



Reviewing Writable System

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Abstract:

This is a type of project which is most effectively going to support the scholars in faculties, schools, or any other educating institutes however can even ease the work of the lecturers. The project 'REVIEWING WRITABLE SYSTEM' is a system in which the useful information written on the board can be reviewed with same words written by the teacher. Consider an example: An important paragraph or some note containing diagrams is written on the board by the teacher. To write further, he or she will rub and then continue to write on the board. And if some students haven't completed copying, and the teacher has rubbed some written part on the board, with the help of this system the teacher can show the same information on the separate monitor or screen which was written on the board without rewriting the information or drawing that diagram again. This information can be transferred or shared as it is in the form of soft copy through pen drives, hard drives CD's etc.

Keywords: piezoelectricity, piezo ceramics, pressure sensing, energy harvesting, PVDC, PTFs

I. INTRODUCTION

This process contains modified thin writing board which consists of a thin piezoelectric film hooked up behind it. Piezoelectric film is based on the phenomenon of piezoelectric outcome. Piezoelectric is an ability of the fabric to provide some amount of electrical charge on an application of mechanical stress. With the aid of marker, when some expertise shall be written on the board, the amount of stress applied on the board will probably be sensed through the piezoelectric film that allows you to generate knowledge in the form of electrical indicators that may be stored. For the storage, hard drives can be worthy as the amount of information will also be colossal quantity. The film used at the back of the board should be touchy enough in an order to document even a small quantity of pressure utilized.

Over so many years there has been many research within the use and formation of polymer thick film as sensors as well as actuators. There levels has been accelerated in one-of-a-kind area. A novel procedure of making use of PTF as a polymer piezoelectric paste developed is used while making a piezo board in the required venture. Prior piezo ceramic substances has a excellent process for piezoelectric functions and now a blend of specific piezo ceramics is used within the required undertaking as an field of application.

II. EXISTING WORK

Use of this technological know, it has been opted and studied by many researchers and scientists previously using piezoelectricity. Using standards in extraordinary subject has been made such as Piezo-Phototronics LEDs, Pyzo Flex, monitor Printable Polymer that are made on

the foundation of contact sensors, fingerprint readers, contact touchy robotic epidermis to e-paper, pressure sensing foil for human computing device interface, display printers and lots of extra. With the application of piezoelectricity and use of piezo materials within the form piezo sensors are used now not only for detecting strain but also used for energy harvesting functions. Study continues to be in growth on mammoth applications of piezoelectricity as on realistic approach and in future it will have a good influence in technical fields.

III. PROPOSED WORK

Contact monitors are fitting increasingly authorised in everyday environments as a consequence of their comfort and humanized operation. In this paper, a piezoelectric film touch screen board is developed and investigated. Piezoelectric ceramics arrayed underneath the contact panel are used as tactile sensors to measure the contact positioning component in an identical trend to traditional contact displays. Moreover, additional contact stress and its acceleration performance can be purchased to gather a greater-level human laptop interface. The piezoelectric ceramics may even be brought to a traditional contact disclose structure, or they are in a position for use independently to construct a novel contact display with an excessive smooth transmittance method to an apparent glass. The piezoelectric ceramics had been processed from PZT piezoelectric ceramic powder correct into a round or rectangular kind. In step with the quite a lot of contact operate and bodily press drive of a finger, or maybe a gloved hand or fingernail, the piezoelectric tactile sensors will have fine output voltage responses. By using calculating the ratio of unusual piezoelectric tactile sensors' responses and summing up all piezoelectric

tactile sensors' output voltages, the touch element role, contact strain and contact with power acceleration may also be detected.

Now piezoelectric energy harvesting method is used for storing the energy signals in the form of written patterns which has been discussed further and hence the written patterns are stored in any external storage device or on computer peripherals for future use.

3.1 MATERIALS OR COMPONENTS USED

There are selective materials used in this project. They are as

3.2 BLOCK DIAGRAM

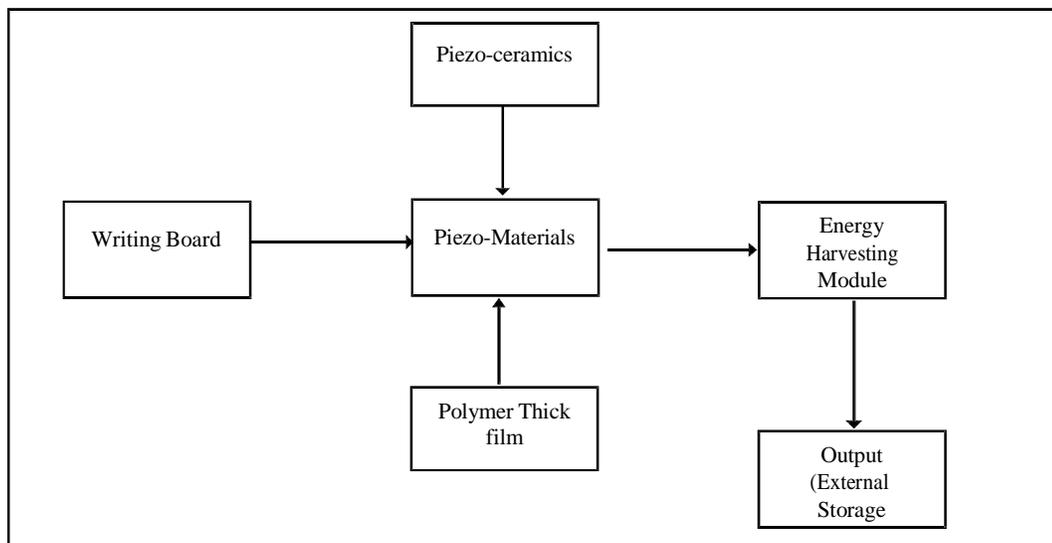


Figure 1: Block Diagram of Reviewing Writable System

A thin writing board is to be considered the place where a piezoelectric film is connected in an effort to observe the pressure. A piezoelectric film is used comprises of combination of piezo ceramics similar to polymer thick film which detects the stress and converts them into electrical signals and thus used for additional methods. Now Energy Harvesting module is hooked up to be able to collect energy from piezo sensors and use this energy which can also be in the form of written patterns for storage purposes. The storage content material is extracted utilising the Data Acquisition Unit and allowed to be transfer into other storage gadgets. Output is stored on any external storage device or on any pc peripherals which can seen and used afterwards.

IV. WRITING BOARD

A writing board is a type of board which is used in general classrooms of colleges, schools, offices etc. in order to write or erase the information written on it.

The board to be used should be very thin. The reason behind a thin board is that to make the piezoelectric film sensible of minimal amount of pressure applied on the board. Commonly, the boards are made up of PORCELAIN, or sometimes glass board is used with an advantage of good erasable property.

follows:

- **Thin Writing Board** –The board used for this application should be a thin board. It should be thin enough to make the piezoelectric film work.
- **Piezoelectric Sensors** – Piezo ceramics, Piezo polymers, Polymer Thick film. The film sensor which will be attached at the back of the board.
- **Piezoelectric Energy Harvesting Module**
- **Storage Devices** – used for the storage of information which is extracted from the board.

Here, the glass board would not be a preferable choice due to its high rigidity issues. A thick film paste PTF having properties of piezoelectric will be applied behind the board for sensing the mechanical pressure and later on used for harvesting signals produced by the screen for storage purpose. A separate energy harvesting device that collects piezoelectric energy for storage is used with the board

V. PIEZO-MATERIALS

5.1 PIEZOELECTRIC SENSORS

Piezoelectric sensors are sensors which receives signals due to mechanical stress. It is basically a transducer which converts one form of energy to another. The mechanical compression changes the dipole moment creating voltage. Direction of compression or tension generates voltage of the same polarity as the poling voltage.

Applications include – aircrafts, vehicles, shoes (phone charging project), relays, houses, speakers, motors etc. It is available in two forms, namely, ceramic crystals (quartz, PTZ) and polyvinylidene fluoride (PVDF) film.

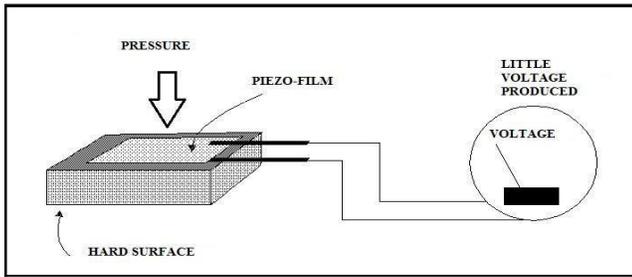


Figure 2: Piezoelectric Device

5.2 PIEZOELECTRIC FILM

Piezoelectric film is a sort of film which works on the principle of piezoelectricity. It is outlined as the ability of the fabric to provide a distinct amount of charge when strain is utilized on it. The electrical energy produced relies on the amount of pressure utilized to the device. It is in actual fact an interaction of mechanical and the electrical state in the crystalline materials. On this challenge the film technology is used. The polymer used within the film is polyvinylidene fluoride (PVF2).

5.3 PIEZOCERAMICS

Development of adaptive method is increasing in importance for brand new enterprise. Wise substances have come to be more productive and main which possess each sensor and actuator characteristics. They become aware of environmental conditions akin to strain, load, mechanical stress, and react to them. Piezoelectric ceramics are the materials usually used for piezoelectric applications. And utilized in harvesting contraptions on account that of their excellent piezoelectric homes, low fee and suitable to the various power harvesting contraptions. Amongst all PZT could be very useful due to the fact that of its fine piezoelectric properties which has been improved into tremendous family of ceramics. PZT-5H and PZT-5A are some of the regularly used ones.

Different researchers and scientist had made many material-based applications with respect to PZT in the vast field of piezo ceramics. Most piezo ceramics and single crystals used to date for energy harvesting are a sub group of piezoelectric called FERROELECTRICS, here PZT(lead zirconate titanite) and PMN-PT, which bestows excellent piezoelectric properties.

5.4 PIEZOELECTRIC POLYMER

The advance use of piezo ceramics has made an excellent approach for the fabrications strategies. PVDF (polyvinylidene Difluoride) is essentially the most commonly used piezoelectric polymer which is a semi crystalline polymer with a repeating unit of HC2-CF2 and comprise 50% crystals. These polymers are bendy and effortless to deform which makes resilient to mechanical

stress or shock and simply mounted or curved surfaces. More over due to the fact that of its bendy nature they have got been used for energy harvesting from wearable gadgets.

Piezoelectric ceramic polymer composites were reviews widely in an effort to combine properties of piezo ceramics with polymers. The material used in this assignment will also be in paste kind that fulfil need for low price piezoelectric functions through making them part of thick film technology. The circuits used on a broad variety represent of substrates like Mylar Polyester bendy substrates that can with stand the curing temperatures. As per the research new paste fabrication approaches is finished via combined PZT-5H form with industrial PTF paste (dielectric form as per required weight ratio). The choice for the PZT because the filler fabric used to be established on its excessive cost piezoelectric constant. The resulting paste had been polymer ferroelectric composites much like these investigated by different researchers (DIAS AND DAS GUPTA, 1996)

VI. PIEZOELECTRIC ENERGY HARVESTING

This matter focuses on the extraction of the energy indicators from the piezoelectric film or the paste used. Energy Harvesting describes the change of mechanical energy into electrical energy with the vibrating constitution and used for other purposes. Power harvesting is a system in which the energy is derived and then used or utilized by machines directly and the energy is stored for further and future use. One of the vital historical energy harvesting ways are sunlight farms, tidal power utilizing farms, wind farms etc. Now a days utilization has popularised vastly.

A single piezoelectric crystal gives output voltage is in mill volt variety, which is one-of-a-kind for unique crystals. And the output in watt is in microwatts. Piezoelectric crystals are arranged in series in order to attain large voltage. Lithium batteries or capacitors are used for storing power That is the working principle in the back of piezoelectric energy harvesting method.

6.1 PIEZO CERAMIC VOLTAGE ACQUISITION:

It's an foremost stage for piezoelectric power harvesting. It is a method in which piezo ceramic substances are subjected to the vibrations and mechanical stress which then changed into the voltage. Essentially, power harvesting is gathering of energy and altering it into electrical energy. Electrical energy is produced which is energised formed from the strain utilized on the piezo ceramics and therefore this electrical signal is determined and got by means of DAQ unit. Accordingly this energy supply is then used for retention purposes and later utilized in many other functions.

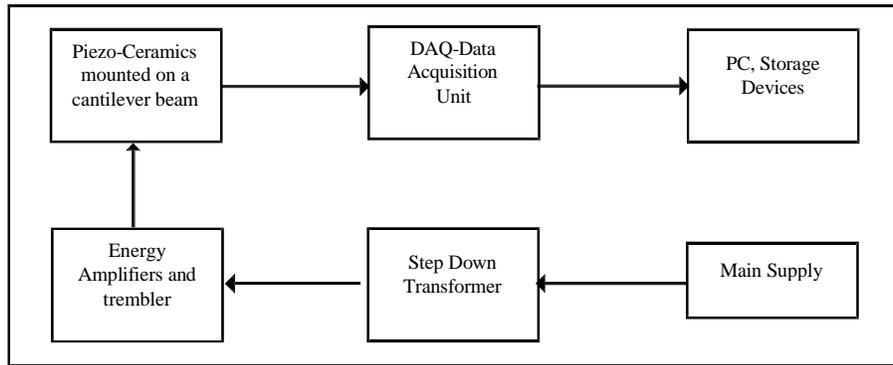


Figure 3: Voltage Acquisition Block Diagram

Figure 3 shows a block diagram that suggests a piezo ceramic fabric which is joined to trembler and power amplifiers which it's trembled and operated by means of accelerometer. This accelerometer offers input for the trembler where vibrating piezo ceramics placed on axle beam. Now Mechanical pressure produced on the piezo ceramic will change into electrical energy. The DAQ unit obtains the information yield with the aid of the piezo ceramics and is entitled as waveform by means of require application. The mains supply gives energy must be reduced by stepdown transformer. Now the power amplifiers fed the input voltages which offers amplifications to the indicators. Now the mechanical stress is given which offers energy with the aid of the piezo ceramic is received by way of the data acquisition unit which is hence stored.

6.2 WORKING OF ENERGY HARVESTING CIRCUIT

6.2.1 Full Wave Bridge Rectifier:

It consists of 4 separate rectifying diodes connected in a bridge form as a close loop association to manufacture the desired influence. The predominant plus factor of this circuit is that there is no need for centre tapped transformer, hence leading to decreased dimension and price. The single secondary winding is joined to 1 aspect of the diode bridge community joined to secondary winding and the opposite part is with the load.

6.2.2 Boost Converter:

The toughen is a well-known non-remote energy stage topology, in lots of instances often called a step-up energy stage. The enhance energy stage regularly is chosen in designing considering the fact that the preferred output is continuously larger than the enter voltage. The enter current for this stage is constant or non-pulsating due to the fact that the output diode conducts handiest for the period of a aspect of the switching cycle. The output capacitor supplies the whole load current for the rest of the switching cycle. Inductor L and capacitor C make up the potent output filter. The capacitor an identical series resistance (ESR), RC, and the inductor dc resistance, RL, are integrated within the analysis. Resistor

R represents the load seen with the help of the energy provide output. The expand converter is so designed to operate simplest in steady Conduction Mode (CCM).

A standard or discontinuous inductor current mode is operated in this power stage. In general inductor current mode, current flows always within the inductor throughout the entire switching cycle in consistent-state operation. In discontinuous inductor current mode, inductor current is zero for a part of the switching cycle. It starts at zero, reaches prime valued at, and return to zero throughout each switching cycle. It is interesting for a energy stage to stay in only one mode over its expected running stipulations in view that the energy stage frequency response changes generally between the two modes of operation.

VII. STORAGE DEVICES

The last step of this project is the storage of the output information or the signals which are extracted from the board and stored using Data Acquisition Unit in Energy Harvesting module. With the help of cables that information can be stored in hard drives, pen drives, CDs , floppy discs or computer peripheral devices. Hence, the storage content can be viewed again and used for further purposes.

VIII. RESULT

Features and applications of this Reviewing Writable System based on the principle of piezoelectric and energy harvesting technique is very much useful and productive at academic level as well as at the institutional corporate level. First of all, the system consists of a board which is held with a polymer thick film, detects pressure and converts into electrical signals. These signals are processed in data acquisition unit for energy harvesting that allows to collect the written data and later stored in any external devices for useful purposes and can view it again. This system gives a good approach for time saving, work loads, and less complexity in education field. In the world of electronics and computer aided services, this system gives a new concept of digital board where there is no harm for the society. Hence, a novel approach for the improvement and implementation of education level in the society.

IX. CONCLUSION AND FUTURE SCOPE

We have proposed this project for the help of teachers as well as students on the institution and academic level. The use of Reviewing Writable System makes the eases of learning and doing as well as completing works on time. This further saves prime time which can be used for other works and students can easily access the study materials. Use of piezoelectric principle and energy harvesting technique makes this project a convenient way for the future scope in the fields of education and corporate levels. More than one using and utilising pen, contact and viewing attention are coming alongside the opposite factors to gain with new experience. Along with this increase in traits for such initiatives makes each lecturers and corporations evaluating their potentials for wider use. Despite the fact that this idea is futuristic and applied for off-the-computing device gesture-based human-computer interplay however in reality it is a theoretical proposal that has been mentioned in this paper and a practical procedure remains to be a task. As a consequence future form motives can also be implemented with other recommendations with this project.

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