Wearable Technology for Personal Security

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***Abstract*—**In global scenario, the prime question in every person's mind is about their safety and the harassment issues. The only thought haunting them is when they will be able to move freely on the streets even in odd hours without worrying about their security. This project focuses on this aspect of security so one will ever feel helpless. Our proposed Raspberry Pi-3 Based Self Defensive System consists of various sub modules such as GSM, GPS, memory card, shock circuit, buzzer and camera.

Keywords: *-Raspberry Pi-3, Personal Security, Smart devices, GSM, GPS, Wearable Technology, Camera, Gmail.*

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I. INTRODUCTION

The wearable tech market is alive and thriving. As a matter of fact, fitness trackers and smart watches are hotter than ever according to figures released by the International Data Corporation. Statistics released from the IDC state that last year came to a close with 102.4 million devices shipped. The worldwide wearable's market reached an all-time high as shipments reached 33.9 million units in the fourth quarter of 2016 and is growing at the rate of 16.9% year over year.
Like many, you might be asking yourself:
What is **wearable technology today**? Present scenario has proved there is more to wearable electronics than the wrist-worn devices.
Who is wearing them?
How are they evolving?
Who are the top vendors?
Wearable technology is more integrated with us and can either capture data, present data or both.

II. WEARABLE TECHNOLOGY

Wearable technology, fashionable technology, wearable devices, or fashionelectronics are smart electronic devices (electronic device with micro-controllers) that can be worn on the body as implants or accessories.

Wearable devices such as activity trackers are a good example of the Internet of Things, since "things" such as electronics, software, sensors, and connectivity are effectors that enable objects to exchange data (including data quality) through the internet with a manufacturer, operator, and/or other connected devices, without requiring human intervention.

Wearable technology has a variety of applications which grows as the field itself expands. It appears prominently in consumer electronics with the popularization of the smart watch and activity tracker. Apart from commercial uses, wearable technology is being incorporated into navigation systems, advanced textiles, and healthcare.

III. WERABLE IOT PRODUCTS CURRENTLY AVAILABLE IN MARKET

1) **Smart Watches: -** Smart watches are watches that twofold as cell phones and emergency alert frameworks. Furthermore, wearers can play music on the watch, send and get instant messages and, obviously, make calls.
2) **Fitness Trackers:** - Gadget or application for checking and following fitness-related metrics such as distance walked or run, calorie consumption, and in some cases heartbeat and quality of sleep.
3) **Implantable:** - Implantable are gadgets that clients convey with them wherever they go as they are embedded under the skin through surgeries in different structures like tattoos or pacemakers.
4) **Smart clothing:** - Smart clothing or smart garments are fabrics that are embedded with digital components and electronics into them. To obtain health care status's signals from various physiological indicators due to forming a source data center for comprehensive health monitoring, a 'smart clothing' design was presented. To make smart clothing systems intelligent, an infrastructure incorporating smartphones, mobile applications, cloud computing, and big data analytic is required to communicate in the structured design.
5) **Smart Jewelry:** - Smart jewelry maintains activity tracking of a fitness band without siliconstrap in a fashionable manner using earrings, necklaces, bracelets and rings.
6) **Smart Eye Glasses:** - The Smart Eye Glasses includes a bunch of features, including a gyroscope, accelerometer, ambient light sensor and built-in

camera. These stylish glasses are packed with sensors that can track brainwaves, eye movement, facial expressions and more.

IV. RASPBERRY-PI BASED SELF DEFENSIVE SYSTEM

In global scenario, the prime question in every person's mind is about their safety and the harassment issues. The only thought haunting them is when they will be able to move freely on the streets even in odd hours without worrying about their security. This project focuses on this aspect of security so one will ever feel helpless. Our proposed Raspberry Pi Based Self Defensive System consists of various sub modules such as GSM, GPS, memory card, shock circuit, speaker, and camera. The project is based on wireless technology. The main problem is when someone is in danger or when there is an emergency situation then the victim cannot protect themselves and operate the smart phones. Also, they cannot set alert function when they are in a risky situation & they cannot pass and send their location to the police & family members immediately.

V. DESIGN STUDY OF THE SYSTEM

The system consists of various modules such as GSM, GPS, memory card, shock circuit, speaker, camera, Raspberry pi-3 module. In this system we are using wireless technology for security purpose. A wearable device for safety means that allow users to protect while traveling odd hours or when they feel helpless. This project is based on personal security as it is reported that every day there is many cases about harassment, theft, etc. Although an Android based applications on security is already out in the market but for non-android users, I thought an idea for developing a system based on security using Raspberry pi module. Raspberry pi module receives the signals from GPS system which has present location information and then the Raspberry pi controller allows the GSM system to send the Alert Message to the three predefined numbers. Also in the system a shock circuit is used to injure the attacker for self-defense. A camera is used for capturing the image of the attacker and a micro SD card is used to save the captured image. A speaker is used to play an SOS message to call for help for the nearby people. There is also an additional feature of e-mail, due to which the image capturedby the camera is immediately sent through the e-mail to the specified e-mail address as a record.

- **Raspberry Pi-3 Module:** -The Raspberry Pi-3 is a popular, low-cost minicomputer running on Linux. It is ideally suited for prototyping machine-to-machine solutions through its GPIO pins and USB support. **Raspberry Pi 3 Model B** was released in February 2016 with a 64 bit quad-core processor, and has on- board Wi-Fi, Bluetooth and USB boot capabilities. In 2018 **model 3B+** appeared with a faster 1.4 GHz processor and a 3 times faster network based on gigabit Ethernet (300 Mbit / s) or 2.4 / 5 GHz dual- band Wi-Fi (100 Mbit / s). Other options are: Power over Ethernet (PoE), USB boot and network boot (an SD card is no longer required). This allows the use of the Pi in hard-to-reach places (possibly without electricity).

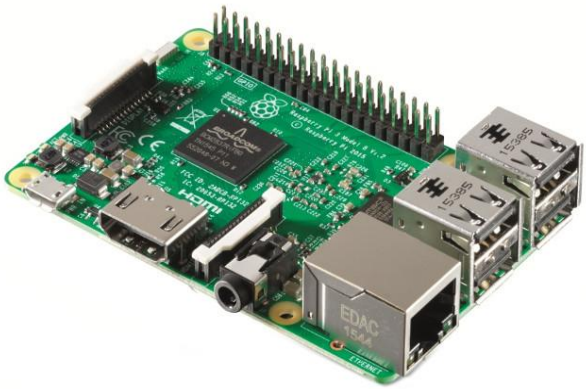

Figure 1:- Raspberry Pi-3

- **GSM:** - A GSM Modem Is a Wireless Modem That Works with a GSM Wireless Network .It Operates At Either The 900mhz Or 1800mhz Frequency Band. It Supports Voice Calls and Data Transfer Speeds.
- **GPS:** - GPS SIM 28 can track as low as -165 dbi signal even without network assistance. It has excellent low power consumption. It can be easily interfaced with GSM module and can provide precision location tracking with SMS to the pre-loaded contacts stored in the GSM Module.

Figure 2:- GPS SIM 28

- **Camera:** - Any camera which can be interfaced through USB can be used in this system for capturing the images.
- **Buzzer:** - Portable buzzer (3-24V) connecting it to raspberry-pi can be used to alert nearby people for help.

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- **Shock circuit: -** The shock circuit which I am using in the system is shown in the figure. It contains a small ferrite core step up transformer which converts low voltage to high voltage. When the two output ports come I contact to any living being then it creates a shock effect and sparks are also generated.

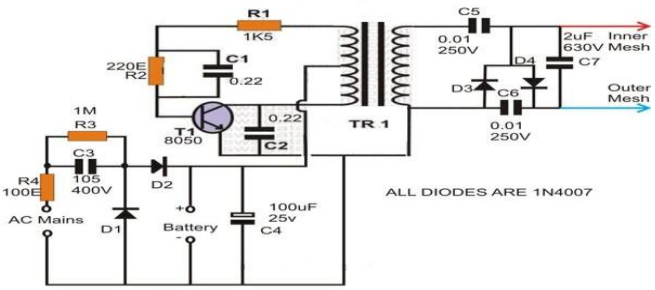
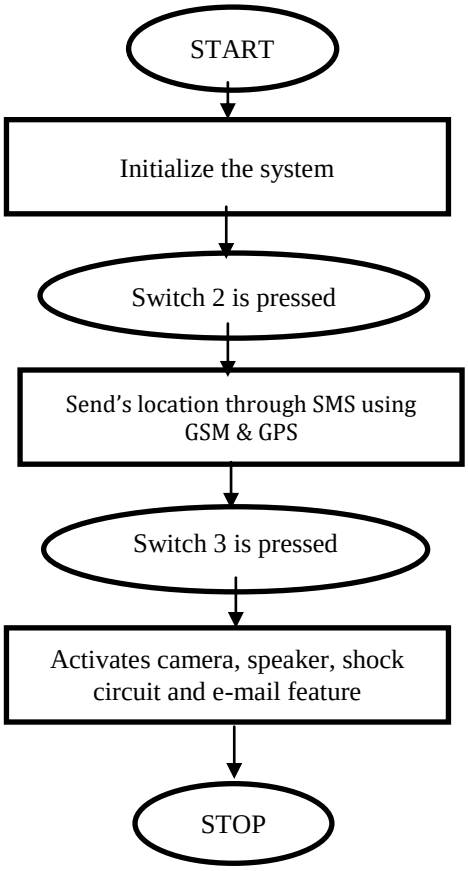
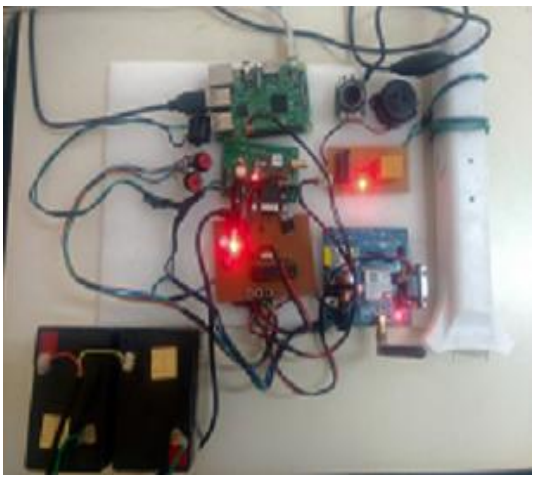


Figure 3:- Shock Circuit

VI. Flow Of Operation



Our Product



Conclusion

The proposed design will help the person when they are in danger. They can make rescue of themselves in danger situations. This system will also remove or decrease the fear of travelling in odd hours so that people will never feel helpless at any situation and can protect themself. And the culprit's image will be captured by camera so that police will be able to trace them with ease.

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