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POWER GENERATION USING FOOTSTEPS FOR MOBILE PHONE GENERATION

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ABSTRACT

In this paper, we've got bestowed the planning of power generation victimization footstep supported out their piezo electrical sensors. mankind needs energy at terribly fast rate for his or her living and upbeat from the time of their arrival on this planet, thanks to this reason power resources are tired and debilitated. Proposal for the use and application of additional energy in foots of human is incredibly abundant to the aim for terribly inhabited nations like China and India. wherever the streets, rail and coach station square measure over inhabited and packed like sardines on the move the clock. So, victimization such construct the facility will be availed and deployed by changing energy to power.

1. INTRODUCTION

In the recent state of affairs, the demand for energy has been increasing at AN horrific rate and there has been a decrease within the handiness of energy resources. For property development, the requirement of the hour is to develop a lot of economical, pollution free and renewable energy resources to fulfill the endless demands. The depletion of fuel has affected worldwide economic science. Some even the recent collapse of few money establishments in countries such US and therefore the Great Britain. This shows that we have a tendency to area unit too smitten by fuel as a supply of power. Besides, fuel as a supply of current has contributed to a severe environmental pollution drawback. Therefore, another technique to provide electricity has got to be place in situ. one amongst the foremost promising choices is to come up with the electrical energy from the close supply. PZT are often used as a mechanism to transfer close energy into current which might be used for low power devices. With new advancement in electricity PZT MEMS Technologies, PZT power generation will use a standard different to power sources want to drive bound styles of sensors/actuators, telemetry, and MEMS devices.The energy generating typically means that the conversion of natural energy sources into usable current, like star, thermal, wind or vibration energy, etc. within the previous couple of years, scientists and engineers have struggled to appreciate the energy generating from close vibration energy employing a electricity device, that generates electrical charges at the strain/stress/force. it's renowned that energy is one amongst the vital sources of energies which will be recycled in our surroundings. The sources of energy are often a vibratory structure or a moving object. the most challenges to come up with current for low power electronic devices area unit i) nature of mechanical vibration and mode of linking with electricity structure, ii) finding the appropriate efficient electricity materials, and iii) storing electrical charges/energy a lot of with efficiency. To recover close vibrations , close a system, the electricity primarily based energy generator is used.

2. LITERATURE SURVEY

A. LITERATURE STUDY

According to T.R. Deshmukh paper deals with style and modeling of components of the model of the foot step power generation system victimization 3d modeling code Creo. This method consists range of straightforward setup that's put in underneath the walking or standing platform. Project system works on the principle of changing the linear motion as a result of to pressure of footsteps into rotating motion by rack and pinion arrangement. This mechanism fails if there's any incidence of variable load results in equalization sort issues Power isn't generated throughout come back movement of rack. Sasank shekhar Panda's paper is predicated on crank shaft; fly wheel, and kit arrangement. This type of footsteps power generation system square measure eligible to be put in in thronged places and rural areas. so, this is often an awfully smart technology to produce effective answer to power connected issues to reasonable extent. this may be the foremost acceptable means that of providing power to the places that involves difficulties of transmission. Maintenance and lubrication are needed time to time. Miss. Methane state that electricity materials having crystalline structure. they'll convert energy within the current and the other way around. The made current from crystal is incredibly low within the order of 2-3 volts and is stored in battery to charge controller, since it's insufferable to charge 12v battery through crystal output. to extend the voltage, the boost convertor circuit is employed. Comparison between numerous piezo electrical materials shows that PZT is superior in characteristics. Also, by comparison it absolutely was found that series- parallel combination association is a lot of appropriate. the burden applied on the tile and corresponding voltage generated is studied and that they square measure found to possess linear relation. it's particularly fitted to implementation in thronged areas. Jose Ananth wine state that project victimization easy drive mechanism that embody rack and pinion assembly and chain drive mechanism. The conversion of

the pressure or force energy in to current. the facility generation is incredibly high however the initial value of this method is high. There is no would like of power from the mains and this system is eco-friendly. it's terribly helpful at the thronged places and on all roads and also as all reasonably foot step that is employed to come up with the electricity. Maintenance and lubrication is needed time to time. Power isn't generated throughout come back movement of rack.

B. LITERATURE SURVEY

Earlier developments within the piezo electrical electronic equipment concerned concentration on tiny vibrations and thence tiny strains. Also, few of them needed external voltage provide and there have been variety of losses within the system that amounts to low voltage output. In Dec 1929, scientists in U.S Navy performed numerous researches on electricity crystals. Their focus was primary on the scale of crystals. This analysis proved that by dynamic the dimension and orientation of crystal the output is significantly modified. They designed the crystal named 'Curie cut' or 'Zero Cut' supported the changes created within the angles of the crystal. Thus, this proves that the crystals designed with such dimensions are effective in dominant oscillations of a 50watt thermionic valve. So, they act as a voltage dominant device too. In 1985, the construct of victimization handwriting dynamics for electronic identification was performed in Sandia Laboratories. An electricity sensing element pen for getting the pen purpose dynamics throughout writing was studied. style equations were derived associate degreed details of an in-operation device were studied. Typical output waveforms obtained from the operation of the pen associate degreed showed the dissimilarities between dynamics of a real signature and a tried forgery. So, this additionally shows high sensitivity of Piezo material towards marginal pressure amendment. In 2000, numerous applications of electricity in wireless sensing were studied and experimented. varied industrial and military applications need remote sensing of assorted machine and instrumentality in operation parameters in locations wherever ancient power sources might not be offered and long periods of unattended operation are needed. very often, however, some supply of moving energy could also be gift operative of the machine in question. hence an electricity supply is with efficiency used to come up with power for the operation of a microcontroller and transmitter to accumulate sampled machine knowledge. Numerous techniques for the economic conversion, use and storage of electricity power is discovered.

The main idea is with the piezoelectric tiles (which is placed under footsteps),we can produce energy that can be stored in a rechargeable battery, so that we can use it for our later purposes and it can be also placed in public places like street light, mobile charging etc. The amount of energy stored can be displayed in a liquid crystal Display.

EXISTING SYSTEM

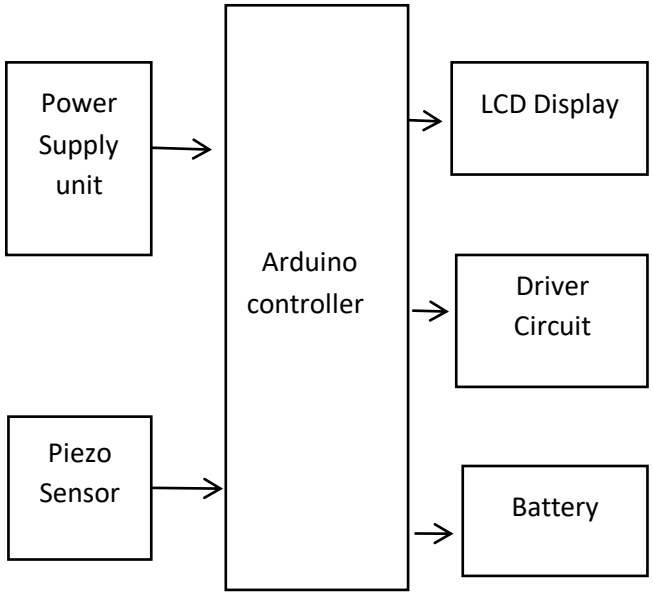
In Existing system power generation is done by mechanical arrangements using rotor setup. Once person cross the footstep means rotor will rotate. It will enable with generator to produce the power.

PROPOSED SYSTEM

Footstep's arrangement is employed to come up with the electrical power. As power demand is increasing day by day, therefore this arrangement is employed to come up with the electrical power so as to fulfill the specified energy demand. during this arrangement the energy is born-again into current.

3. FUNCTIONAL BLOCK

DIAGRAM



A. WORKING PRINCIPAL

The working principle of an electrical power generation from foot step. When a human strikes his foot on the STEPS, it pressurizes the rack existing under to it. That rack makes the torque to the piezo sensor attached to it (anticlockwise direction) which is further makes the rotation of the power generation. Due to the shaft rotation, gears embedded on the shaft which is made to maintain the gear ratio for velocity. Unidirectional clutch is involved after it senses the shaft rotation in that direction. The rotor in the generator gets torque and starts rotating and generating power. After getting maximum displacement, rack starts moving upwards then the gear attached to it rotates clockwise direction so, one - way clutch will be discarded, and another unidirectional clutch engages which is used to utilize the upward motion energy. But it was maintained so that the rotor will be in the same direction which boosts the torque to the rotor.

HARDWARE REQUIREMENTS

1) Piezoelectric sensor
2) Power supply
3) Arduino uno controller
4) Lcd
5) Driver circuit
6) Battery

PIEZOELECTRIC SENSOR

Piezoelectric device uses electricity to live pressure or mechanical energy by converting all of it to power signals. it's substantial tool that might be use for the mensuration of varied the caused. It has terribly high modules of physical property and it goes up to 10e6 N/m2. It converts the mechanical stress to electrical voltage. once mechanical stress is applied onto the device, electrical charge is accumulated on the crystal that may be extracted employing a wire. once a electricity material is subjected to fret T, it produces Polarization P that is linear perform of T: P=dT (d: electricity strain constant). For a stuff substance, the relationships of electrical displacement D with field strength E are given by D=εE. Basic electricity equation: Dn = dnjTj + εT nm Em (m, n=1,2,3; I, j=1, 2, …., 6) Piezoelectric device is thought-about as a RC Network ANd an AC supply I as shown within the fig1.

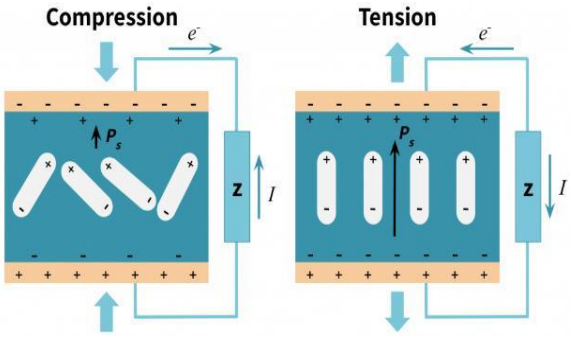


Figure 1

POWER SUPPLY UNIT

A typical Power offer unit consists of the subsequent. Transformer − Associate in Nursing input electrical device for the stepping down of the 230v AC power offer. Rectifier − A Rectifier circuit to convert the AC parts gift within the signal to DC parts.

ARDUINO IDE

The Arduino Integrated Development Environment is the cross-platform IDE designed for Arduino microcontrollers. The IDE uses a combination of the C standard library and C++.

LIQUID CRYSTAL DISPLAY(LCD)

Liquid-crystal show (LCD) is that the flat-panel show or totally different electronically modulated device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light-weight directly, instead using a backlight or reflector to provide footage in color or monochrome. A liquid-crystal show (LCD) may be a flat-panel show or totally different electronically modulated device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light-weight directly, instead using a backlight or reflector to provide footage in color or monochrome.

DRIVER CIRCUIT

The driver circuit style contains AC capacitors that are designed for top voltage and are connected line to line. the essential perform of the electrical device is to limit this of the availability. because the electrical device solely reduces this, high voltage is delt (rectification and regulation) within the later a part of the circuit.

BATTERY

Battery which is supplied fully charged and discarded after use, it is a type of electrical battery that can be charged, discharged into a load, and recharged many times. It is composed of one or more electrochemical cells. And it is going to be system's central brain.

ADVANTAGES

- It helps to reduce requirement of power increasing.
- No need fuel input.
- Power generation simply walking on steps
- Low-cost power generation.

APPLICATIONS

- It can be used for mobile charging purposes in buses, colleges, etc.
- This piezoelectric tile can also be placed in public places like staircases in malls, temples, airports and even shops.
- This can be alternate scope for placing this idea in sidewalks in road.

4. CONCLUSION

In this work, we have improvised the energy scavenging tile and presented with the simulation results. Due to improvisation, power generation was increased. Load resistance and flywheel with different inertia's are tested with the output power generation. Optimal load resistance of 7ohms is obtained by performing different operations with the load where it couldn't generate from 1ohm and 50ohms. Different types of flywheels are used to determine the type of flywheel to be used with its moment of inertia to get better power output. Two unidirectional clutches are used to overcome the over damping of the scavenging device and the extension period of device working time. Performance of the device will be affected without clutches. Permanent magnet synchronous generator is used even though it is costlier due to its performance and due to its long-term use. Peak energy output from this device is generated more than 2 joules. An obtrusive result of 15Watts electrical power output is generated through this device which is more than previously generated within these dimensions and displacement as per mentioned literature review. The objective of increasing power output by using both upward and downward motion from the energy scavenging tile is satisfied with the match of the theoretical calculation.

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