An effective approach to charge IOT devices using footsteps

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***Abstract*— Gradually the number of inhabitants in our nation is expanding and the necessity of the utilizing things and their power consumption is additionally expanding. Simultaneously the wastage of vitality is likewise expanding in many ways. So, reforming this energy back to usable form is the major solution. In this human stride power generation system, we are developing power with the assistance of human's stride which is additionally used to charge a battery. The force put away in battery is utilized to charge IOT device utilizing RFID card. This framework is fueled up by At mega 328 microcontroller, it comprises of Arduino IDE,RFID sensor, USB link and LCD. At the point when power was on the framework, the framework goes into the enlistment mode. We can register three users. Once all the users are entered into the framework then the framework requests to swipe the card and associate the charger. At first all the client is given a total time of five minutes of charging time as default. User approved upon swiping card, the framework turns on for charging and will accuse the IOT device of given time allotment.**

Keywords*— Arduino Microcontroller (At mega- 328), RFID cards, RFID module, Piezo electricsensor. Internet of things-IOT.

1. INTRODUCTION

"An effective approach to charge IOT devices using footstep RFID is based on Arduino UNO microcontroller, the RFID technology and piezoelectric sensor(load) to save power generated by footstep force".As the name suggests "Footstep" theme of this approach is the power generation. Piezoelectric sensors are just a plates which have the two terminals that are connected in parallel to produce the small amount of current. So reforming this vitality back to usable form is the major solution. As the technology using gadgets, electronic devices also increased. Power generation using this kind of conservative methods is very efficient. There arises a necessity for different power generation methods. At the same time the energy is wasted when the human moves. To overcome this problem, the energy wastage can be converted to usable form using the piezoelectric sensor. This sensor converts the pressure on it to voltage. So in this is the energy saving method, that is the footstep power generation method, we are generating power.

2. EASE OF USE

RFID Field Guide developing radio frequency identification systems: This is one of the efficient way in which RFID raising technology is used to protect the privacy with licenses. Today explores on RFID for the most part center around the execution part to secure individual information put away in RFID labels and to keep associations from following an individual through the data discharged by indicated RFID labels. RFID Technology Based Attendance Management System and "Electrical Power Generation Using Piezoelectric Crystal: New power generation techniques are required for the next generation of wearable computers, wire-less sensors, and individual systems to be feasible".

3. PROPOSED

This system will have power generation and charging the mobile phone that was stored in the

battery. Power generation can be done using force using the piezo sensor which are placed in parallel of dozen sensors. Whenever foot kept in these plate powers will be generated this power is stored in the battery. This system uses RFID module for charging purpose. If RFID tag is scanned charging will starts for particular time. After this time charging willbe stopped.

The force is produced with the assistance of human's strides; this force is then used to charge battery. The force is put away in a battery that can be utilized to charge a cell phone utilizing RFID card. This framework is fueled by At mega 328 microcontroller, it comprises of Arduino IDE, RFID sensor, USB link and LCD. At the point when we power on the framework, the framework goes into enlistment mode. We can enroll three clients. When all the client is entered in the framework then the framework requests to swipe the card and associate the charger. At first all the client is given 5 minutes of charging time as default.

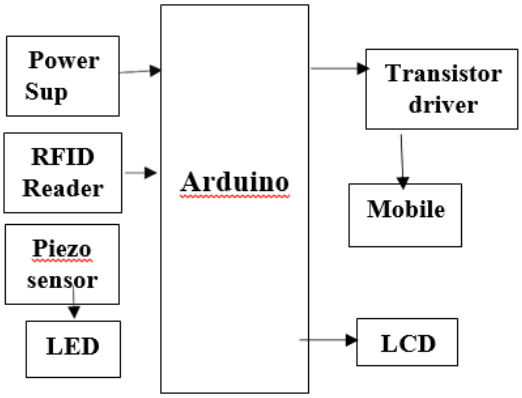


Fig 1:Block diagram of smart footstep power generation using RFID for charging

At the point when we show the card and if the client is approved, the working model turns on for charging and will charge the IOT Device. In the event that the client is un-approved, at that point the framework will show as unapproved client, in the event of some unforeseen issue if the client needs to stop the charging in halfway the client needs to swipe the card once more. When the card is swiped again,the remaining time balance is shown and the charging stops. So as to energize a card, we have to press revive button which is on the framework, and afterward framework will request to swipe the card, when the client swipes the card, it adds more 5 minutes to the specific card of the client.

A. RFID MODULE

The EM-18 RFID Reader module operating at 125kHz is an inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to receive pin of your microcontroller. Many types of RFID exist, but at the highest level, we can divide RFID devices into two classes: active and passive.

Active tags require a power source they’re either connected to a powered in fra structure or useenergystoredin an integrated battery. Passive RFID is of interest because the tags don’t require batteries ormaintenance.

Fig 2: RFID module

B. RFID TAGS

RFID labeling is an ID framework for distinguishing proof and following purposes that utilizations radio recurrence ID gadgets. A RFID labeling framework comprises of the tag, a read/compose or just read gadget, and a framework application for information assortment, handling, and transmission. RFID labels comprise of least two sections: a coordinated circuit and a reception apparatus for getting and sending the sign. The label data is put away in a non- unstable memory.

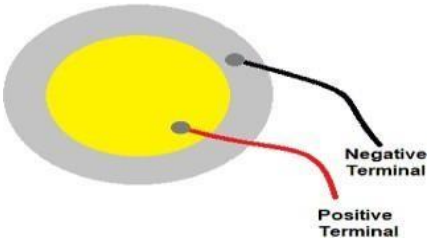
RFID Tag Types Tag's material and structure are distinctive relying upon the end application and condition There are three fundamental classes known for RFID Tags. Decorate Tags involve 70% of the market. This kind of Tag is for the most part utilized in apparel and product the executives, and can be supplanted by standardized tag. They are ease and simple to utilize yet can be utilized uniquely in metal free and ordinary temperature. Composite labels possess 20% of the market. This sort of tag is mostly applied away and pipeline the executives. They can be used in metal environment but have poor performance. Earthenware Tags possess 10% of the market. This sort of Tagis utilized in clinical hardware, oil and gas pipeline and boring administration which identify with unforgiving condition. They are small, high temperature and high pressure resistant. However they have tight transfer speed and manufacturing cycle.

Fig 3: RFID tags

C. PEIZO ELECTRICSENSOR

A piezoelectric sensor is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge. Piezoelectric technology is in sensitive to electromagnetic fields and radiation, enabling measurements under harsh conditions. Some materials used (especially gallium phosphate or tourmaline) are extremely stable at high temperatures, enabling sensors to have a working range of up to 1000°C.

The rise of piezoelectric technology is directly related to a set of inherent advantages. The high modulus of elasticity of many piezoelectric materials is comparable to that of many metals and goes up to 10^6 N/m².Even though piezoelectric sensors are electro mechanical systems that react to compression, the sensing elements show almost zero deflection.



D. ATMEGA 328 MICROCONTROLLER

The Arduino Uno is a microcontroller board dependent on the ATmega328 (datasheet). It has 14 computerized input/yield pins (of which 6 can be utilized as PWM yields), 6 simple information sources, a 16 MHz fired resonator, a USB association, a force jack, an ICSP header, and a reset button. It contains everything expected to help the microcontroller; just associate it to a PC with a USB link or force it with an AC-to-DC connector or battery to begin.

The ATmega328 is a low-power CMOS 8-piece microcontroller dependent on the AVR® upgraded RISC (decreased guidance set PC) engineering. So as to boost execution and parallelism, the AVR utilizes Harvard design with discrete recollections and transports for program and information.

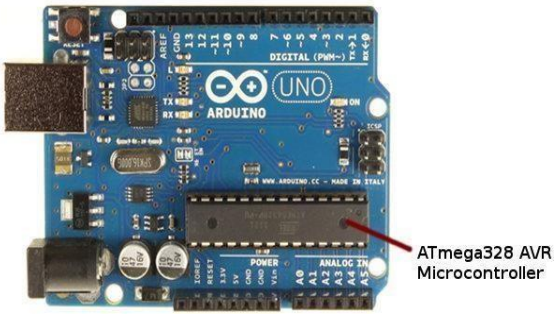


Fig 4: Arduinoboard(Atmega 328 microcontroller)

E. ARDUINO SOFTWARE

The Arduino is an Integrated Development Environment software which is a cross platform application. Thissoftware can be written in functions from C and C++. The software provides back up for a wider range of boards of Arduino. It includes Arduino Uno, Esplora, Mega, Ethernet, Pro or even Pro Mini Fio and LilyPadArduino. It is working jointlywith an Arduino controller so that writing, compiling, and uploading code into the board is possible. It also contains a message area, a text console, a toolbar withbuttons.

4. WORKING

A propelled stride power generator framework that utilizes piezo sensors to create power from the human strides. The framework takes into account a stage for setting strides. The piezo sensors are mounted underneath the stage to produce a voltage from it by utilizing the human strides. The sensors are put in such a game plan in order to produce most extreme yield voltage. This is then given to checking of cutting edge stride power creating hardware. The circuit is a microcontroller based observing circuit that permits client to screen the voltage and charges an associated battery.

It additionally shows the charge produced and displayson a LCD show. Likewise it comprises of a USB cell phone charging point where client may associate links to charge mobilephone from the battery charge when cards are swiped accordingly.

Consequently we charge a battery utilizing power from client footsteps,display it on LCD us in gmicro controller circuit and take into account versatile charging through the arrangement. Thusly the whole framework works so as to produce the force from the human foot step.

5. RESULT

In coming days, this will demonstrate an extraordinary help to the world, since it will spare a ton of power of intensity plants. As the traditional sources are exhausting exceptionally quick, at that point it's timeto consider choices. We got the opportunity to spare the force picked up from the regular hotspots for proficient use. So this thought gives elective as well as adds to the economy of the nation. Presently, vehicular traffic in huge urban communities is more, making a difficult person. Be that as it may, this vehicular traffic can be used for power age by methods for new strategy called "powerhump".It has advantage that it does not utilize any external source. Now the time has come to put forte these sorts of creative thoughts, and explores ought to be done to update their suggestion.

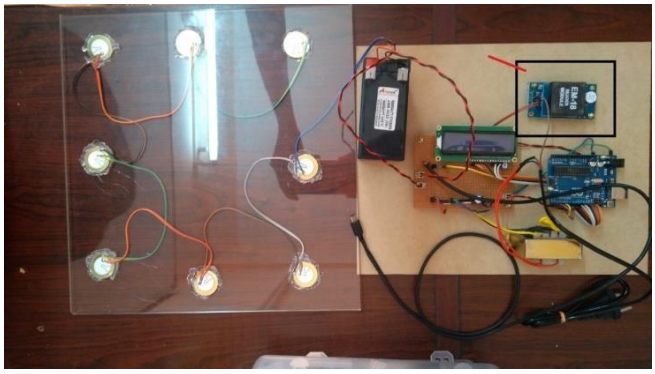


Fig 5: Kit photo of power generation system

Weight (Kg)	**FOOT STEPS**	**Voltage (V)**	**Current (micro Ampere)**
40	1	0.10	0.25
50	1	0.35	0.50
60	1	0.51	1.01
70	1	0.76	1.31
80	1	0.93	2.21
90	1	1.12	2.96
100	1	1.50	3.62

Fig6 : Calculated values

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