ENERGY FLOOR

[1]Omkar U.Deshpande, [2]Omkar V.Adkar, [3]Shweta S. Raorane, [4]Bhushan D.Wani, [5]Shrinath R. Joshi

Department of Instrumentation Engineering, Konkan Gyanpeeth College of Engineering, Karjat

Abstract—Energy Floors developed by applying pressure on the floor.It is an eye catching floor which can be installed in customized ways for various occasions to represents sustainable innovation.

The energy floor uses the movement of people as source of energy. This kinetic energy is converted into electricity which powers the Floor's load given to the output. In that way the floor is reacting to the public and involves people into an interactive dance experience. The electricity can also be fed back to the electricity grid, be used for Energy Applications that create a unique Energy Experience, or power other customized local systems.

The Energy Floor module flex slightly when stepped on which creates a movement that can be transformed into an electric power by a small internal generator. Each module by the size of 75x75x20 CM can produce up to 35 Watt sustained output. Between 5-20 Watt per person.

Keywords —Energy generating floor, kinetic Energy converts to Electrical Energy

I. INTRODUCTION

The kinetic energy of walking or dancing people converts into electricity which is used to make the floor react and interact visually and to power applications which show the direct electricity output of a person's moves.

This project resulted in the foundation of the start-up Energy Floors. Nowadays sells and rents out the floor to locations and events all over the world. Originally, Energy Floors specialized instinctively to activities.

Our goal is to create awareness about energy production and energy consumption by making it interactive and fun and relating it to human scale.

The energy produced by movement is converted into electricity that makes the floor react to the person in an interactive way. The energy floor consists of modules measuring 75 x 75 cm each which. These movements are transformed into electric power. Every person is able to produce 5-20 watt of power, depending on body weight and activity on the energy floor. The floor provides a unique visual experience by LED-lights that react to movements. Continuous real-time interaction between the people walking on the floor and the floor allows every individual to contribute to the collective experience which is enhanced by using accompanying applications.

It is for large scale implementations, with high cost efficiency for use at: fairs, large stadium events (dance or sport), for use at airports, railway stations, shopping malls, city squares and other high density walking areas

When it is built-in in parts of the pavement where cars have to slow down, the otherwise 'lost' energy for braking can also be harvested. The electricity can be used for any kind of human or vehicle powered interaction. EF is developed for high footfall areas, such as fairs, festivals, city squares and streets, playgrounds, shopping malls, airports, railway and subway stations.

Energy floor is used for convertic kinetic energy to electrical energy in high footfall areas to raise awareness about energy consumption and production on large scale.

Using this concept we can generate usable electricity, up to 20 W per module. We can contribute to indirect energy saving and sustainable innovations in buildings, public space, for events: by connecting to LED-lights, smart energy-management systems.

II. LITERATURE REVIEW

PIEZOELECTRIC TECHNOLOGIES:- According to How Stuff Works, piezoelectric materials create a positive and a negative end when work Isdone. The International Harvest Tribune claims that "energy harvesting", more commonly referred to as "crowd farming". An electrical charge flows across the material once pressure is relieved from them. While they usually provide very low currents, they can generate extremely high voltages. Harvesting energy from piezoelectric flooring is said to be impractical in residential applications due to the high cost of implementation and small amount of electricity generated in these settings. Common piezoelectric materials include quartz, and some ceramics. Harvesting energy from piezoelectric materials is inefficient, converting only a small amount of kinetic energy into electricity. A single footstep could potentially generate enough electricity to power two 60-watt incandescent bulbs for one second, the technology were implemented in a busy train station that the energy

captured could power 6,500 LED lights for an unspecified amount of time.

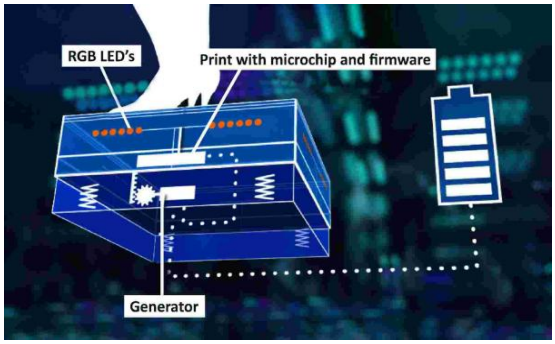
By using piezoelectric materials in the dance flooring of pubs we can generate higher amounts of electricity. That harvesting power or energy from the dancers is stored in batteries, which are emptied into the grid to help directly offset the costs of electricity usage. vigorous dancing could generate as much as 60% of the energy.

The energy harvesting aspect of these piezoelectric floor tiles lies in the unique proeperties of the crystal structure.When the crystal is strained, the center atom displaces from its lattice site and creates a potential. In our case, this displacement allows for energy harvesting of the depression caused during foot strike. The energy output of these types of energy harvesting tiles depends upon the applied force; a larger stress corresponds to a larger potential difference and thus more energy.

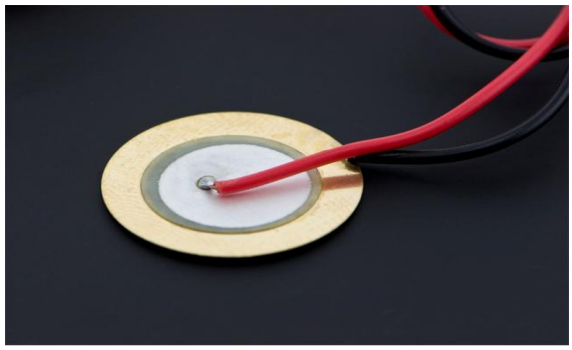
The purpose of this project is to raise energy awareness . This is accomplished through our project.

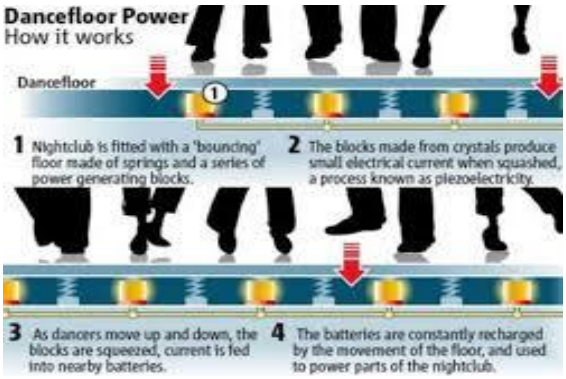
III. ARCHITECTURE OF PROPOSED SYSTEM

In this project our aim is to build a energy floor using piezoelectric plates implementing in crowdy areas to convert kinetic energy to electrical energy…



IMPLIMENTATION OF THIS PROJECT

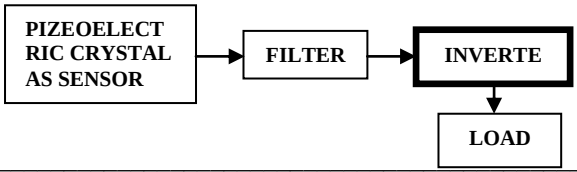




IV. WORKING OF THE PROPOSED SYSTEM

The working of our proposed system mainly depends on piezoplates.The energy harvesting aspect of these piezoelectric floor tiles lies in the unique proeperties of the crystal structure. Certain ceramics, such as lead zirconate titanate form a tetragonal structure with a small atom in the center. When the crystal is strained, the center atom displaces from its lattice site and creates a potential. In our case, this displacement allows for energy harvesting of the depression caused during foot strike. The energy output of these types of energy harvesting tiles depends upon the applied force; a larger stress corresponds to a larger potential difference and thus more energy. In order to estimate the power output of a single person walking through the campus center, it is important to determine the magnitude of forces experienced by the ground during walking. While walking.

1. Block Diagram:



2. Working:

TheEnergy Floor module flex slightly when stepped on which creates a movement that can be transformed by a small internal generator Each module by the size of 75 X 75 X 20 CM can produce up to 35 Watts of sustained output. Between 5 to 20 Watt per person.

BLOCK DIAGRAM DESCRIPTION

1. SENSOR:

In this block diagram sensor is a Piezoelectric Crystal which is a Transducer used to convert the kinetic energy into an electrical energy. When pressure is applied to it then voltage will generate across the terminals of it therefore in this device to convert kinetic energy into an electric energy a Piezoelectric Crystal used.

2. FILTER:

In this block diagram, Filter is a capacitor filter used to remove the AC components present in the DC voltage.

Capacitor will short circuited the AC voltage to the ground because,

$$\mathbf{Xc = 1/2\pi fc}$$

Where,

Xc = Capacitive Reactance.

F = Frequency.

C = Capacitance.

Therefore:

For AC: F = 50 Hz.

Xc = 1/2π x 50 x C

For DC: F = 0 Hz.

Xc = ∞

As the reactance of capacitor is large (infinite for DC) it opposes DC and hence it produces pure DC o/p.

3. INVERTER:

In this block diagram an inverter is used to generate the pure AC voltage from DC voltage generated by the sensor.

We can use the SCR or Transistor to convert the DC voltage into AC voltage; appliances are use as a load for this circuit that will run on AC voltage therefore DC to AC conversion takes place from.

4. LOAD:

Load is any kind of electronic equipment (e.g. Lights & Fans on the Railway Stations.) These equipments will be work on the energy which is generated by using above assembly.

APPLICATIONS

PUBLIC PLACES:

This device can be used at public places to generate the high as well as sustainable energy production.

For example, at Airport having large frequency of passengers then there will be high and sustained energy generate.

HOUSEHOLD PURPOSE:

This device can be used at household purpose to generate the energy required for that house.

We can use this device for triggering and powering the external systems such as mobile phone chargers, small screens, photo camera, entrance gates etc.

PUBS:

This device can be used at the pubs to generate the energy required for than pub. In pubs footsteps are more therefore the conversion of kinetic energy to electric energy is more so that the high as well as sustained energy generation takes place.

VI. CONCLUSION

Thus, with the implementation of sustainable dance floor

This device can be used in battery charging circuitry, when at the public place the energy is generated then some amount of energy will used to charge the batteries. Hence the battery backup also provided.

This device will be a best option for the nonrenewable energy sources because it is a renewable energy source.

REFERENCES

[1] http://www.sustainabledanceclub.com

On http://www.sustainabledanceclub.com website we get the basic idea of this project that we can generate the electric energy by using kinetic energy.

[2] **http://www.wikipedia.org**

Onhttp://www.wikipedia.org website we get the information regarding this project that the piezoelectric crystal can be used as a sensor as well as transducer to convert kinetic energy to electric energy