Development of a Defense System For Women Security using IoT Structure and Piezoelectricity

[1]C Nancy ,[2]D Salma Faroze
[1]Assistant Professor ,[2] Assistant Professor
[1] CSE Department, [2] CSE Department
[1]CBIT Proddatur-AP,India, 2CBIT Proddatur-AP,India

Abstract *:* The proposed research is to provide security for the women using defense technique, when they are in trouble. In our proposed work the piezoelectricity will be generated through the high intensive movements of hands, legs and bags of the women when they are trying to escape from an attacker. The embedded piezoelectric devices will coverts the vibrations of hands and legs of women into electrical energy. This electrical power would be supplied with wearable sensors and IoT devices implanted in the body of a woman and also this power would be stored in a battery for future purpose. And through these sensors the heart beat and BP of the women would be gathered. If these values are above the threshold value, then the system would consider the victim is under threat and the IoT structure would send the alert messages along with the current location of the victim, to respective police and family members. In this proposal an embedded shock based gloves are being developed and the victim is in problem the IoT structure makes them active and the electric power would be supplied. When a victim touches the attacker then the gloves gives shock to him.

IndexTerms - Piezoelectricity, Internet of Things, Health Sensors, Cloud, Raspberry Pi

I. INTRODUCTION

In everyday life women or girls are being assaulted in streets, schools, colleges, workplaces, all over the places. The Government of India, meeting a longstanding demand for gender parity in the workforce, has approved an amendment in The Factories Act 1948 to allow women employees to work in nightshifts. The amendment suggests that nightshift for women shall be allowed only if the employer ensures safety, adequate safeguards in the factory as regards occupational safety and health, equal opportunity for women workers, adequate protection of their dignity, honor and transportation from the factory premises to the nearest point of their residence are met. With the onset of IT&BT industry, women work in night shifts. It is the responsibility of the firm to provide office transportation to such employees. Now a days even though the companies provide the facilities for transportation, but the security of the women is not fully ensured as one of the incident occurred in the year 2007 at Pune where a girl working in the call centre was brutally raped by two of her cab drivers assigned by the company. It is very much mandatory for them to provide security. The problem with woman are, they can defend them self if any problem comes. To address this challenge technology is being used for providing security for them. In our proposal, we

would like to provide some security measures. A garment based electric shock gloves had been invented which can produce an electric shock when a attacker attacks [1]. An alarm based IoT structure was developed for safety of women [2]. In our proposal in the domain Internet of Things was m-Health technology, here the health of the women can be monitored anywhere. Basically, all IoT mobile could be operated by batteries. The important challenge with batteries in IoT technology is which interrupts the continuous machine to machine (M2M) communication.

EXISTING TECHNOLOGIES

A. SHE (Society Harnessing Equipment): It is a garment embedded with an electronic device. This garment has an electric circuit that can generate 3800kV which can help the victim to escape. In case of multiple attacks it can send around 80 electric shocks [1].

B.   ILA security: The co-founders of this system, have designed three personal alarms that can shock and disorient potential attackers and hence safeguard the victim from perilous situations.

C. AESHS (Advanced Electronics System for Human Safety) It is a device that helps track the location of the victim when attacked using GPS facility.

D. VithU app: This is an emergency app initiated by a popular Indian crime television series "Gumrah" aired on Channel [V]. When the power button of the Smartphone is pressed twice consecutively, it begins sending alert messages with a link of the location of the user every two minutes to the contacts.

E. Smart Belt: This system is designed with a portable device which resembles a normal belt. It consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help [2].

Drawbacks of the existing systems:

1. The systems are bulky and are not portable where in these cannot be carried easily anywhere, any time

2.Requires more hardware, which in turn increases the implementation cost.

3.The systems doesn't provide a complete kit solution to the existing problem

4..The only thing that is clear about constitutional protections for location-based service information is the lack of clarity.

Proposed System

In our proposed project first we would like to design an energy harvesting device named as piezoelectric device and then we are proposing an Internet of Things (IoT) framework using a piezoelectric device to monitor the security of women in a problem.

Designing Piezoelectric Device:

Piezoelectricity is a non conventional energy harvesting method. The Piezoelectric transducers generate electric power, if they have been stressed. The basic principle of piezoelectric effect is "If a mechanical stress or force is applied to quartz crystal then it produces electrical charges on the surface of quartz crystal" and it works reverse also that is if we applied electric charge to quartz crystal, it would be deformed. The amount of charge is directly proportional to amount of stress. Figure 1, represents the principle of piezoelectricity. Some of the materials which produce piezoelectricity are quartz crystal, rochelle salt, barium titanate. The energy generated by a quartz crystal surface can be calculated through the following two equations.

Generating piezoelectricity :

Women might have a high intensive running while they are attacked and try to escape from attacker then their body parts like hands and legs are in continues vibrations. The piezoelectric device can be attached to the hands or legs of women as shown in figure 1.The vibrations cause the steel ball to hit the surface of crystal continuously which results generating electrical energy. And this electrical energy will be supplied to the various wearable health monitoring sensors implanted in the body of women.
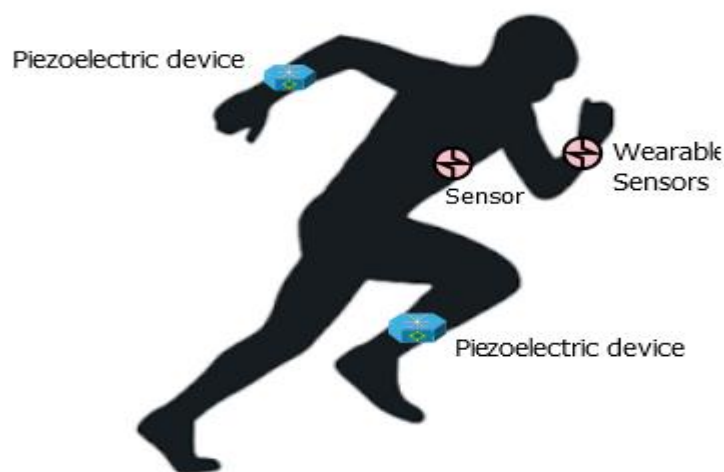

Figure : Piezoelectric device attached to women

Women on the ground or anywhere having the wearable devices like micro controlled embedded sensors powered through piezoelectric devices. These sensors continuously get the health conditions of women and transmit the data with the help of microcontrollers to IoT gateways which are connected to cloud through the internet. Here the data can be transmitted between sensors and gateway through wireless communication like Wi-Fi or Bluetooth. The IoT gateways are smart enough to perform actions like transmitting and receiving the data to and from wearable sensors and cloud. The health statistics will be displayed on the PCs , mobiles and LED display by using websites and mobile application. So that the polices and family members and friends continuously monitor the health condition of women in display and can perform the

necessary actions. Even the women can see their health condition when they are stressed with the help of LED display, which is available in wearable sensor device. A buzzer, which is embedded on wearable sensor device, would also alert the player if his health condition is critical.
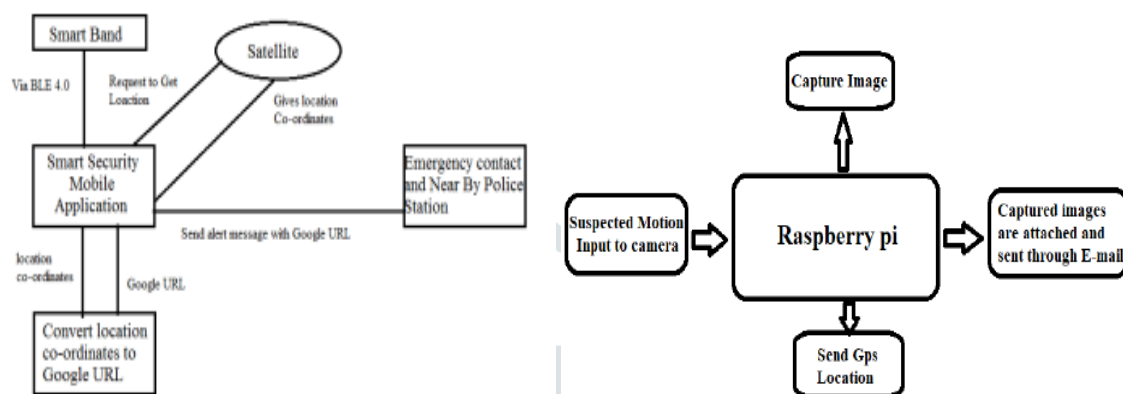
Advantages:

1.Powering the wearable body sensors with piezoelectricity to overcome the problems of battery operated sensors.

2. Raspberry Pi based IoT structure will also capture the images of the current location and forwards to the respective persons.

Conclusion:

For security of women in our proposal the piezoelectricity will be generated from the kinetic energy produced from the hand bags. These electricity will be supplied to the wearable sensors to the read the heart beat and BP when they are in trouble . If these sensed values are above the threshold value, then the alerts and respective emergency messages will go to the nearby police patrolling vehicles with woman current location. Our Raspberry Pi based IoT structure will also capture the images of the current location and forwards to the respective persons.

References

1.Alexandrous Plantelopoulous and Nikolaos.G.Bourbakis, "A Survey on Wearable sensor based system for health monitoring and prognosis," IEEE Transaction on system, Man and Cybernetics, Vol.40, No.1, January 2010.
2.B.Chougula, "Smart girls security system," International Journal of Application or Innovation in Engineering & Management, Volume 3, Issue 4, April 2014.
3.Smart Gadget for Women's Safety," Akanksha Chandoskar,[2]Shraddha Chavan, [3]Yojana Mokal,[4]Payal Jha, [5]Pournima Kadam", International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 4 Issue: 1.