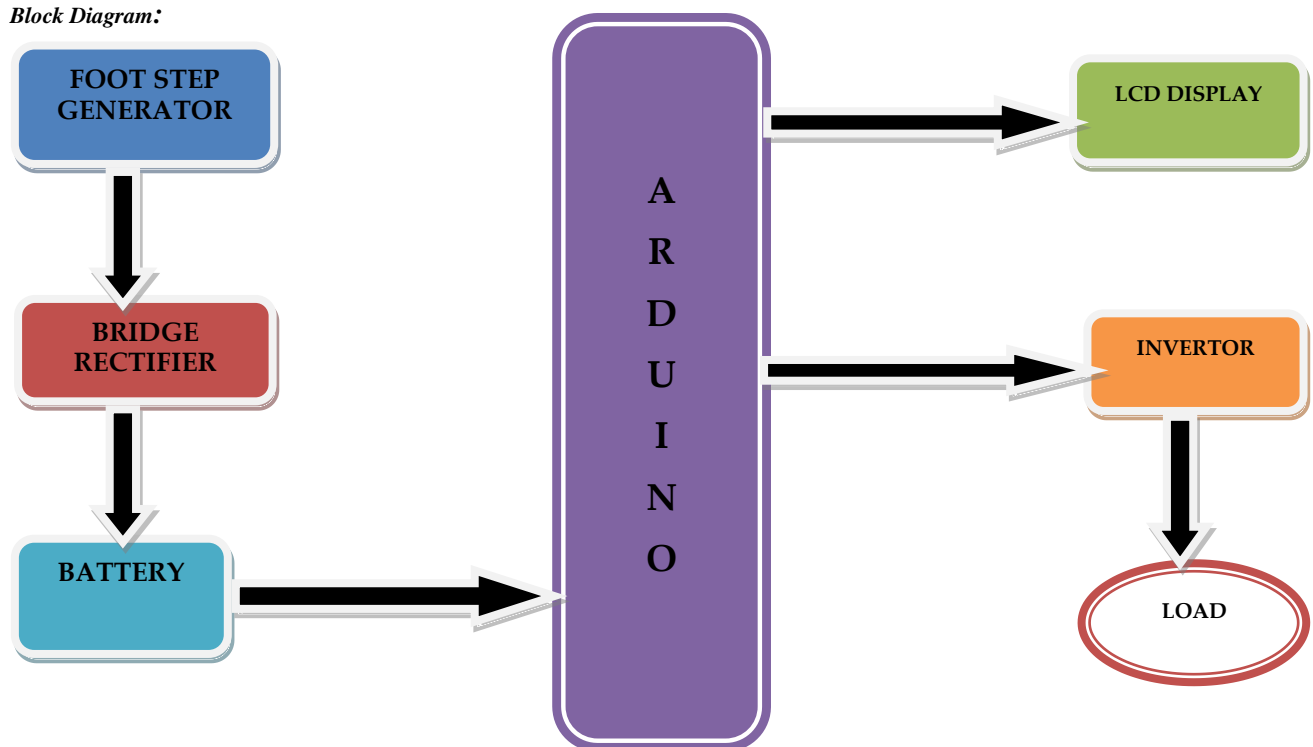
Objective:

The main aim of this project is to develop must cleaner cost effective of power generation method, which is turns helps to bring down the global warming as well as reduce the power storages.

The objective is to convert foot step, walking and running energy into electrical energy by using transducer and use it in an electronic device that requires low power.

Utilize the power for helping up the road lights, additionally for activity reason, sign boards of streets and in other public places.

Block Diagram:



Working:

The basic working principle of our project is based on the piezoelectric sensors and to implement this we adjust the wooden plates above and below the sensors. When the pressure is applied on the sensors, it will convert mechanical energy into electrical energy. The Step-up transformer is used to provide power generation to the circuitry, where the MOSFET is used for switching purposes and to boost up the power. Here the polyester capacitor, diode, resistances and L293D IC is being used. The main purpose of foot step power generation is to provide more power by using piezo.

A piezo film is capable of generating 40V. To store this generated Power we require a 12 v rechargeable battery which will be connected to the inverter. This inverter will convert the 12v DC to the 230v AC. This 230v AC voltage is used to activate the loads. By using this AC voltage, AC loads can be operated. To monitor the supply from the circuitry we need the AVI GPO Board which provide the 5volt to the controller and the 16*2 LCD Display. it Consist of P-N junction diode, filters, voltage regulator i.e. IC 7805 which is used to process.

PIEZOELECTRIC SENSOR:

All the researchers are trying to develop source of electricity generation. So to find the resources that is renewable surceases of energy for the future. Piezoelectric materials are being more and more studied as they turn out to be very unusual materials with very specific and interesting properties. In fact, there materials have the ability to produce electrical energy from mechanical energy for example they can convert mechanical behaviour like vibrations in to electricity. Such devices are commonly referred to as energy harvesters and can be used in applications where outside power is unavailable and batteries are not a feasible option. While recent experiments have shown that these materials could be used as power generators, the amount of energy produced is still very low, hence the necessity to optimize them. Piezoelectric materials have two properties that are define as direct and converse effect. Direct effect is the property of some materials to develop electric change on their surface when mechanical stress is exerted on them, while converse effect is the property of some materials to develop mechanical stress when an electric charge is induced.

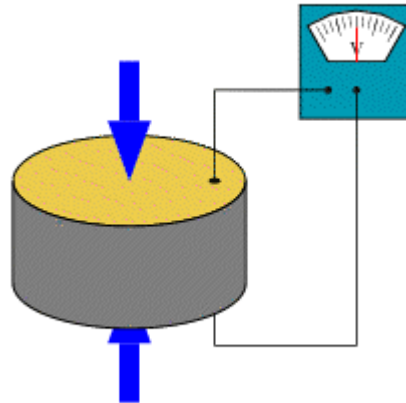


Fig 1 Piezoelectric Sensor

Arduino:

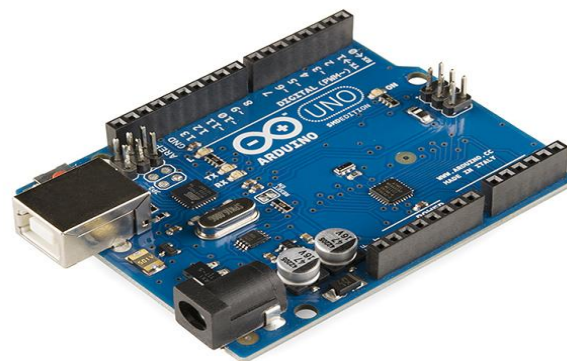
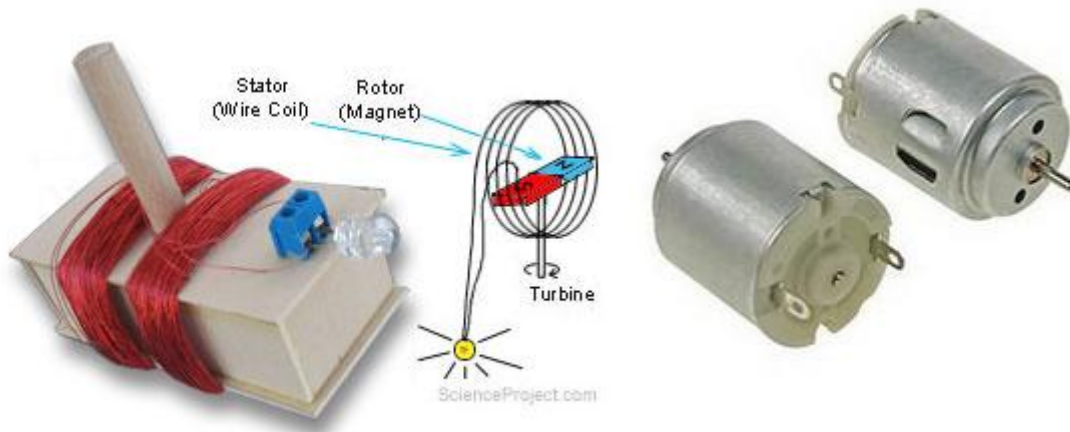


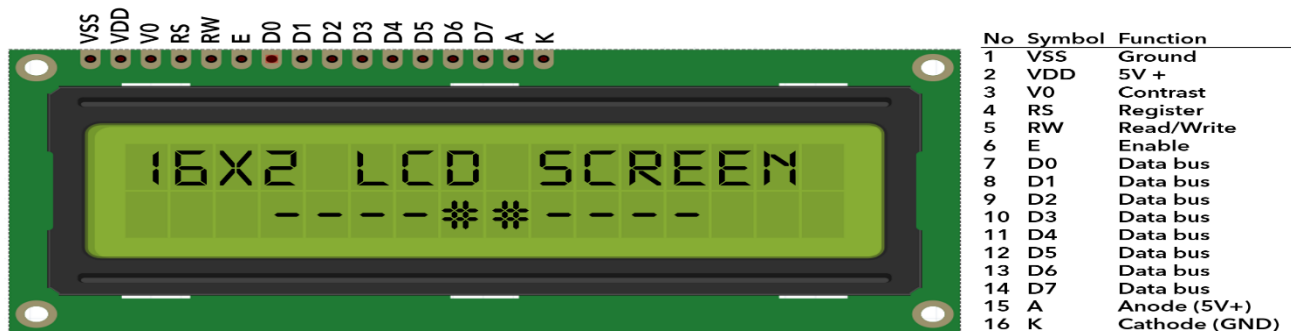
Fig. 2 Arduino

Arduino is an open source programmable circuit board that can be integrated into a wide variety of makerspace projects both simple and complex. This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world. By responding to sensors and inputs, the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays. Because of it's flexibility and low cost, Arduino has become a very popular choice for makers and makerspaces looking to create interactive hardware projects.

Arduino was introduced back in 2005 in Italy by Massimo Banzi as a way for nanoengineers to have access to a low cost, simple tool for creating hardware projects. Since the board is open-source, it is released under a Creative Commons license which allows anyone to produce their own board. If you search the web, you will find there are hundreds of Arduino compatible clones and variations available but the only official boards have Arduino in it's name. In the next section, we're going to discuss a few of the Arduino boards available and how they differ from each other.

Electric generator:

Electricity that we use at home is produced by electric generators. An electric current is created when a magnet is spun rapidly inside a coil of wire. As you see in the conceptual diagram in the right, a turbine (usually powered by water or wind) spins a magnet inside a coil. This action induces an electric current in the coil that can be used to power a light bulb. In this project you will successfully build an electric generator that really works. The electric generator will produce enough electricity to light up a light bulb or an LED lamp by using Inverter. The rotating magnetic field induces an AC voltage in the stator windings (coil). The rotor's magnetic field is produced by the neodymium magnet sphere. The permanent magnet field is constant and the terminal voltage varies directly with the speed of the dc motor. This is an AC electric generator which can lights up small LED.

LCD Display:

This is an illustration of a Parallel Port. Because it does not make use of the bi-directional capability available on later ports, it should operate with the vast majority, if not all, Parallel Ports. It does not, however, illustrate how to use the Status Port as an input. Seven-segment and other multi-segment LEDs are favoured over these modules. The reasons for this are as follows: Since LCDs are capable of showing unique and even characters, animations, are inexpensive, easy to program etc, they are favoured for such applications. Command registers are used store command instructions of LCD.

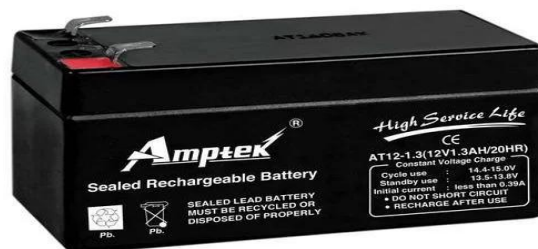
Various activities of the LCD such as cleaning its screen, setting cursor location, initializing it etc can be done using the commands that are stored in the command register. Data registers are used to store the data that is to be displayed by the LCD. Data is basically the ASCII value of the characters that is to be displayed on the LCD.

Bridge Rectifier:



The yield from the stride body is sustained to the rectifier. It changes over A.C into pulsating D.C. The rectifier might be a half wave or a full wave rectifier. In this undertaking, an extension rectifier is utilized in light of its benefits like great strength and full wave correction. The Bridge rectifier is a circuit, which changes ac voltage to dc voltage utilizing both half cycles of the information air conditioning voltage.

Battery:



Batteries are a collector of one or more cells whose chemical reactions create a flow of electrons in a circuit. All batteries are made up of three basic components: an anode (the '-' side), a cathode (the '+' side), and some kind of electrolyte (a substance that chemically reacts with the anode and cathode). When the anode and cathode of a battery is connected to a circuit, a chemical reaction takes place between the anode and the electrolyte. This reaction causes electrons to flow through the circuit and back into the cathode where another chemical reaction takes place. When the material in the cathode or anode is consumed or no longer able to be used in the reaction, the battery is unable to produce electricity. At that point, your battery is "dead".

Results & Conclusion :

The primary source of energy is generated by human footsteps. There is no requirement for energy from conventional sources, and this sort of power generating produces no pollutants. It is crucial to the places, all tracks where footsteps are used to generate non-conventional energy such as electricity, that there is no need for any form of power from the mains. It is a well-known fact that non-conventional energy contributes 11% of our primary energy. If this project is implemented, it will not only exacerbate and obstruct the energy shortfall, but it will also result in positive worldwide environmental change.

The project is being tried and updated, which is the most conservative, rational solution to prosperity for the people of our world. The concept of piezoelectric energy can be used in areas with frequent power-cuts and unstable power usage. In rural areas where agriculture works involving high power usage can be benefited by piezoelectric technology and also places where high crowd movements are involved can be benefited. We need to take steps which increases power generation from renewable sources to decrease carbon footprint at global levels. In modern times the contribution of renewable energy is just 11 percent for sustainable growth this number should be increased. Various developed economies such as France, Germany are taking steps towards the growth of renewable energy and related technology.

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List all the material used from various sources for making this project proposal

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