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Integration of Footstep Power Generation with Energy Storage Systems for Sustainable Power Supply

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Abstract: ***This design is generating electricity in a non traditional expressway in this type we exercise piezo sequel to induce electricity the pressure is applied on piezo component which creates the electricity that sequel exercised in step authority generation, in this we created a mechanical arrangement for them to turned on bedded system. The at mega 8/168/328 microcontroller is exercised control the tackle outfit detention on colorful outfit it can numerous tackle outfit through the series law and detention. the bedded system is interface with TV(liquid demitasse exposition) and the step count is reflected down in the TV the system main function and regulator is Arduino uno Ac and Dc regulator unidirectional regulator, 12v,1.3 Amp supereminent acid battery and an inverter is assumed 12 volts ac is converted to ac force the loads are actuated utilizing 230 volts Ac we're utilizing rechargeable battery to authority the compass and AURDINO is interface between the liquid demitasse flash 16X2 exposition. Though it will not meet the demand of electricity but as a matter of fact if we're suitable to design a authority generating bottom that can produce 100W on precisely 12 way, also for 120 way we can produce 1000 Watt and if we install similar type of 100 bottoms with this system also it can produce 1MegaWatt. Which itself is an acquirement to make it significant.***

Keywords: step, Detectors, Piezo component, Ac, Dc, Uni instruction Controller.

I. INTRODUCTION

The advancing of generation usage resources are getting depleting .The cost of demand in resources collection and processing the material is rapidly increasing the upcoming generation we can see scarcity of the resources the solution is to use the natural resources that need not to get increase the harm to the environment then natural cycle will collapse. As the pedestrian increasing as the population one of the alternate resources for generating electricity. General condition of the power on of electronic gadgets it can be used as retail purpose. The piezo electric is the one which is made up of copper element ant it was combined kinetic energy is applied to the element and the electric signal is generated .it was stored in battery and it can be used for daily electronic gadgets for charging street lights to power on. it can be used for alternate when the pedestrian gets the power automatically it turn on and it can also save of energy of power the maximal usage get increased of people get used. It can turn on into the alternative usage with low-cost maintenance

The labour cost also less as the increase usage of power consumption increases in gadgets it can also problem to the solution. It can be remedy for the for the problem that caused for the reduction of cost of footstep power generation.it is one alternate usage of element. The stress in the piezo element from kinetic energy to the electric field stored into battery and pressure into the element the give rise to stress. Generate of electricity.

In the world electricity was scarcity in that areas where the like Africa continent in urbans where there is people live in the dark areas in the night time and 60% of the continent is lack of bulb in their houses due to economic crisis in urban in areas where the maintenance increases drastically by laying cables which carried out by the time increases and people get difficulty where in that areas the footstep power generation is one activity where the people used to work in fields and market it will be generate to clear the people from darkness they can do work in a night life eradicate the problem and continue lit in areas. The crowd places where electrification on that areas is possible cost effective less management it can also controlled through sensor in daylight condition it lit up in that areas well.

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The increasing the usage of electrifying equipment that needs to power up the source so the continuous done work usage increases the need of source also increases in that area the management of the equipment in various problems arises featuring them in condition delay which increases the workforce management in that case we use Arduino which is installed with ATmega 328 P microcontroller which conditionally follow the program where memory was inject the code into appoints the work based on the code.

The types of materials used as piezo for generation:

1) *Ceramic:* It consist of randomly oriented grains are ferroelectricity is piezo electricity. The presence of abnormal grain in crystal it can exhibit piezo effect
2) *Crystal:* The crystal material has nearly 32 classes each varies with crystal structure class.in that 20 produces piezo effect 21 class crystal not produce piezo effect.
3) *Polymers:* The polymer does not posses has the ceramic exhibit piezo effect. The non-toxic polymers they are biocompatibility in nature.

II. SIGNIFICANCE OF THE SYSTEM

The paper mainly focuses on the efficiently the soring of electricity and producing it in main efficient manner with less external effort the study of literature survey is about the association in the project compact ability of storing the energy.

III. LITERATURE SURVEY

In our literature review the piezo electric element is usually made up of ceramic element when the stress effect applied physical contact will help to generate electricity through the positive element and negative element piezo element which generate electricity through the piezo effect which is around 12V output it can generate through the piezo output. It is the order of two to three volts. Here it shows the energy that generates from one medium to another medium. When the area was filled full of pedestrian then it works with electrifying results and deployed in populous areas where the dense region get high electrifying results subordinately the weight of person also matters while the generate electricity in dense area the group of piezo are connected adjacently then the storage of electricity get increased.

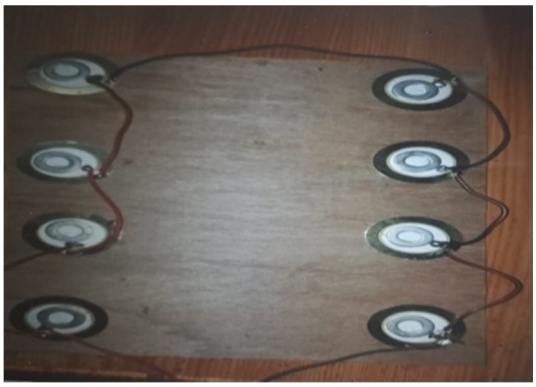


Fig: piezo sensor connections

Overview affair, the rechargeable battery is charged for our coming action. it gains the capability to define coffers. Our programme uses an microcontroller ATmega to count way and flash how important voltage is generated in the TV exposition by enforcing a law that indicates the TV interface leg to pass the needed archive modules of calculating voltage as well as led index to constitute the starting stage. Calculating way is a necessary prerequisite for indicating the current stage at each interlude. Aimed the foreign compass connection the as per the block illustration by utilizingPIC16F677.The input of the snap is given away from the piezo electric demitasse. The affair from 15th leg of the snap is given away as a socket input. The affair from the socket is 5v which can be exercised for a movable charging.

A. Outfit Accoutrements

That are needed to make

B. LCD

The liquid demitasse flash 16x2 exposition. the exposition frame was made up polarised sludge electrodes, demitasse, polarised sludge, backlight, glass, snap colour with six subcaste exposition seven member exposition which was exercised get to flash in the pickets. It time of preface was on 1990.

C. Arduino uno

The Arduino uno is a typical in an bedded system, where the process is controlled in ATmega 328P open source microcontroller affordable low cost conservation range of electronic accoutrements

D. Piezo Electronics

The piezo electric effect is made up of ceramic element. Ceramic element is know as piezo element. The stress principle is applied on piezo element. When stress is applied to the piezo element also force applied charged is developed in the element. Flex movements, touch, climate, and shock dimension all use piezoelectric detectors. They're used in sectors similar as healthcare, aerospace, consumer electronics, and nuclear instrumentation A piezoelectric detector converts physical parameters for illustration, acceleration, strain or pressure into an electrical charge which can also be measured. They're largely sensitive and veritably small in size making them well suited to everyday objects.

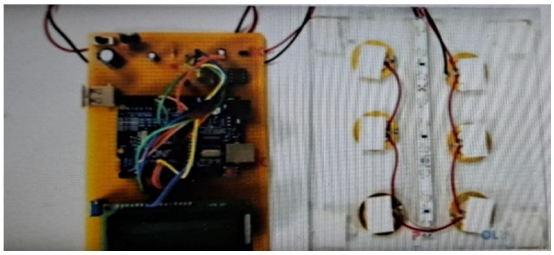
E. Lead Acid Battery

The supereminent acid battery is a rechargeable battery discovered by a Gaston Planté French physicist in 1859. To power on display the impact screen in TV. Storing the energy.

F. LED (Light Emitting Diode)

It's semiconductor diode which emits light through it when electricity passes through. when stress is applied in ceramic also it produces the piezo effect and generates electricity emits through the glowing led light.

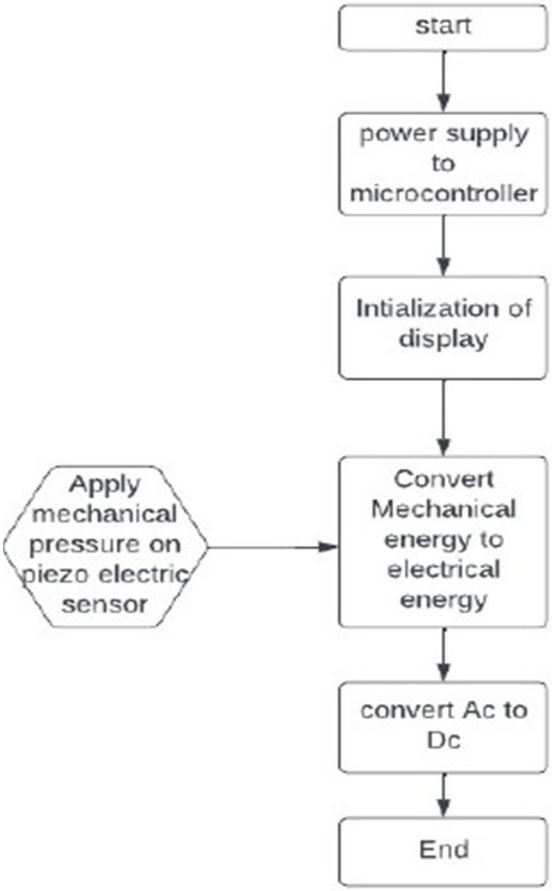
IV. METHODOLOGY



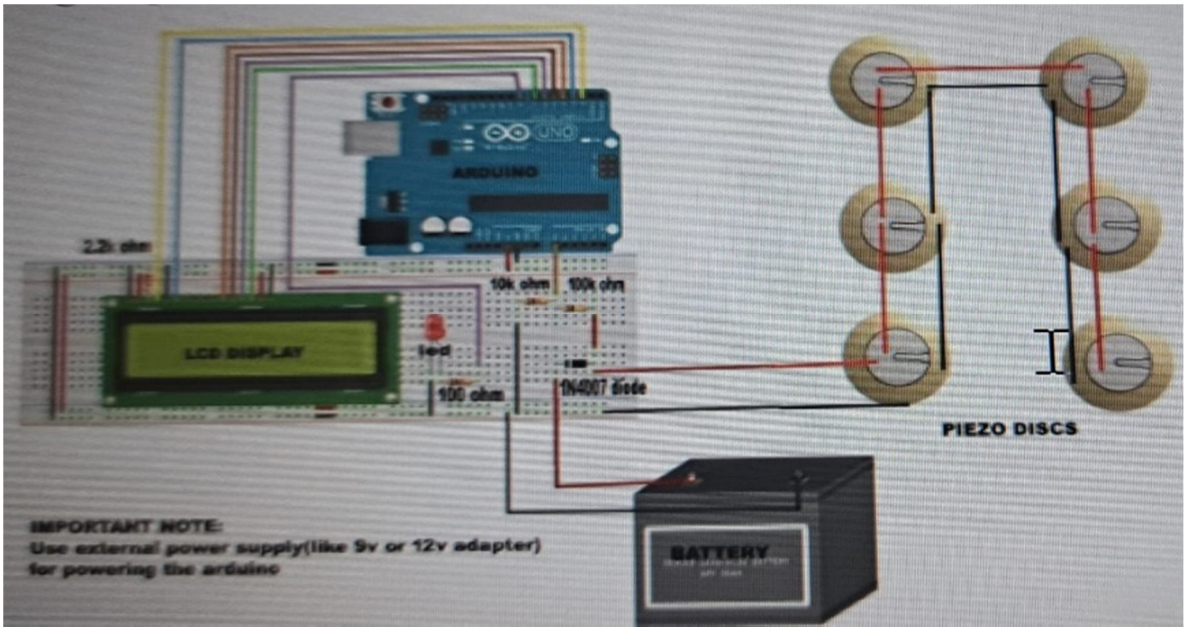
We done our design and testing illustrated illustration above in this design to recharge and discharge we used supereminent acid battery where the piezo electric detector induce electricity also it used to recharge the battery in the chuck board it used to connect the following factors into the TV display and Arduino uno is mounted to the chuck board of legs and8 is connected to board hooked to it. TV legs are and 14. The LED is connected to one end of the resistor to gesture the arduino's original power on stage. The other end is attached to the ground. The resistances are 100 ohm, 10k ohm, 100k ohm, and,2 k ohm. In order to exhilarate power transmission, a IN4007 diode is also employed to induce the direct transmission of voltage and current. To power up the Arduino we supply the 9 to 12v volts is supplied one side connection is given to the piezo discs and other end force to the ground. This putatively simple design can be largely useful because the complexity is vastly reduced, allowing it to be enforced on a big scale. The connections are extremely introductory, as the only need is that all of the factors be present. further information about the colorful legs that indicate different functions can be set up in the TV display schematic below

Fig: LCD display

V. TREE DIAGRAM



VI. SIMULATION DIAGRAM



VII. WORKING

The main factors of the system include piezoelectric sensors, voltage boosters, voltage regulator, snap microcontroller, battery, television display, LDR and a socket for mobile charging. also in this this system, at first, the affair from an array of piezoelectric sensors is fed into voltage supporter. In the system, two voltage boosters are used to boost the voltage to get the asked affair. The affair from piezoelectric sensor is in the range of 3 V to 4 V. It's range of 9 V to 12V assistance of voltage boosters. In this system the power generated has been used for two operations analogous as lighting a road light and charging a mobile phone. A LDR is used to indicate the road light operation. A buzzer is used to advise when the battery voltage falls below the demanded voltage for charging the microcontroller. For snap microcontroller 5 V is demanded for its working. The working system doesn't need any energy input for its performing this is a non-conventional system in which battery is used to store the generated power. Indeed still the force is used to induce power, the system is applicable to particular places. Mechanical moving corridor used in the system are large there by adding the cost. The power generation using way can be executed effectively in seminaries, sodalities, cinema halls, shopping complexes, temples and multitudinous other structures.

This system is a piezoelectric dynamism harvesting system that generates electricity by converting mechanical manpower(steps) into electrical dynamism utilizing piezoelectric detectors. The system also boosts the voltage utilizing voltage boosters, regulates the voltage utilizing a voltage controller, and stores the dynamism in a battery. The dynamism is also exercised to power a snap microcontroller, an TV exposition, a road light, and a movable charging socket. The piezoelectric detectors induce an affair voltage in the range of 3 V to 4 V, which is also boosted to a range of 9 V to 12 V utilizing two voltage boosters. The voltage controller maintains a constant affair voltage anyhow of oscillations, and the restrained voltage is stored in the battery.

The microcontroller is powered by the battery and displays the quantum of charge stored by the battery on the TV exposition. The system has two operations lighting a road light and charging a movable phone. The road light operation is indicated utilizing a LDR, and a buzzer cautions when the battery voltage falls below the needed voltage for charging the microcontroller. The movable charging socket requires a draw down resistor to draw down the voltage to 5 V, which is the needed voltage for its operation. The system is anon-conventional system that doesn't bear any energy input for its functioning. still, the mechanical moving corridor exercised in the system are voluminous, which increases the cost. The authority generation utilizing steps can be enforced effectively in seminaries, sodalities, cinema playhouses, shopping installations, tabernacles, and numerous other structures

VIII. FUTURE PRESPECTIVE

Over the times, World per captia electricity operation adding through the conceptions from 2825Kw to 3081Kw, India's per capita electricity operation has steadily swelled. From 734 kWS in 2008 to 1241 kW time on time it was adding fleetly the requirements are adding as the consumption adding normal of 8 percent dynamism consumption is relatively low when assimilated to other of the world's developed nations. It's only7.5 percent of that of the United States and6.6 percent of that of China. The use of dynamism is a gesture that commodity is moving. The world's moderate per capital. electricity use, India, as the world's fastest expanding and developing country, can not go to be caught up in this conclusion. In order to free this up, our action plays a overcritical part in the manufacturing requests. Drastically boost in dynamism prices.

By exclusively fitting a unit similar as" bottom STEP authority GENERATION," a significant quantum of dynamism can be produced. This dynamism can be utilised in indeed further ways. in academy motorcars, sodalities, tabernacles, or any other congested position where dynamism operation is overcritical it can exercised as alternately dynamism resource. The piezo electronic is kept in crowd apt areas where in developed country operation peopled America, China, Japan the metropoltican areas like promenades road position machine bay areas in planting in shoes. we can rechargeable to the mp3 widgets in sweaters for wireless charging to the system. where it can shake the cargo of a system to bear them it can in erected them for ready commute it can also reduce the operation in electric terrain. It power the road light less areas through jackets where it can power up through led radiances in piezo detectors

IX. ADVANTAGE AND DISADVANTAGE

A. Advantage

1) Low input high operation of widgets
2) No stir of outfit
3) Further life effectiveness
4) No authority

B. Disadvantage

1) High temperature will prompt missions
2) if ceramic component is high tensile also crack
3) High cost intial
4) It is on special position

X. CONCLUSION

This design" bottom STEP authority GENERATION" has been successfully tried and executed, and it's the most cost effective les conservation. It can be maximize the application purpose in pastoral areas where authority is scarce or missing. Because India is a developing country with a voluminous population, dynamism operation is a major company. This design allows us to control both AC and DC loads grounded on the pressure applied on the Piezoelectric detector.

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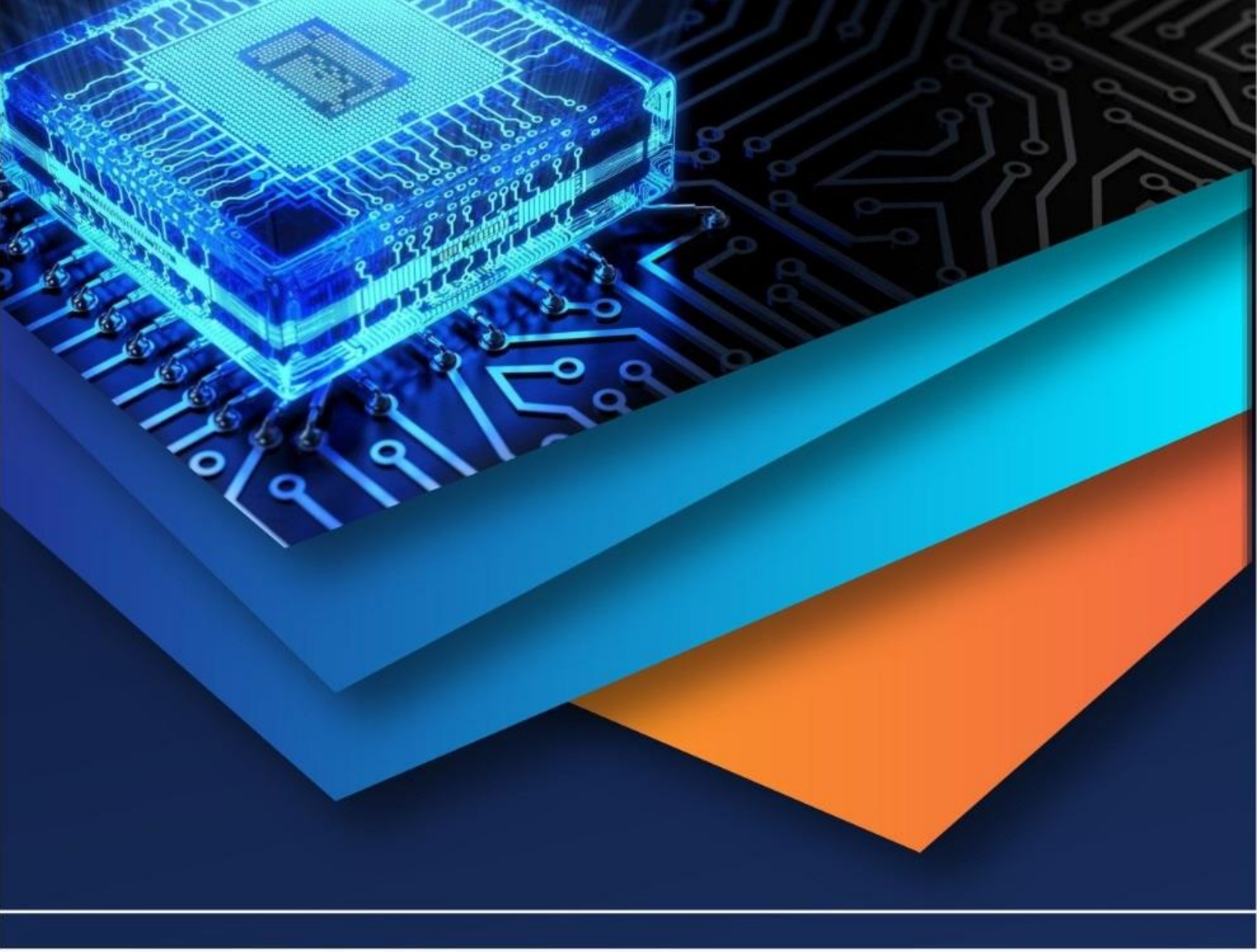

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