



FOOTSTEP POWER GENERATION

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ABSTRACT:

The main aim of this project is to convert the wasted energy surrounding the system into electrical energy which is further stored in a battery and this generated voltage will be shown on display. Man has needed and used energy at an increasing rate, or his sustenance and wellbeing ever since became on the earth a few million years ago due to this a lot of, energy resources have been exhausted and wasted. The most interesting method, obtaining the energy surrounding a system is to use piezoelectric materials this energy can be used to charge mobile and for many other appliances. In this project, we are using an RFID to validate the user if the user is valid then and only then the user will be able to use the battery. And all this data like who used the battery and how much power is generated will be updated on a server with the help of the WI-FI module.

Keywords- LCD, GSM, PZT, RFID, WI-FI.

I. INTRODUCTION

This project uses a piezoelectric sensor to generate energy. When the pressure is applied to the piezoelectric sensor it converts mechanical energy into electrical energy. This project is very useful in public places like bus stands, theatres, railway stations, shopping malls, etc. At such places, these systems are to be placed at any entry points where people travel through entrance or exits, and they must step on this device to get through. These piezoelectric sensors may then generate a voltage on every footstep and when mounted in series they will produce a maximum amount of electricity. The electric power will be generated by simply walking or running as the input source. The piezoelectric sensor will convert applied force into electrical energy which is directly proportional to applied pressure. The LCD will then display the amount of voltage generated by the circuit. Then generated voltage will be stored in a rechargeable battery. If there is no pressure on the piezoelectric sensor then the battery will be charged with the help of a solar panel. RFID will check whether the user is valid or not. And Relay Module will switch on charging and switch off the charging or it will stop a user from using a battery. This data means how much voltage is generated as well as how many users and who is using a battery will be uploaded on a server with the help of the WI-FI Module. We are using another battery to give a power supply to the system which will be charged by a solar panel.

II. REVIEW OF LITERATURE

[1] According to D. Sathish , C. Srisailamb , D. Harshac and K. Muralidhar Goud the energy scavenging section of renewable resources where wasted energy during regular processes such as heat during exothermic reactions

is captured and converted The AC output of the generator is actually passed to the rechargeable battery through a rectifier and diodes. The power for each footstep of varying weights is calculated based on the efficiency of the tile and other parameters.

[2] According to Shubham Kumar, Sharad Mittal, Sachin Saini, Vishnu Pal electrical energy produced by pedestrian and moving vehicles on the ground surface by means of renewable energy generation method. They used a rack-pinion gear mechanism, a shaft and dynamo. The interchange of impact load due to the heavy weight into electrical energy by using simple rack-pinion gear drive mechanism because of its specification, linear motion can be converted into rotatory motion. This system does not create any pollutants so we can reduce greenhouse effect and power shortage.

[3] According to Rajeev Ranjan Tiwari, Rahul Bansal, Quamruzzaman, Pushyamitra Gupta, Dr. Sarnendu Paul described the simple drive mechanism which include rack and pinion assembly and chain drive mechanism. The conversion of the pressure or force energy in to electrical energy. The power generation is very high but the initial cost of this system is high. There is no need of power from the mains and this system is eco-friendly. It is very useful at the crowded places and on all roads and as well as all kind of foot step which is used to generate the electricity. Maintenance and lubrication is required time to time. Power is not generated during return movement of rack.

[4] According to K.Raju, Bandari Theja, V.V.Ramana Rao described the Arduino power generating using human footstep. This process provides electricity with the assistance of electronic components that produces application of energy using human footsteps. The ADC converter deployed in the circuit stores the charge for future constraints. They also used a GSM modem to display voltage. Voltage generated can be seen on LCD by sending request to GSM modem.

[5] In Advanced Footstep Power Generation System using RFID for charging paper we studied that this project with RFID this project is very helpful to give an access to the valid person to use a battery for a particular period of time.

III. PROPOSED METHODOLOGY

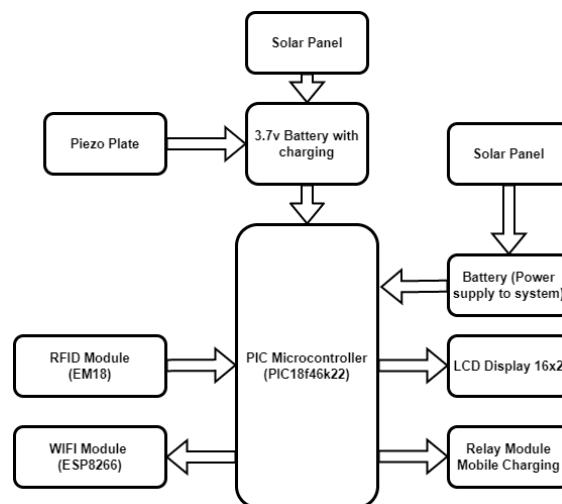


Fig.1 Block diagram

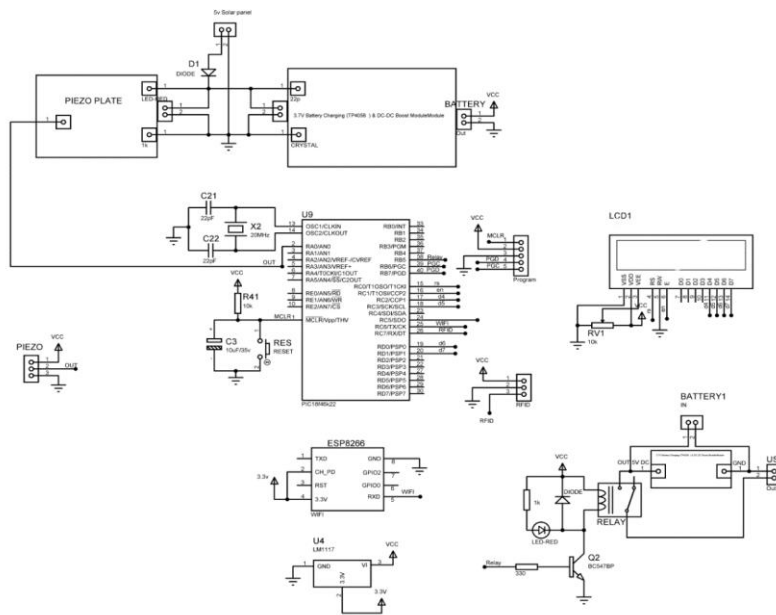


Fig.2 Circuit diagram

WORKING

The proposed system is focusing to generate the energy using Piezo electric method and store the generated energy in batteries, and it can be used during our usage. This proposed system is created using a microcontroller based. The sensors are placed in such an arrangement, so as to generate maximum output voltage. This is then provided to our monitoring circuitry. We also know the monitoring circuit is a microcontroller based that allows the user to monitor the voltage generated and this voltage is given to a rechargeable battery and here the energy was stored. And valid user will be able use it and this system also displays the total stored energy details using LCD display. Whenever the pressure is applied to the piezoelectric sensors in the form of mechanical energy it will convert it into electrical energy and pass to the battery. And we are using a solar panel if there is no pressure applied on piezoelectric sensors then the batteries will be charged with the solar panel. LCD is interfaced with microcontroller. The 16 x 2 LCD is used to display the voltage generated by the piezo-electric sensors. The output voltage which is generated from the sensor is used to drive DC loads like any appliances. We are using another battery to give a power supply to the system which will be charged with the solar panel. And we are using a RFID Reader and RFID Tag to validate the user. With the help of RFID only valid user will be able to use a generated voltage. Every user will have a certain amount of balance and it will be reduced when user uses a tag. If the user is valid and user do have a balance relay module will be switch-on and user will be able to use it to charge mobile etc. Once the user will use his all balance user will not be able to use a battery. The mobile will be charged for a particular time it is depend on the which RFID Tag we used. Relay Module will switch-off after time-out and mobile charging will stop. And this data will be updated on the server with the help of Wi-Fi Module. We can see the balance all user on server and how many times battery is used.

IV. RESULTS AND DISCUSSION



Fig 3 Footstep Power Generation

We successfully implemented a Footstep Power Generation and which can be used to generate an energy.

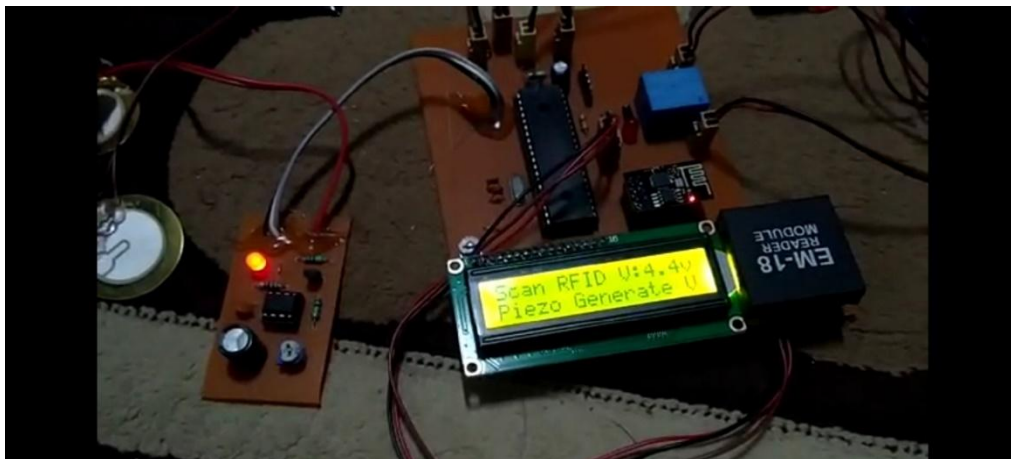


Fig. 4 Voltage generated by piezoelectric sensor

In Fig. 4 we can see that piezoelectric sensors successfully generate a voltage between 3.2v to 5v which is further stored in a battery.

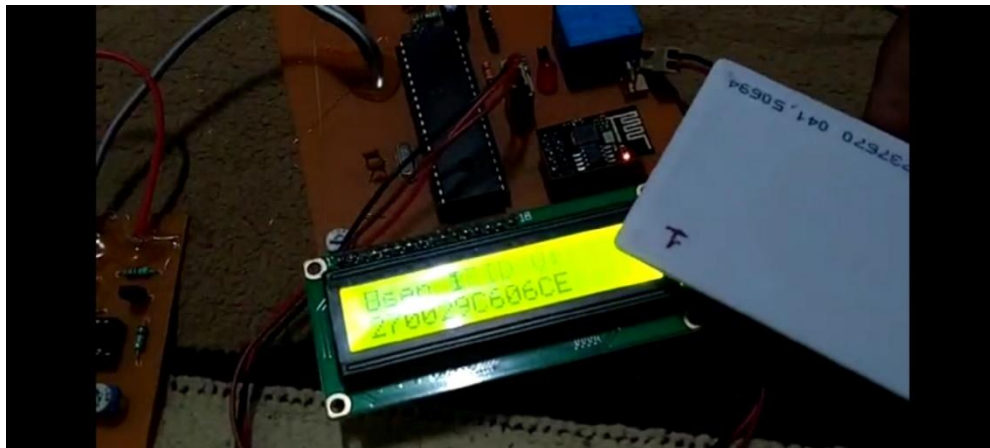


Fig. 5 Scanning RFID



Fig. 6 Charging Timer

In fig. 5 we can see that RFID reader successfully reads the RFID tag it checks whether the user is valid or not. If the user is valid it gives access to user for certain time we can see the timer in fig. 6.



Fig. 7 Using a generated energy

In fig. 7 we can see that relay module switch ON and Switch OFF the charging if user is valid and we can use the voltage generated by piezoelectric sensor to charge mobile and for many other applications.

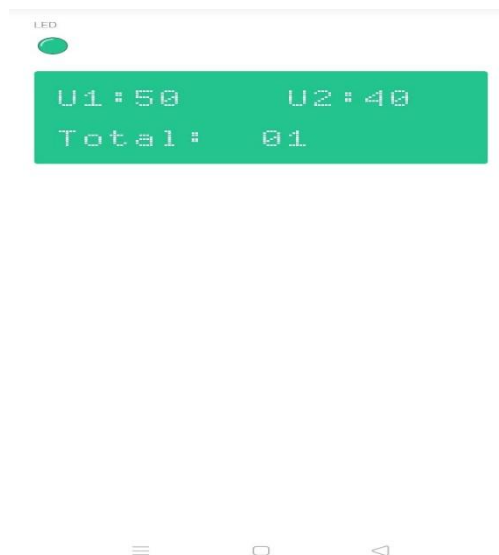


Fig. 8 Users details

In fig. 8 we can see that balance of user and how many times battery is used. U1 is a user 1 balance, U2 is a user 2 balance and total is a number of users used a battery. It is get updated when user uses tag.

V. CONCLUSION

The project “Footstep Power Generator” is the best economical affordable energy solution to common people. There is no need of energy from conventional source of energy and there is zero percent of pollution in this type of power generation. This can be used for many applications in rural areas where power availability is less or totally absence. As India is a developing country where energy management is a big challenge for huge population. By using this project, we can drive both A.C as well as D.C load according to the force we applied on the piezoelectric sensor. And this project is very useful for validating a person and all this data will be uploaded on sever. A Piezo tile capable of generating 40 volts has been devised. Comparison between various piezo electric material shows that PZT is superior in characteristics.

VI. FUTURE SCOPE

In future, charging stations for mobile phone can be made available which will use approach of electricity generation to piezoelectric sensor. The piezoelectric sensors when used on large scale will give positive result. In India, maximum public movement is observed in railway stations, temples, and shopping malls; hence this places can be equipped with platforms with piezoelectric sensors for generation of electric power.

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