

Utilizing RFID to Charge for Advanced Footstep Power Generation

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Abstract— The country's population is increasing every day, which has a variety of effects on how much power is required. Repurposing this energy into a form that may be used is therefore the main strategy for meeting future demands. In this project, human footsteps generate electricity that is used to store energy generated by piezo sensors and recharge the battery. RFID cards are used to charge mobile phones utilizing the battery's electricity. The LCD, NodeMCU, RFID Sensor, and USB Cable are all part of this battery-powered device. When the power is turned on, the system enters registration mode. Three people can register as users. The technology prompts users to swipe their cards and connect their chargers as soon as everyone has logged in. The user is initially given a 5 minute charging timer. After the card is swiped and the user is confirmed, the mechanism switches on to charge the mobile phone within a predetermined amount of time. NodeMCU, RFID (Radio Frequency Identification), and LCD are some related terms.

I. INTRODUCTION

This study's main objective is to determine how much electricity can be produced from people's footfall and the pressure they exert when walking. The term "Advanced Foot Step Power Generation System" describes the process by which mechanical power is converted into electrical power using transducers and the pressure that a footstep creates. The floor that produces power effectively transforms kinetic energy into electrical energy, or power generation. Existing power generation sources are unable to keep up with the rising global demand for electricity. The imbalance between supply and demand is the primary problem with the current energy crisis. Even while it won't be sufficient to satisfy the tremendous need for electrical energy around the world, it will be able to change things and lessen reliance on conventional means of producing electricity. It can be used on walks along the side of the road, in parks and jogging trails, as well as many other public spaces, including airports, and it will have a big impact on electricity production.

II. EXISTING METHOD

Now, power is generated via piezoelectric sensors that sense footfall. Whenever the energy produced is not used, it is wasted. Also, we don't know how much power the current system generates. Also, we are unsure of the amount of electricity generated by the current system. There isn't a battery, therefore we can't store the created electricity to use later.

III. PROPOSED METHOD

The "Advanced Footstep Power Generation Using RFID for Charging" approach is an effective innovation that conserves energy when human footfall causes piezoelectric sensors to sense weight. With RFID cards, this energy is first divided among several users before remaining in the battery. These cards have a 12-digit human identification number that is used to track user data. RFID uses electromagnetic waves to operate. The system works by allocating a specific amount of minutes at a time to each user, according to the disclosed software code. As a result, this strategy saves time and minimizes pollution, which will enhance our future generations' capacity to achieve both a pollution-free environment and time-consuming demands.

IV. WORKING PRINCIPLE

This system's basic operation is the translation of pressure from footstep pressure into electrical output. The pressure exerted on the floor by a person's weight determines how much electricity is produced. Work and Construction The system is made up of blocks that, when stepped on by a person, gently depress, depressing a piezo transducer setup located 45 seconds later inside the system. This consists of a top platform that is compressible and a bottom platform with piezo sensors. Together with these components, the system also includes a weighting platform, voltage regulators, a computer, LEDs, an LCD display, and diodes. When individuals walk on the floor, piezoelectric transducers directly convert mechanical pressure into voltage since they have the capacity to generate electrical output at their terminals, which is how electric current and power are gained. The weight as a function of pressure is a factor that affects this process. Ninety-five percent of the pressure that is applied

through a footstep is transformed into energy in this way.



Fig.4.1. RFID Cards

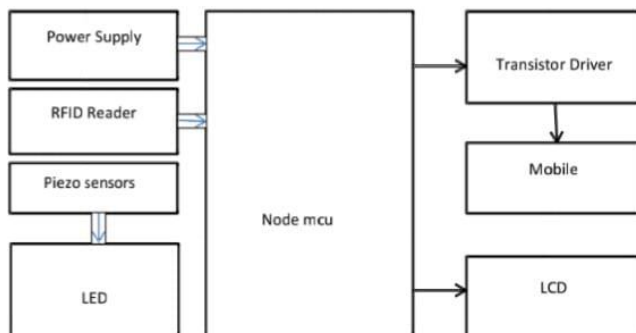


Fig. 4.2. Block Diagram

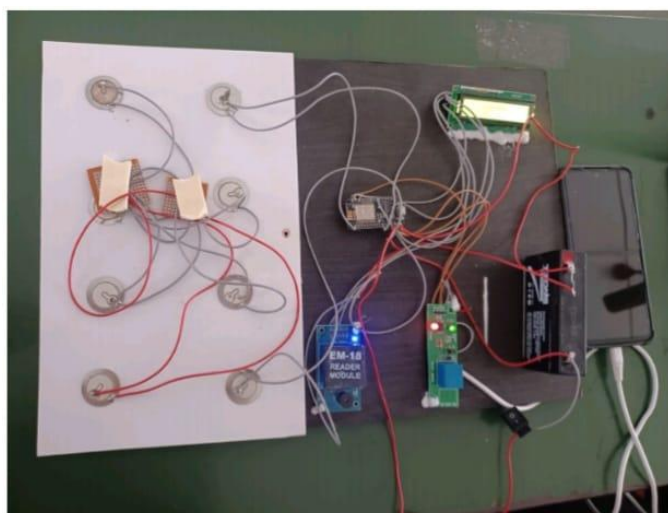


Fig.4.3. Output

V. HARDWARE DESCRIPTION

A. LCD Display

A type of flat panel display known as an LCD (Liquid Crystal Display) operates primarily using liquid crystals. LCD derives its meaning directly from its name. It is the fusion of the solid and liquid phases of matter. A liquid crystal is used by LCDs to create viewable images. Comparing LCD technologies to cathode ray tube (CRT) technologies, displays may be made significantly thinner.



Fig5.1.LCD Display

B. NODE MCU

The Node MCU ESP8266 is a stand-alone WiFi networking solution that can run standalone programmes, serving as a bridge between the current microcontroller and WiFi. Several pin-outs and a built-in USB connector are included with this module. By connecting the NodeMCU devkit to your laptop with a micro USB cable, you can easily flash it, just like you can with Arduino. Moreover, it quickly accommodates bread boarding.



Fig5.2.Node MCU

C. RFID

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. An RFID tag consists of a tiny radio transponder; a radio receiver and a transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number

can be used to inventory goods. There are two types. Passive tags are powered by energy from the RFID reader's interrogating radio waves. Active tags are powered by a battery and thus can be read at a greater range from the RFID reader; up to hundreds of meters. Unlike a barcode, the tag doesn't need to be within the line of sight of the reader.

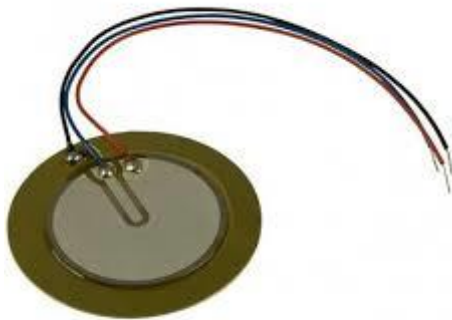
so it may be embedded in the tracked object. RFID is one method of automatic identification and data capture (AIDC).



Fig.5.3.RFID

D. PIEZOELECTRIC SENSOR

Here is a diagram of a piezoelectric sensor internal circuit. Insulator resistance or internal resistance is the resistance. The sensor's inertia is what causes the inductance. The elastic modulus of the sensor material is inversely correlated with the capacitance C_e . The load and leakage resistance must be sufficient to maintain low frequencies for the sensor to respond properly. An electrical signal might refer to a sensor as a pressure transducer. A secondary name for sensors is



main transducers.

Fig.5.4. piezoelectric sensor

VI. RESULT AND CONSLUSION

Steps taken by people are the main source of energy. No need for energy from conventional sources exists, and this type of power generation emits no pollutants. The absence of any type of mains power is essential in all locations where human movement is employed to produce unconventional energy, such as electricity. The fact that 11% of our primary energy comes from unconventional sources is widely

acknowledged. If this proposal is put into action, it will not only make the energy crisis worse and make it harder to solve, but it will also have a good impact on the environment all over the world. The initiative, which is the prudent and most conservative approach to ensuring the prosperity of the peoples of our world, is currently being tested and updated.

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