

ADVANCED FOOTSTEP POWER GEERATION SYSTEM USING PIEZOELECTRIC SENSORS

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Keywords:

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Introduction:

Electricity is a vital resource for the human population and has evolved into a fundamental human requirement. Electricity is used in almost every situation. If there is no electricity, we would encounter numerous obstacles and difficulties in carrying out our regular tasks. Nonrenewable energy supplies are rapidly decreasing as the world's population continues to grow. As a result, more energy-generating methods are required. Despite our large population, we are not efficiently employing our personnel and are unwittingly wasting energy. That is why we plan to develop a mechanism for generating electricity from footsteps. Some resources have the ability to amass electrical power after being subjected to force and strain, thanks to a phenomenon known as the piezoelectric effect. Meanwhile, energy harvesting can be defined as converting existing energy that would otherwise be wasted into useful energy. Using implanted piezoelectric material, pressure from human movements can be turned into electric current.

Objectives:

1. The Primary objective is to generate the free energy by the footsteps.
2. Pressure of the footsteps is converted to electrical energy by using piezoelectric sensors.
3. The generated electricity can be stored in the battery and can be used for many purposes.
4. It can be implemented on the footpath and the generated electricity can be used as a backup for the street lights.

Methodology:

The piezoelectric sensors being used in the circuit act as the input source for the circuit operation. The voltage that are generated from the piezoelectric sensors are AC voltage. The sensors outputs are connected to the unidirectional controller. Later that

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output is connected to the bridge rectifier. Rectifier will convert the AC voltage to DC voltage and make the voltage a stable one so that it can be stored in a battery or a capacitor.

A diode bridge is an organization of four or more diodes in a bridge circuit structure that offers the similar polarity of output for any polarity of input. It is also known as a bridge rectifier circuit when it is used in its most common application which is for the conversion of an AC input into a DC output. The main function of voltage sensor in the circuit is to determine, monitor and measure the voltage supply that is generated.

The dc output through the rectifier can be stored in a rechargeable battery and can be used for further requirements. The generated voltage can be boosted using dc bug boosters and can convert that voltage into a maximum voltage. The maximum voltage is passed through a voltage divider circuit and read through the microcontroller. The 5v input supply is given to the microcontroller to run the system. The coding is done in Arduino for the the microcontroller to display the voltage in the lcd display. 16*2 lcd display is used to display the voltage .Finally a simple led circuit is done to indicate the obtained voltage. The final outcome can be used in many application depending on the number of sensors used in an array and the placement of the footstep arrangement.

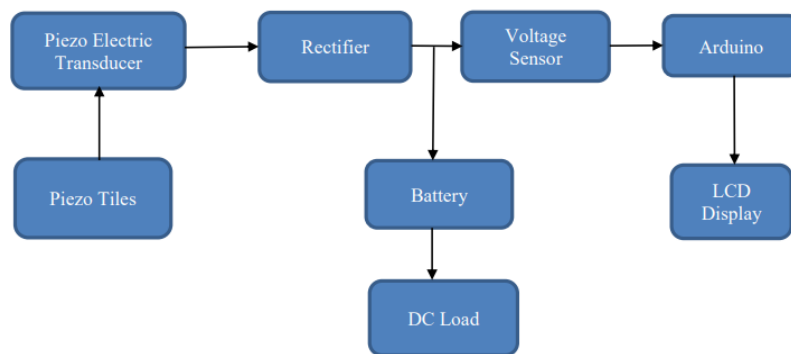


Fig 1: Methodology

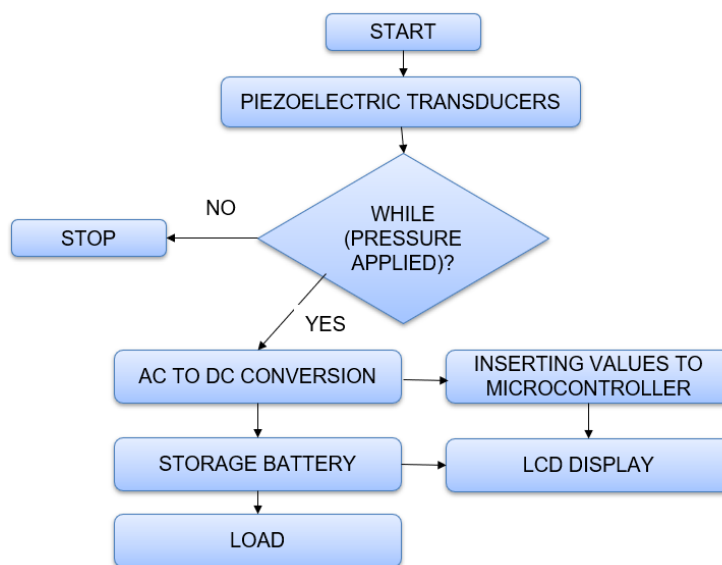


Fig 2: Flow Chart

Conclusion:

This is in the event of a power outage, energy generation via footsteps provides a backup. The energy can be used to charge batteries and power inverters. It can be utilized as a backup energy supply for street lights due to the serial transmission of energy. The project is now being tested and updated, and it is the most conservative and sensible answer to the problem, for the people of our world's prosperity. This is useful in remote locations where power availability is limited or non-existent for specific uses. In densely populated countries, this strategy allows for efficient electricity generation. Invented a new way for humans to obtain electrical energy that is both affordable and environmentally friendly. More voltage is generated as the steps exert more effort or pressure. Because power may be generated simply by walking, running, or exercising on the steps, when a large number of devices are clustered together in a crowded location, large-scale power generation is conceivable.

Scope for future work:

1. For large-scale power generation, a huge number of devices will be packed together in a congested area.
2. Boosting of the obtained voltage will be the highest priority.
3. The obtained energy will be used to run suitable applications.