Smart Shoes Based on Android Application using Smart Phone

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***Abstract*-- As the power requirements for microelectronics continue decreasing, environmental energy source can begin to replace batteries in certain wearable subsystems. In this spirit, this paper examines three different devices that can be built into a shoe, (where excess energy is readily harvested) and used for generating electrical power "parasitically" while walking. Two of these are piezoelectric in nature: a unimorph strip made from piezoceramic composite material and a stave made from a multilayer laminate of PVDF foil. The third is a shoe-mounted rotary magnetic generator. As a self-powered application example, a system had been built around the piezoelectric shoes that periodically receives digital signals from Bluetooth module as the bearer walks.**

I. INTRODUCTION

As wearable electronic devices evolve and proliferate, there will be a growing need for more power delivery to distributed points around the human body. Today, much of that storage is provided by batteries and power delivery is via wires. The current approach to power distribution is clearly becoming problematic—as more appliances are carried, we are force to either use more small batteris that require replacement everywhere or run wires through our clothing to supply appliances from a central power source. Both are undesirable. A better solution is clearly to generate power where it is being used, bypassing the storage and distribution problem altogether. As power requirements drop for most wearable devices, it is no longer infeasible to harvest a useful amount of energy "parasitically" from a normal range of human activity.

Our project smart shoes has three features:

1. Android application which sync up with smartphone via bluetooth.
2. Vibrator which tells the user when and where to turn to reach the destination.
3. Buzzer which is set when the user goes in wrong Direction.

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II. HARDWARE ARCHITECTURE AND IMPLEMENTATION

HARDWARE USED:

1. Piezoelectric Transducer
2. Bridge Rectifier
3. Microcontroller
4. Bluetooth Module
5. Motor Driver

Working of Receiver:

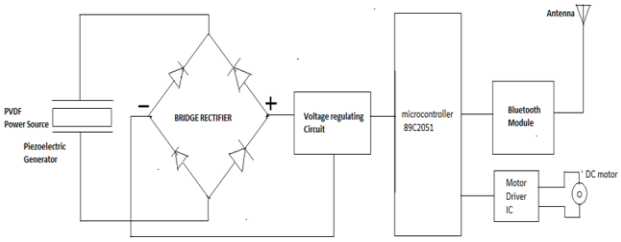

Fig 1: Block Diagram Of Receiver

Receiver consists of different blocks:

1. Power source - Piezoelectric transducer acts as a power source. Piezoelectricity, also called the piezoelectric effect, is the ability of certain materials to generate voltage when subjected to mechanical stress or vibration, or to vibrate when subjected to an voltage, or both. The most common piezoelectric material is quartz. Certain ceramics, Rochelle salts, and various other solids also exhibit this effect. A piezoelectric transducer comprises a "crystal" sandwiched between two metal plates. When a sound wave strikes one or both of the plates, the plates vibrate. The crystal picks up this vibration, which it translates into a weak AC voltage. Therefore, an AC voltage arises between the two metal plates, with a similar to that of the sound waves. Conversely, if an AC signal is applied to the plates, it causes the crystal to vibrate in sync with the signal voltage. As a result, the metal plates vibrate also, producing an acoustic disturbance.

2. Bridge Rectifier: It converts AC voltage into Pulsating DC.

3. Voltage regulating Circuit : This circuit produces required voltage level necessary for driving microcontroller Unit

4. Bluetooth Module: This module receives the signals from the transmitter regarding the directions from the map and sends it to microcontroller for processing so that motor is driven.

5. Motor Driver IC: to control/ drive the motor according to the said commands from microcontroller motor driver IC is used.

III. SOFTWARE DEVELOPMENT

Software Used

1. Smartphone App
2. Google Map
3. Keil vision for microcontroller programming.

Working Of Transmitter:

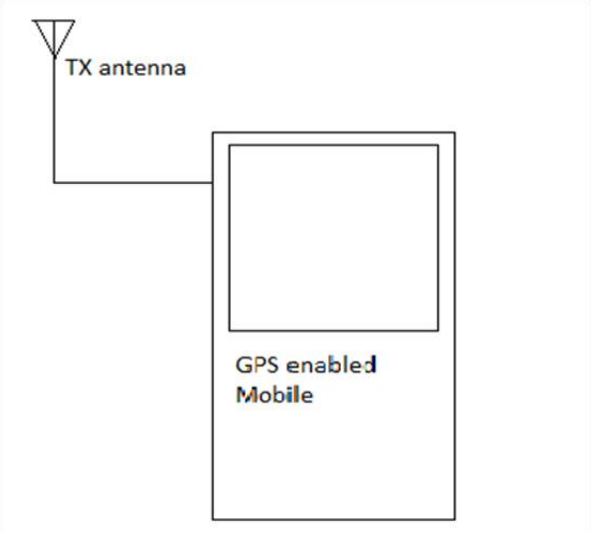

Fig 2: Transmitter On Mobile

Transmitter consists of Smartphone with GPS and bluetooth enabled. The shoes sync up with a smartphone application that uses Google maps and vibrate to tell users when and where to turn to reach their destination. The smartphone communicates with the shoes by bluetooth.

Advantage:

1. We can determine exactly where we are at the moment.
2. Track the location on Smartphone
3. No more fear of getting lost.
4. Search nearby area and going directly there and saving time.

Disadvantages:

1. Battery consumption is high.
2. Obstacles like trees and buildings can deflect the signal.
3. Inaccurate when the road is closed for some maintenance and all.

IV. CONCLUSION:

Our initial intent was to find the best mobile platform for wireless health applications. We based our comparison on the development of a simplified wireless health library. The requirements for this library were based on several ongoing research projects in our labs at UCLA. During this process, we noticed several advantages afforded by J2ME such as a unified runtime environment across a large number of devices.

V. REFERENCES:

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