Theory of Earth vibration Impact

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Abstract— Collected energy from thermal and vibration of the human body could potentially give rise to autonomous wearable and implantable devices. Energy harvesting is an important enabling technology needed to trigger the next shift in mm-scale and W-powered computing devices , especially for wireless sensor nodes. This paper focuses on obtaining experimental data from the human body using off-the-shelf harvesters and discreet electrical components. Our results showed that up to 20 W of power can be produced at 220C room temperature for 9 cm of the thermoelectric generator field. In addition, the 0.5 cm piezo electric harvester can generate up to 3.7 W when running at 7 mph. These data correspond to a power density of 2.2 W / cm and W / cm respectively for thermoelectric generator and piezo electric harvester.

Keywords: human body, vibration theory, Energy harvesting, piezo electric harvester, wireless sensor nodes, wearable devices.

1. Introduction

$_{\circ}$ The laws of vibration says that something that is observable or unvisible in our world, broken up and studied because it is mere energy or light that resonated and acted as a vibrational frequency or pattern where Any THING MOVES NOTHING RESTS. Ultimately the earth itself is a matter and has gravitational force attracts these vibrations accordingly. Or in more simplifingly as the earth was born spinning attracted both Time and vibrations Perpendicular to each other. All matter we know is given or borrowed ENERGY even the thoughts and feelings has its own vibrational frequency. Science indicates that all the embodied worlds essentially consist of energy packets; quantized units that vibrate at some frequencies. If you look at it though a high-powered microscope, while matter seems to be air, it is actually empty space interspersed by energy, even though it is broken down into a smaller portion – molecules, atoms, neutrons, electrons and quanta. And, basically, resources and empty space consist of everything. The magnitude of the acceleration of the energy it makes-up is all that remains solid. The more compact the material, the higher the vibration intensity, is an curious finding. At the same time, the lower the density of an object, the lower the vibration speed, and the lower the vibration in the face of either light or darkness. Results of plastic piece hitting the aluminum at certain speed in space or no vibrational energy. The results states that at '0' vibrations or '0' gravity mass loses energy due to lack of energy transmission attracted by gravity.

Equations:

V= vibrations

V$\neq \frac{E}{M}$ x S$^{\infty}$ S= speed and (vice versa); G= gravity; M= mass; and E= energy

Cultural observations are the different cultures made different symbols to communicate or to transfer knowledge. Indians however managed to invent '0' zero in the early ages must have came across with these vibrations and symbolized a digit 0 as of nothingness in the vast universe. Even though this 0 may not have named after vibrations but they figured out that vibrations are energies and humans can produce these vibrations in the form of voices. Early Indian ages divided themselves into cast systems which can be noticed still now. The top humans in this cast chain were called BHRAMANAS as their duty was to control vibrational frequencies in the form voices called (MANTARS). And they concluded that vibrations among the universe were produced by planets orbiting around at the vast distance results their day to day life by the term called Astrology, but no scientific proof exists of these actions. Many Indian books state that time frames moves in triangular format where according to modern sciences these frames are given edge points namely 3, 6, 9 to form

a triangular sequence to understand the magnificence. As also Indians used to draw these triangular forms on floors or grounds to attempt prayers (Poojas) producing vibrations (mantars) around it as in belief that bringing the good times among the parallel universes by frequencies naming them. (HOMAM) and also can been seen at welcome doors which later evolved into designs naming them Rangoli. Up to this day in India the vibrational energy through symbolization or numerals are vastly believed as numerology. The examples of these actions were noticed in recent lockdown as PM NARENDRA MODI SIR asked every Indian to light torch on April 5th at 9 pm. The exact reason behind was when added the date and time results in no.9 which believed to be a repeating number in numerology.

This paper records calculations using off-shelf components of the thermal and vibratory capacity of the body. Measured results showed that the thermoelectric generator (TEG) has higher power available in contrast with the piezoelectro (PE). PE harvesters, however, display higher voltage than TEG. This work is part of a totally separate biomedical framework using sensors to test non-invasively ECG and glucose rates Alhawari (2013)[1]. This study is focused on The key components of this network include an energy and power storage block, a block of biomedical sensors, biomedical transmitter block and a block of wireless transmitters. Two types of energy are included in power generation and control units, namely TEG and PE harvesters. The interface circuit also integrates, picks and automatically passes captured energy to the central storage device. The power control unit usually facilitates the reduction of power usage in operating mode. In Kwong literature (2008) [2] several ultra-low energy circuits were published. Compared with the power provided from energy harvest sources for these circuits, TEG and PE harvesters may have ample ability to operate low-powered soC.

2. Literature survey

Battery life is also one of the most critical design requirements for advanced mm-size and W power computers for long-term service. In several mobile computing parameters, such as Processing power, memory capacity and wireless transmission rates Paradiso has increased exponentially over the last two decades [3]. However, the efficiency of a battery did not hit the same level; rather it increased by Buchmann (2006) at a rate of 8 – 10% per year [4]. Fig. 1 contrasts three types of regular batteries, the Alkaline AA, the Lithium Coin 20 mm and the Thin Film Lithium 1 mm [5]–[7]. In addition, the 1 mm harvester power density is shown in Fig. 1. Theoretically, the technical component in the fundamental development of ultra-low voltage sensing applications can be taken up with energy recovery as smaller batteries can be powered with small power harvesters. Super condenser or solid state batteries may also be used to resize the unit. Note: Small and high-capacity batteries tend to be used as common energy sources for implantable devices, for instance in pacemakers.

However, new work has shown that the energy from the inner ear can be harvested and implantable instruments can function independently [8], [9]. Circuit architecture innovations played a significant part in reducing and prolonging the power usage of computers. Power control systems were supported basic equipment to sleep in WSNs using its power saving methods such as clock gating and power supply. Such low-power technologies helped incorporate sources of energy storage so that batteries can be continuously recharged to enable autonomous service. Many sources such as thermal, vibratory, radio and solar are required to capture electricity. The power available depends on the scale, efficacy and quality of the harvester. Owing to their almost universal nature, energy harvesting from thermal and vibrating effects of the human body became a matter of interest to power wearable and implantable devices. The usable energy density could exceed a W range from human temperature and vibration. As a result, strong levels of thermal strength and vibration can be obtained from humans, which could theoretically operate low-energy machines. Besides human activity, energy may be obtained during breathing from other motions such as the normal contraction of the human chest [10].
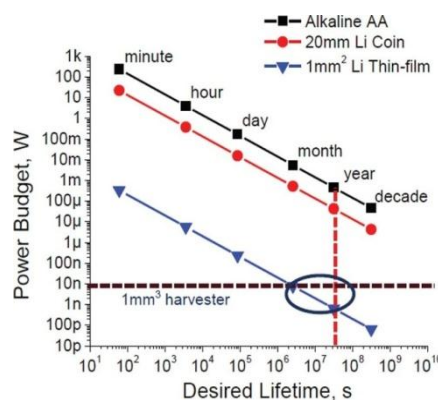

Fig.1: Power budget versus lifetime for different batteries [11]

3. Thesis Statement

The amount of gravity attracted both time and vibration accordingly and matter on earth is given energy by the mixture of unknown vibrations throughout the vast universe and time allows these vibrations to travel in it but time is not a vibration itself. The early humans have symbolized these vibrations in the form of different symbols according to their culture of age within the time which evolutionarily changed into form of numerals which modern sciences uses to define a matter's measurements of shape, size, structure etc and even TIME but the vibration's energy within the measurable time having symbolizations are perfectly camouflaged. Although the time is different from vibrations but both are attracted by gravity the symbolized energy works accordingly on earth's time not in space time making everything happen for a reason but as an accident or co-incidence So ultimately the vibrations having symbolic form consist of energy in given time. But the symbols (numbers or equations) themselves are not energy but just a form. The use of TEG devices can transform thermal energy into electrical energy. The mechanism of transformation is based on the See Beck Effect, which generates electricity from the temperature gradient between two connected conductors[12]. Image. 2(a) depicts a standard TEG device's structure. It consists of small legs of electrically attached materials and form materials. The electrons and holes are pushed in opposite ways as a temperature increase is introduced on the sides of the TEG. This effect corresponds to a disparity in voltage at the TEG terminals. Please note that the temperature differential must be retained if the TEG is to produce a voltage continuously. TEG can only be modeled in series with a resistor as a voltage source, as seen in Figure. 2(b). The voltage generated at the TEG ends of the open circuit is equal to

$$V_T = S\Delta T V_T = S\Delta T$$

Similar to thermal matching, electrical matching is achieved when the load resistance matches the source resistance (R_T). This occurs when the output voltage is equal to $V_T/2$. The maximum output power is equal to

$$P_{\mathrm{out,max}(TEG)} = \frac{V_T^2}{4R_T}.$$

The PE (Piezo Electric Harvester) is based on a piezoelectric effect [13], which is the main operating system. A mechanical strain is produced when a force is applied to a PE product in order to alter the material's polarization. As such, the PE content accumulates positive and negative electric charges. Such a transition in the product flow creates a potential difference in the electrical field. The size of the difference in potential depends on the task power, oscillation frequency and unit geometry. Originally, the PE harvesting technique was developed using the common mechanical to electrical technique linear spring-mash-damping system is the system associated with the pattern. A simple harmonic motion is produced when the device is excited by a force. The harmonic motion does not persist indefinitely and ceases for some time because of damping forces components like friction and drag power. The mechanical power is converted to electric power during the harmonic action. The required output power depends on the machine mass and whether the unit is worked in the resonance situation (m), the electrical damping ratio (ζ_e), the mechanical damping ratio (ζ_m), the natural (resonance) angular frequency (ω_n), and the input acceleration (a_{in}), as shown in equation

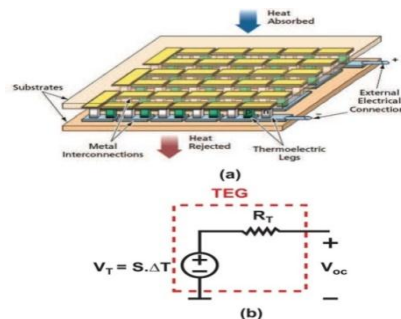$$P_{\mathrm{out,max}(PE)} = \frac{m\zeta_e a_{in}^2}{4\omega_n(\zeta_e + \zeta_m)^2}.$$

Fig. 2. Overview of TEG (a) structure and (b) model.

In order to be more accurate to a PE harvester [14] the default mechanical-to-electric configuration is changed. The PE harvester's corresponding circuit is described as an electrical domain related mechanical spring mass network. Image 3(a) demonstrates the PE harvester equivalent circuit on the mechanical and electrical sections. The PE component can be determined by the strength of the resonance of the PE harvester by sinusoidal vibration. A dual sinusoidal current source with a parasite and parasite tolerance as shown in the Fig 3(b) [15].
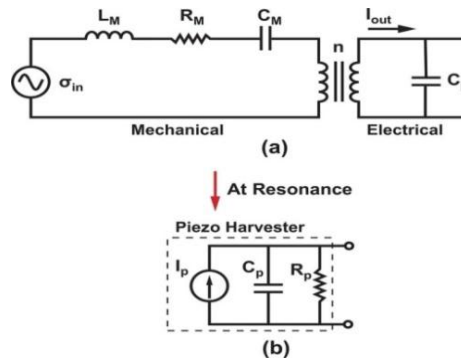
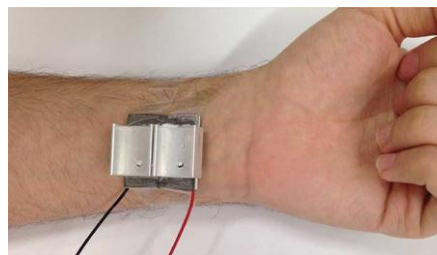Fig. 3. Equivalent circuit of the PE harvester at (a) no resonance condition and (b) at resonance

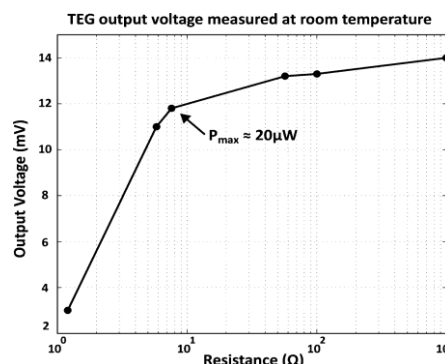Fig. 4: Experimental setup of TEG mounted on a human wrist.

Fig. 5: Output voltage of 3 3 cm TEG device at different load resistances

4. Purpose of Research

The calculation of time from seconds to millenniums in modern sciences are by numerals which we use almost for everything were originally designed by early humans to communicate as virtual symbols. As they evaluated in the great time ended up by taking the forms of numerals and equations to represent every measurable particles or matter. But the modern science doesn't state that the evaluated characters perform vibrational energy excepting a few theories. And also the inventions of these numerical characters may or may not were based on vibrational formats but the time on earth deals with mass or material which can be divided into numerical formats then these vibrations can also be divided or can be given symbols(numbers or equations) as energy of the mass was just borrowed. And everything which is born organically(life) or inorganically (non-life) may receive vibrational energy but as organic have their own energy as they are self functional where as in-organic or material is just received energy by vibrations are directly connected to the organic as they both received vibrational energy along with time(seconds to years). So both organic and in-organic interact with each other along with earth's time resulting in everything happening for a reason but as an accident. (Simplification): Seconds are calculated into digits for representation of little amount of time applying on mass whose energy is transferred by vibration but the digits are not vibrational energy itself but just given symbols.

Example1: As vibrations were attracted by gravity earth created its matter accordingly at different places on itself. But there are other planets coexisting with earth having gravity in our very solar system. And each has their gravitational limits which attracts vibrations and created matter, particle or minerals different from the earth according to their perspective. Earth and our solar system's other three internal planets (Mercury, Venus and Martian) are composed of rock that contains common minerals such as fe1ldspars and metals such as aluminum and magnesium. Pluto is like that. There

are not solid other stars. For eg, Jupiter consists mostly of helium, hydrogen and water stuck.

Example 2: The amount of gravity attracts the amount of energy but when there is no gravity there's no vibrational frequency or energy for a mass. But the energy for the mass which is already given and taken into zero gravity location the energy of the mass becomes zero. And when external force is applied energy less mass becomes easily destructible result of no vibrations. Here's results of the 2 masses which were formed on earth tested by giving one of them the external force(speed) making to hit another at 0 gravity or no vibrational energy at all resulted in leaving the first mass with destruction which would have been no match for the force or energy for the first mass at earth's gravity.

5. Experimental analysis and results discussion

A commercial TEG tool (G 230–0313) from Telluric with an area of 3 * 3 cm2 is used to describe the thermal energy emitted by the human body. The estimated internal resistance of the TEG is 7.6 livers and the extrapolation from the data sheet of the See beck coefficient is 40 mV / C. As seen in the image, the TEG unit is placed on a human arm. 4 at 22ºC air temp. 4. Therefore, as seen in Fig. 4, a heat sink is equipped with the TEG. Rising heat dissipation and preserving temperature variability in the TEG. Fig. 5 shows the TEG output voltage at varying resistance values. As seen in the figure. 5, with a load resistance of 7.6µ equal to 20W, the optimum power occurs. This is equal to a density of 2.2 µ W / cm. This is less than what is stated in a magnitude order (20 µ W / cm. In [35], a TEG based on MEMs is manufactured in TEG-structure and in the radiator configuration. In order to optimize power output, a thermal match is often carefully planned. Nevertheless, the market has not implemented TEG based on MEMs due to high processing costs, and BiTe thermopiles still dominate TEG mass production. TEG production. Commercial TEGs are also chosen for this paper trial. Please note that a portable TEG on a human being is a maximum power limit of 30µ W / cm at 22oC ambient temperature and a maximum power limit of ZT 1
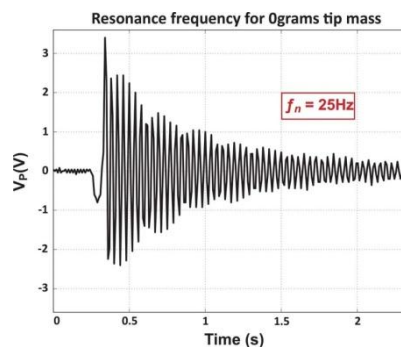

Fig. 6. Output voltage of the PE harvester during the flicking experiment at 0 g tip mass.

A PE harvester (V22BL), known as a voltage, is used from MIDE to describe energy produced by human activity. This consists of two petroleum harvesters, installed on the same beam, based on the transverse configuration. Such PE harvesters may either be paired in series or at the same time. Connecting the two PE harvesters in series leads to double the open circuit output voltage (Vp) and half the total equivalent parasitic capacitances (Cp) compared to a single PE harvester [16]. In comparison, as opposed to a single PE harvester, the amount of the output current of two paired PE harvesters is the same. Contrast, it leads to the same relation between the two PE harvesters V_P, double C_P, and double. The natural frequency (f_n) and the output power of the Voltage for both cases are the same. In systems with weak acceleration levels, the series relation is preferred. For all experiments in this article, the series relation is used. Moreover, C_P of a single Voltage is measured using a millimeter. For each frequency, the capacitance is around 9nF, with a gross effective capacitance of 4.6nF. The frequency of resonance is calculated by a basic flick experiment. It is achieved by pressing the voltage tip so that as seen in the image, the beam "rings out." 6. As depicted in the figure, f_n is tuned to 25 Hz. To order to optimize the output power, this frequency can be reduced down to the human motion frequency. The frequency of movement in humans is less than 2 Hz, as seen later in the article. The normal frequency of the PE harvester has been reported to be 110 Hz rather than 25 Hz. The explanation is that by tying the PE harvester to calculate the normal frequency, the harvester is not strong.
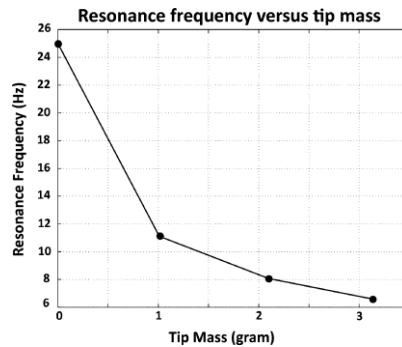
Fig. 7. Resonance frequency of the Volture versus tip mass.

Fig. 7 shows the measured f_n versus the added tip mass. As depicted in the figure, f_n Reduces the tip mass with the spring-loaded device equation

$$\omega_n = \sqrt{\frac{k}{m}}$$

where $\omega_n = 2\pi f_n$ And the rigidity of the season. Small magnets are used as tip masses and glued together on the tip of the Voltage using an adhesive. The magnet number is governed to 3.14 g for the addition of the tip mass. This particular mass weight is selected such that during the vibration, the voltage does not change too much to break the tension. Nevertheless, mass is necessary to increase the PE Harvester deflection and de-higher the normal frequency of the harvester, so that it is as close to movement frequency as possible. Although the current method is not feasible for the harvester and the tip weight the harvester may however be produced, engineered and manufactured as part of the harvers themselves to generate the tip weight. Five primary studies are performed using the PE harvester to describe the behavior of humans. One such experimental design, Fig. 8(a) indicates the stress mounted on a 3.14 g tip mass breadboard. Additionally, Fig. 8(b) shows the friction attached to the experimental handle. However, the experiments performed in this paper included valuable data on the behavior of human body by the PE harvester, such as frequency of motion and acceleration, output voltage and sufficient tip mass for frequency adaptation, although the harvester seems unworkable. These data provide valuable knowledge in order to design realistic PE systems for various parameters.
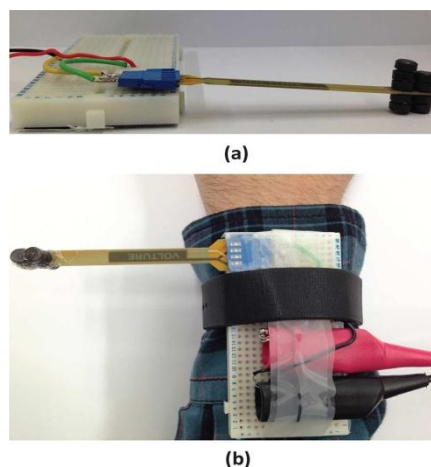

Fig. 8: (a) Side view of the Voltage with the added tip mass and (b) the Voltage mounted on a breadboard and fastened on the experimenter wrist.

The first experiment is performed using the data logger Slam Stick to determine the frequency and extent of the movements of the human body. The second experiment examines the effect of tip mass on the field. The experimenter first stepped on a pulley when the PE mower was placed on his side with a mass of 0 g of tip. An oscilloscope gradually raises and records the tip mass volume. The third study is carried out to calculate a tip mass of 3.14 g at different speeds of humans: 1.8, 2.5, 3.8, 4.4, 5, 6, and 7 mi / h. For the fourth experiment the voltage is attached to a tensile rectifier, and the VD binds to a tensile rectifier. Output capacitor (C_{rect}) Calculate the production of energy at different rates. Finally, the fifth experiment is performed to measure the output power at various loads, while the PE harvester is connected to the VD. The following section describes the specifics of each experiment and the results. The calculated data logger output range is shown in Fig. 10 1.8 mph and seven mph. As seen in the figure, 0,857 Hz and 1,476 Hz respectively equate to 1.8 mi / h and

7 mi / h. Figure displays all different harmonic frequencies. 9 & 10.
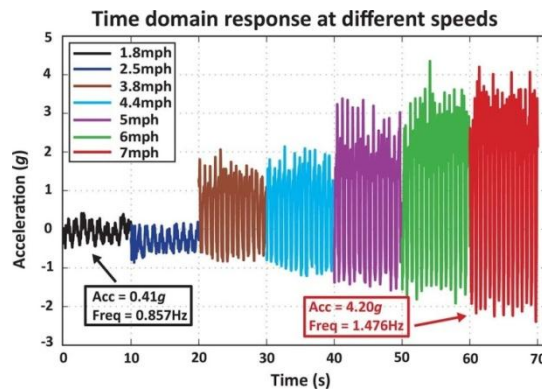

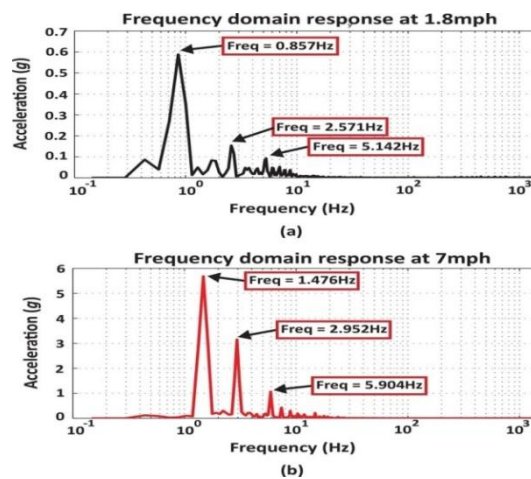Fig. 9. Time domain response at different speeds.

Fig. 10. Frequency domain response at (a) 1.8 mi/h and (b) 7 mi/h.

CONCLUTION: In over all summary of the above theory in short states that energy of mass was just received as gravity attracts vibrations and vibration is the energy within the mass as it was transferred. Even if it may or may not have symoblifications but the energy works as it is made up but perfectly camouflaged. The paper provided calculated data on thermal and vivid energy obtained with the TEG and PE harvesters, respectively, from the human body. The calculated results showed that the mean human impact intensity is 4.20 g and the average frequency at 7 miles an hour is 1.47 Hz. In comparison, the PE harvester average voltage is 7.68 V at 7 mi / h. The maximum power produced with an output condenser of 1µF is 1µA at the same rate. Furthermore, measured data shows that up to 3.7 W output power can be produced by a 5 cm PE harvester. A 9 cm TEG region can output up to 20 W at a room temperature of 22µ C, in comparison. The results are W / cm and 7.4 µW / cm , respectively, for TEG and PE harvesters. TEG thus produces more energy than the PE harvester. Nevertheless, the output voltage of the PE harvester was higher than that of TEG. This will allow semi-autonomous activity of human body-based energy harvesting applications if both thermal and vibration harvesters were combined.

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