



ADVANCED FOOTSTEP POWER GENERATION SYSTEM USING RFID FOR CHARGING

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Abstract: As with energy demand, the country's populace is developing rapidly. At the equal time, energy waste is growing in diverse ways. Therefore, the principle answer is to translate this power without delay right into a useful form. In this step strength technology project, power is generated from human footsteps and used to price the battery. Energy is saved in batteries that may be used to price cell telephones with RELAY. The device includes an Arduino IDE, USB cable, and LCD. Switch to the strength of this device to enter registration mode. You can add 3 new customers. When all clients enter the device, the device clears the map panel and connects to the charger. By default, all clients are given 5 minutes of load time. With that, the relay will turn on and the charger will turn on the to charge the phone. If the customer wants to interrupt the loading process, they will have to pull the field again. To prevent loading, the downtime is credited and the swipe card is displayed again. To fill the carton, press the refill button on the device. The device then begins wiping the paperboard. Swipe a card and you may see for a particular card every 5 minutes.

Index Terms – Piezoelectric sensors, Arduino, Atmega 328 Microcontroller, RFID Reader, RFID Tags

1. INTRODUCTION

Nowadays, road infrastructure could be a key concern within the developed world. consistent with recent studies, tierce of fatal or serious accidents square measure caused by excessive or unsuitable speed, additionally as changes within the route (like the presence of road-work or sudden obstacles). Accident reduction and mitigation square measure major issues for traffic authorities, the automotive business, and transportation analysis organizations. One essential course of action is that the adoption of advanced driver aid systems, that square measure acoustic, haptic, or visual cues provided by the automobile to alert the motive force to the danger of a collision. These systems square measure currently accessible in some business vehicles, Associate in Nursing future trends predict that automatic driving controls and an increasing range of sensors on each the road infrastructure and also the vehicle itself can improve safety. controller, that has the facility of maintaining a gentle user predetermined speed, and its evolution, accommodative controller (ACC), that adds to CC the aptitude of maintaining a secure distance from the preceding vehicle, square measure 2 distinguished samples of driver help systems. One disadvantage of those systems is that they can't severally discriminate between straight and c sections of the road, wherever the speed should be reduced to avoid accidents.

An embedded system could be a code and hardware combination that performs a selected task. Microprocessors and microcontrollers square measure 2 of the foremost common physical science found in embedded product. Microprocessors are referred to as general processors since they merely settle for input, process it, and output the results. A microcontroller, on the opposite hand, not solely accepts information as inputs however conjointly manipulates it, interfaces it with alternative devices, regulates it, and thus produces the end result.

II EXISTING SYSTEM

The existing system generates the power using footsteps with the help of piezoelectric sensors. The generated power if not consumed leads to wastage. We also don't know how much power is generated in the existing system. We also don't know how much power is generated in the existing system. As there is no battery we can't store the generated power and can't use it for future needs.

III PROPOSED SYSTEM

In this paper, a substitute strategy for the generation of power is finished by utilizing a piezo plate. Proposal of the utilization of waste energy of foot power with human locomotion is very much relevant and important for highly populated countries like India and China. In this, the generated voltage is not wasted even though we don't consume it as we use the battery to store it. Also with the help of a battery which is used as a storage device helps to utilize the power for charging, lighting the streetlights, etc. Also in this system, we can come to know how much power is generated

IV BLOCK DIAGRAM

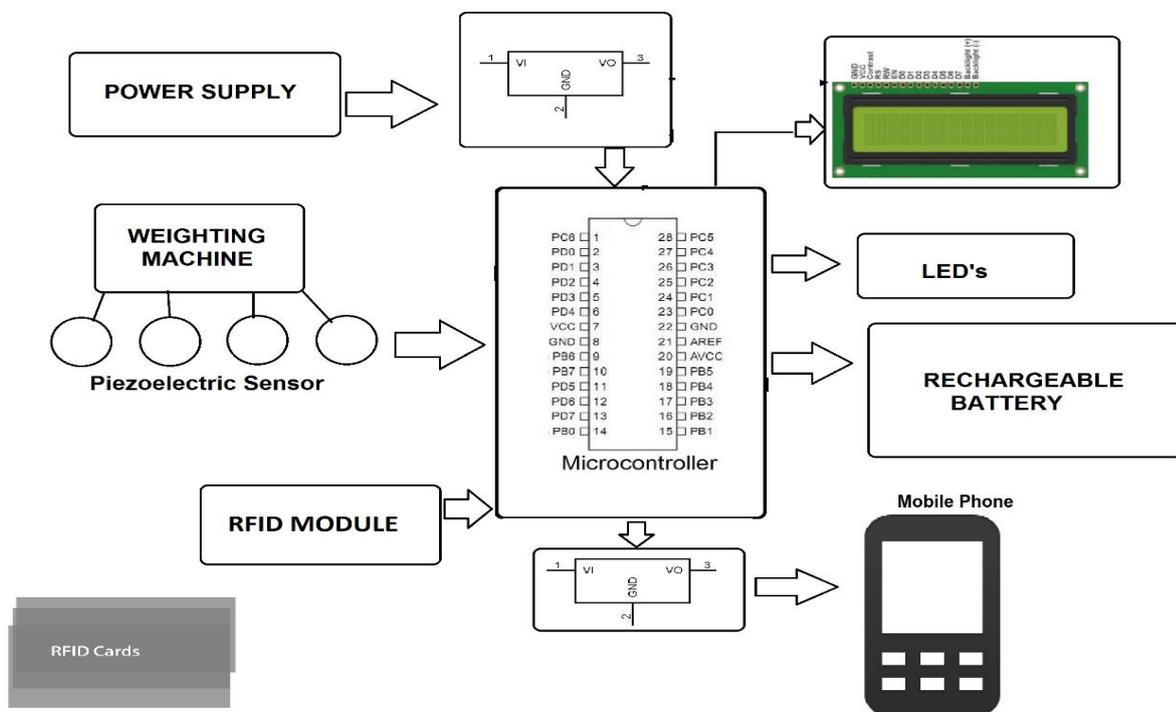


Fig 1: BLOCK DIAGRAM

The following figure shows the diagram of advanced footstep power generator system which is using RFID for charging. Once applying weight on electricity plate's voltage is developed across the plates. That voltage is applied to the battery for charging functions. This can be then provided to our observance electronic equipment. LCD is interfaced with a piezo device employing a microcontroller that permits the user to watch the voltage and charges a connected battery by it. Also, RFID is interfaced with microcontroller to know licensed users & it consists of a USB mobile phone for charging purpose wherever the user can connect the cables to charge the itinerant from the battery charge.

V SCHEMATIC DIAGRAM

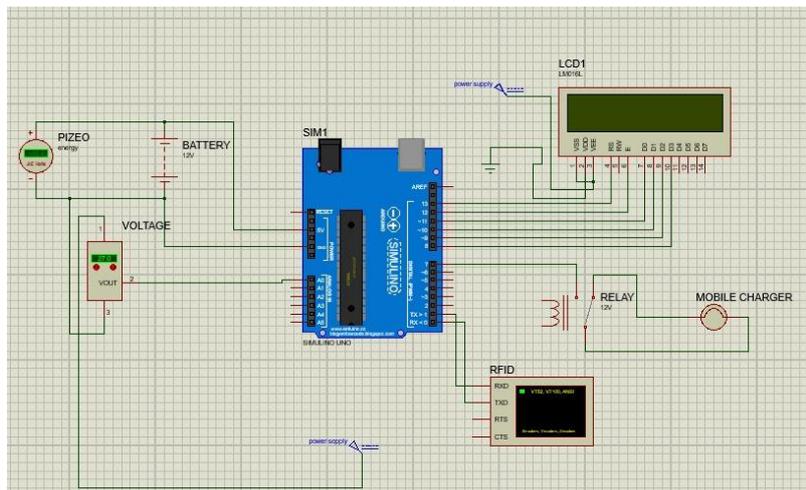


Fig 2: Schematic representation of the working model

VI FLOW CHART

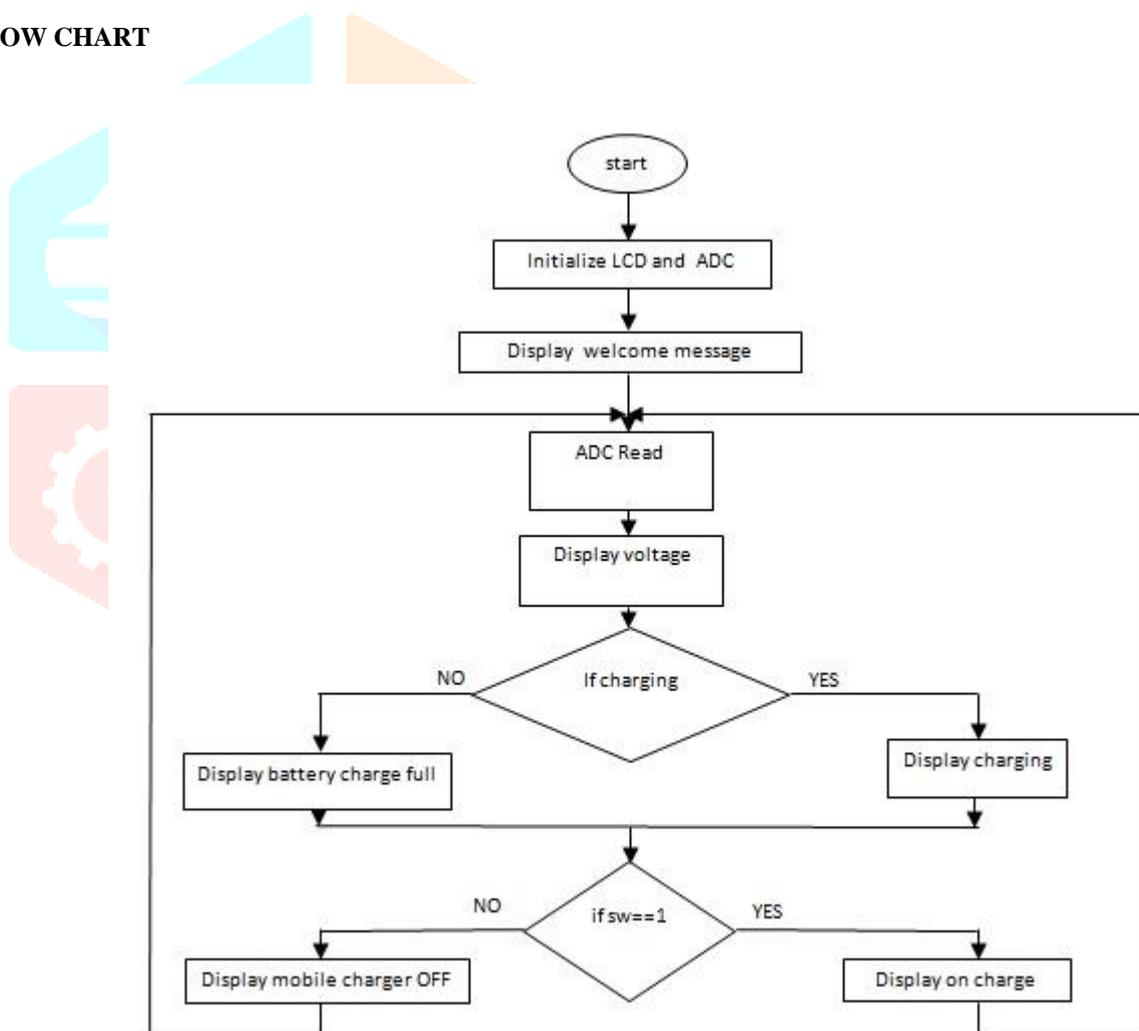


Fig 3:flow chart

VII METHODOLOGY

The working of the footstep power generation system involves

1. Interface and transducing
2. Processing
3. Storage
4. This wastage of energy can be converted to usable form using the help of a piezoelectric sensor.
5. The piezoelectric sensor is a device that can convert pressure into voltage.

VIII PIEZOELECTRIC SENSORS:

A sensing element that works on the principle of piezoelectric effect is thought as a electricity sensing element. Wherever piezoelectric effect could be a development wherever electricity is generated if mechanical stress is applied to a fabric. Not all materials have electricity characteristic.



Fig 4:Piezoelectric Sensor

Working of Piezoelectric Sensor

There are units for measuring different types of electrical materials. Specimens of electrical materials A measuring unit for measuring single crystal crystals and bones, which can be obtained from artificial proposals, purchased at stores such as PZT ceramics. Electrical detector features electrical detectors typically measure a combination of physical quantities (acceleration and pressure). Both pressure gauges and accelerometers use the same concept of in piezoelectricity, but the views applied to the police investigation differ by 0.5. A thin film is applied to the huge base of the pressure sensor to transfer the applied force to the electrical element. As soon as pressure is applied to the existing thin film, the electrical material is charged and voltage begins to be generated. The voltage generated is proportional to the pressure applied. The seismic mass is associated with the accelerometer Crystal 0.5 and transfers the applied force to the electrical material. According to Newton's second law of motion, when motion is applied, the unstable mass becomes a complete mountain of electricity. Current materials produce electric charges, or calibrated movements. The pressure sensor uses the associated accelerometer in combination with them to detect unwanted vibrations and eliminate false readings.

IX Working:

When an electric current is being sent through an electromagnet, a magnetic field is generated around it, that's how relays work.

- The diagram above depicts how the relay works.
- The copper coil and iron core operate as electromagnets in relays.
- When a direct current is delivered through the coil, the connections attract each other, as indicated. This is used to activate the relay.
- It will return to its original when the power is switched off. This is known to it as the relay's power.

For some relays, the contact closes first and then opens when the relay is activated. This is direct across from the relay.

A detector element in solid-state relays senses the input voltage and utilizes it to control the relay.

It uses piezoelectric sensors. To generate a maximum output voltage from footstep the piezo sensors are mounted below the platform. The circuit is the microcontroller-based monitoring circuit that allows users to monitor the charges and voltage of a connected battery.

The energy from the sensors is stored by using the battery, and it is helpful to charge the mobile. The main controlling part of the whole system is the Atmega328 Microcontroller. The current is distributed using (radio-frequency Identification) RFID cards.

X. Result

When the force is applied on the sensors, the amount of power generated from the sensors is showed on LCD and also the pressure applied is converted into voltage form and stored in battery. When a user swipes his/ her card ,the RFID reader reads the card. If it is a valid one, it will display as LOAD ON on LCD and charge for a speculated period of time, else it displays as INVALID USER on LCD.



XI Advantages

- Helps in renewable energy generation.
- Just take a step to generate electricity.
- It is an authentic and genuine device.
- No fuel is required in this hence it is eco-friendly.
- It is a self-producing device using our footsteps.
- Efficient and low-cost design.
- This is a Non-conventional system.
- Easy to operate.

XII Applications

- Crowded areas like railway stations, bus stations, airports.
- This can be installed at home , swimming pools, colleges
- Also at busy footpaths like markets, malls.
- Moreover in music halls, auditoriums etc.

XIII CONCLUSION

The proposal has been tried and tested, and it is the most conservative, practical vitality answer for ordinary folks in our nation. When control accessibility is restricted or non-existent in remote regions, this can be employed for some applications. India's enormous population makes energy management a critical concern for a growing country. Based on the power connected to the piezoelectric sensor, we may drive both alternating current and direct current loads with this task. By decreasing control demand without polluting the environment, this method allows for efficient power generation in highly inhabited places. In reality, just 11% of renewable energy sources contribute to our well-being. We will not only be able to address the energy issue if this project is done, but we will also be able to be able to make significant global environmental changes

XIV Future Scope

With a view of future prospect in case of densely populated nations. The optimum use of energy wasted is of very much importance.

- 1) Japan is one of the first liner to use electric principle for generating mechanical energy from Flooring tiles i.e. by using these plates on bus stairs. When someone step in the energy is Generated which leads to increase of steps as well as energy also increased.
- 2) Secondly Europe is setting another milestone in the field by using such plates on dance floors, so if anyone step on to these tiles and dance again the energy is released with which even one can charge their mobile and other handy gadgets.

XV REFERENCES

- 1] Prabaharan R, Jayramaprakash A, Vijay Anand. "Power Harvesting by Using Human Foot Step"- International Journal of Innovative Research in Science Engineering and Technology, vol.2, issue 7, July 2013
- 2] Ramesh Raja R, Sherin Mathew. "Power Generation from Staircase (steps)"- International Journal of Innovative Research in Science Engineering and Technology, vol.3, Issue 1, February 2014
- 3] Power Generation Using Foot Step Method
- 4] Itika Tandon, Alok Kumar. A Unique Step towards Generation of Electricity via New Methodology"- International Journal of Advanced Research in Computer and Communication Engineering, vol.3, Issue 10, October 2014
- 5] Kiran Boby, Aleena Paul K, Anumol. C.V, Josie Ann Thomas, Nimisha K.K." Footstep Power Generation Using Piezoelectric Transducer"- International Journal of Engineering and Innovative Technology, vol.3, Issue 10, April 2014
- 6] Jose Ananth Vino, AP. "Power Generation Using Footstep"- International Journal of Engineering Trends and Technology, vol.1, Issue 2, May 2011
- 7] Alla Chandra Sekhar, B Maruti Kishore, T Jogi Raju. "Electromagnetic Foot Step Power Generation"- International Journal of Scientific and Research Publication, vol.4, Issue 6, June 2014
- 8] Shiraj Afzal, Farrukh Hafeez. "Power Generation Footstep"- International Journal of Advancement in Research and Technology, vol.3, Issue 4, April 2014
- 9] K. Ramakrishna, Guruswamy Ravana, Venu Madhav Gopaka."Generation of electrical Power through Footsteps"- International Journal of Multidisciplinary and Current Research
- 10] Umeda, M., Nakamura, K., and Ueha, S. Energy Storage Characteristics of a Piezogenerator Using Impact Vibration. Japan Journal of Applied Physics, Vol. 36, Part 1, No. 5b, May 1997, pp.3146-3151.
- 11] Design Study of Piezoelectric Energy- Harvesting Devices for Generation of Higher Electrical Power Using a Coupled Piezoelectric-Circuit Finite Element Method IEEE Transactions on Ultrasonic's, Ferroelectrics, and Frequency Control, vol. 57, no. 2, February 2010.

