

Footstep Power Generation and Optimization for Street light System

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ABSTRACT:

In day today life the utilization of power turns to be necessary for each work .The power delivered in this paper will not contaminate the surroundings and it is also will not to rely upon the climate conditions. The paper proposes a novel technique for the creation of power utilizing piezoelectric sensors kept along the footpaths which can ready to charge the battery and ready to supply the force at whatever time of our prerequisite. The footstep power generation technique through piezoelectric sensors produces electrical force by changing mechanical energy of the development of individuals on the floor to electrical energy. The benefits of piezoelectric force generation framework is that it is sheltered and secure to utilize, it doesn't make any issue or distress for the general population strolling through footpath, and it is absolutely chance free strategy. Footstep power generation technique has mechanical part and in addition electrical part, however the electrical and mechanical losses are negligible. This framework additionally has the ability to store the electrical force away battery. The power produced by this technique can be utilized for helping up the road lights, additionally for activity reason, sign boards of streets. At long last the force which will be abandoned can be given to national grid for power reason.

KEYWORDS : *Piezoelectric sensors, Battery, Electricity, Footstep power generation.*

INTRODUCTION

Power assumes a critical part being developed of the country. Power is characterized as set of physical wonder connected with the stream of charge. There are two sorts of power to be specific Static power, that can be held steady and Dynamic electricity which can spill out of one potential to another. With the upgrading population and foundation of the forthcoming organizations and production lines there have been an awesome interest for the need of power so as to run the machines and types of gear. Power can spill out of one section to another either as flash or current in metal. Power is created in the power stations by generators. These

generators themselves require extensive measure of info energy to deliver power which thus relies on upon the " NON RENEWABLE" assets of vitality to create power with a specific end goal to run them.

"Renewable" assets of vitality, for example, Solar Cell Panel, Wind Energy can likewise be utilized to collect power. However these sources are constrained to a specific region for eg. we can say that SOLAR ENERGY can be utilized just at the spot where the sun focus is entirely great and continuous. Wind Energy can fundamentally be utilized as a part of the seaside territory's the place the wind pace and accessibility [1] is all the time present. Aside from all there human movements such as nonstop driving of the hand wrenches and little generators can be additionally used to deliver power however all these wonder of producing power requires a consistent human exertion and checking.

In addition step by step because of expansion in the expense of the assets required to deliver power there is an awesome increment in the expense of electricity [2], due to this reason till today numerous weaker segment individuals of the general public can't get power and are not in any case ready to work even little apparatuses.

In this manner there is a need to locate a substitute technique for the generation of power separated from these strategies with the goal that it can be made effortlessly accessible to even the weaker segment and needy individuals of the general public.

There is a strategy to deliver power by utilizing the piezoelectric plates [3] that can create voltage by the utilization of power on them which can be utilized to charge BATTERY and which thus can be effortlessly use to create power.

Overview and depiction of Proposed system:
In this paper a substitute strategy for generation of

power is finished by utilizing piezo plate. In this framework shown in fig 1. when a power is connected on the piezo plate the state of the piezo plate changes which prompts the generation of voltage. Piezo electric impact is depicted as a straight electromechanical collaboration between the mechanical and the electrical state in crystalline materials with no reversal symmetry.

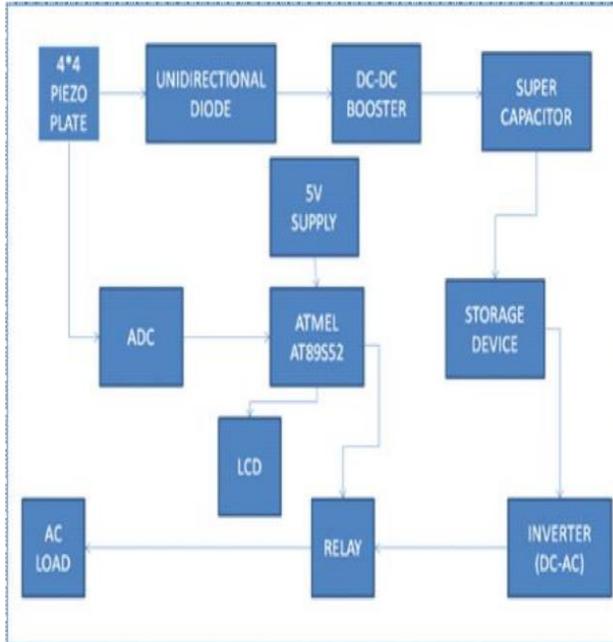


Fig 1. Block diagram of proposed system

This impact is a reversible procedure in that materials showing the direct piezoelectric impact and it likewise display the converse piezoelectric impact as well. This voltage is then given to unidirectional diode. A unidirectional diode is a gadget utilized for permitting the voltage to travel just in one bearing. It is most usually found in electronic circuits where it serves as associations between two or more components. It is found in the modern control level for such atomic force plants, and electric force era. The boost DC-DC converter is the propensity of an inductor to oppose changes in current by making and devastating an attractive field, the yield voltage is constantly higher than the input voltage. The idea is that when the switch is closed, current moves through the inductor in clockwise generating so as to bear and the inductor stores some vitality a magnetic field. Polarity of the left half of the inductor is positive. On other hand, when the switch is opened, current will be diminished as the impedance is higher.

The magnetic field already made will be pulverized to keep up the present stream towards the

heap. Thus two sources will be in arrangement bringing on a higher voltage to charge the capacitor through the diode D. A super capacitor is a high-limit electrochemical capacitor with capacitance values up to 10,000 farads at 1.2 volt that conquer any hindrance between electrolytic capacitors and rechargeable batteries. Super capacitors are utilized as a part of uses requiring numerous quick charge/release cycles as opposed to long haul conservative energy storage: inside of autos, transports, trains, cranes and lifts, where they are utilized for recuperation energy from braking, transient energy storage or burst-mode power conveyance. Little units are utilized as memory reinforcement for static arbitrary access memory. The super capacitors are three sorts. They are shown in fig 2.

Electrostatic twofold layer capacitors use carbon terminals or subsidiaries with much higher electrostatic twofold layer capacitance than electrochemical pseudo capacitance,

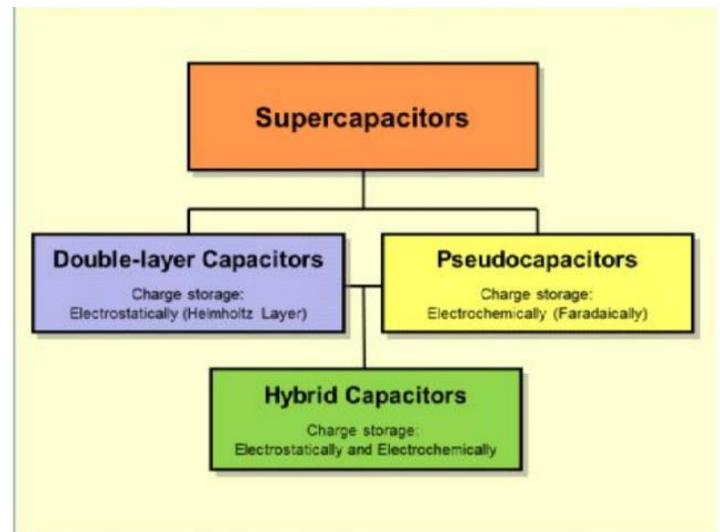


Fig 2.Types of super capacitors

accomplishing partition of charge in a Helmholtz twofold layer at the interface between the surface of a conductive cathode and an electrolyte. The division of charge is of the request of a couple ångströms (0.3–0.8 nm), much littler than in an ordinary capacitor.

Electrochemical pseudo-capacitors use metal oxide or leading polymer anodes with a high measure of electrochemical pseudo capacitance. Pseudo capacitance accomplished by Faradaic electron accuse exchange of redox responses, intercalation or electrosorption.

Hybrid capacitors, for example, the lithium-particle capacitor, use cathodes with contrasting qualities: one displaying for the most part electrostatic capacitance and the other generally electrochemical capacitance. This boosted voltage is then gone through the SUPER CAPACITOR the capacitor here is utilized as a part of request to low the losing because of transportation of charge the voltage then coming after the capacitor is given to the battery to charge.

The battery that is being charged by using this method can be later be used to run both DC as well as AC loads. The battery that is using so as to be charged this strategy can be later o used to run both DC and additionally AC loads.

In the event that AC control supply is connected, the tapping of delivered voltage is given to the ADC which changes over the simple sign of the voltage created to the advanced structure this computerized structure is given to the chip AT89S52. It is a low-control, superior CMOS 8-bit microcontroller with 8K bytes of in-framework programmable Flash memory .the elements are 8K Bytes of In-System Programmable (ISP) Flash Memory Endurance, 256 x 8-bit Internal RAM, 32 Programmable I/O Lines. Quick Programming Time etc. the it is given to 5V supply with a specific end goal to process and work the voltage created at the piezo is shown on the LCD screen which straightforwardly demonstrates the amount of voltage is delivered. LCD are associated with microcontroller through a LCD interface IC or straightforwardly to its location and data bus and few control pins.

This technique used to deliver power is very much an efficient and eco well disposed approach to create power. In addition it likewise does not impact the environment moreover.

RESULTS AND DISCUSSION:

Fig 4 explains the way in which the foot force is converted into electric power and stored in battery. Fig 5 shows the power storage battery which lights the load .

Power Description:

S.NO	WEIGHT(kg)	POWER(W)
1	10	0.012
2	20	0.024
3	50	0.600

The given graph represents the relation ship between the weight of the person walking on the piezoelectric sensor and the amount of electricity generated according to the weight



Fig 3. Foot step power Generator

Fig 3 shows complete setup of the circuit used to generate electricity by the foot step power generator.



Fig 4. Force application generates force which charges battery



Fig 5. Application of force charges battery which in turn lights the load

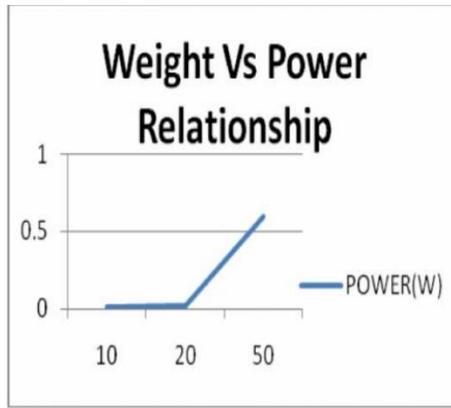


Table 1. The relationship between weight and power

CONCLUSION:

This technique for generation of power is extremely prudent and is anything but easy to produce. It can be utilized as a part of Rural zones additionally where accessibility of power is less or exceptionally low. It can be utilized to drive both AC and in addition DC load. In developing nation like India we can utilize this strategy for power generation with a specific end goal to uncover the heaps from Renewable and non-Renewable wellspring of energy.

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