Smart Security Solution For Women Using IOT

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Abstract: *In the light of recent outrage in Delhi which shook the nation and woke us to the safety issues for women, people are finding up in different ways to defend. Here we introduce a device which ensures the protection of women. This helps to identify protect and call on resources to help the one out of dangerous situations. Anytime you senses danger, all you had to do, is hold on the button of the device. The device consists of a PIC microcontroller, GSM module, GPS modules. The system resembles a normal watch which when activated, tracks the place of the women using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication), to contacts and the police control room. The main advantage of this system is that the user does not require a Smartphone unlike other applications that have been developed earlier. The use of sophisticated components ensures accuracy and makes it reliable. The GSM and GPS are presented in IOT modem itself.*

Index term: *EMG Sensor, pepper spray, IOT modem, Shock sensor.*

I.   Introduction

This is a security system that is designed to providing security to women so that they never feel helpless while facing such critical situations. An advanced system can be built that can detect the location and health condition of women that will enable us to take action accordingly.

We can make use of number of sensors to precisely detect the real time situation of the women in critical situations. The temperature of women in such situations is normally higher which helps to make decisions.

The Smart band integrated with Smart phone has an added advantage so as to reduce the cost of the device and also in reduced size. The GPS and the GSM can be used of a smart phone. This also enables in reduced power use and that the watch can be installed with Bluetooth 4.0 BLE (Bluetooth Low Energy) which comes in handy for several days on a single shot of charge.

Day by day the women safety is becoming the common issue, such apps do exist, and they are equally smart to confiscate the victim's phone. Hence the strategy to switch to an independent hardware is focused in our project. Here we introduce a device which ensures the Protection of women. This helps to identify protect and call on resources to help the one out of dangerous situations. The system consists of pulse and temperature sensor, which when activated, sends values to the training dataset to be compared with per 10sec. If the comparison result is abnormal then a popup message is send to women. Main purpose of the system is to provide security and safety. As being an independent nation women's are not safe even today. There should be some effective measures for the security of the women's. Nowadays there are many applications developed for the women security but main drawback of these applications is it required initial interaction of women and that situation it is not possible.

Here we build a one smart band and android application. This project work automatically based on pulse sensor and temperature sensor. This   application uses pulses readings of that woman and protect her. If she is in danger then emergency message is send to the family member and nearby police station with the GPS location of victim. Also this emergency message is send on application so it is provide social platform.

The Internet of Things (IOT) refers to the use of intelligently connected devices and systems to exploit data gathered by embedded sensors and actuators in machines and other physical objects [1]. IOT refers to the ability of network devices to sense and collect data from the world around us, and then share the data across the Internet where it can be processed and utilized for various purposes.

The IoT is comprised of smart machines interacting and communicating with other machines, objects, environment and infrastructures. Almost every device today has an embedded processor typically a microcontroller or MCU, along with user interfaces that can add programmability and deterministic ―command and control‖ functionality. The electrification of the world and the pervasiveness of embedded processing are the keys to making objects ―smart. Our old toaster that mechanically controlled the color of your toast now has an MCU in it, and the MCU controls the color of your toast. The toaster completes its task more consistently and reliably, and because it is now a smart toaster, it has the ability to communicate with you electronically using its

touchpad or switches. After a device becomes smart through the integration of embedded processing, the next logical step is remote communication with the smart device to help make life easier.

Communication capability and remote manual control lead to the next step. The ultimate goal of some IOT applications is to connect with the Internet to achieve the goal, for which they must first become —"smart" (incorporate an MCU/embedded processor with an associated unique ID) then connected and, finally, controlled. Those capabilities can then enable a new class of services that makes life easier for users.

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has become more inclusive covering wide range of applications like healthcare, utilities, transport, etc. Although the definition of ‗Things' has changed as technology evolved, however, the main goal of making a computer sense information without the aid of human intervention remains the same. The evolution of current Internet into a Network of interconnected objects not only harvests information from the environment (sensing) and interacts with the physical world

(actuation/command/control), but also uses existing Internet standards to provide services for information transfer, analysis, applications, and communications. Fueled by the prevalence of devices enabled by open wireless technology such as Bluetooth, radio frequency identification (RFID), Wi-Fi, and telephonic data services as well as embedded sensor and actuator nodes, IoT has Stepped out of its infancy and is on the verge of transforming the current static Internet into a fully integrated Future Internet. The Internet revolution led to the interconnection between people at an unprecedented scale and pace. The next revolution will be the interconnection between objects to create a smart environment. Only in 2011 did the number of interconnected devices on the planet overtake the actual number of people. Currently there are 9 billion interconnected devices and it is expected to reach 24 billion devices by 2020.

In today's world, over 80% of the world population, including children around the age of eight or seven, owns smart phones. This is due to many reasons. One of them is the remarkable features and capabilities that new smart phones offer especially Android based smart phones. GPS offers outstanding capabilities in locating position and this can be used to develop resourceful application that helps in locating missing or lost children [1].

The essential idea of the IOT has been around for nearly two decades, and has attracted many researchers and industries because of its great estimated impact in improving our daily lives and society [2]. When *things* like household appliances are connected to a network, they can work together in cooperation to provide the ideal service as a whole, not as a collection of independently working devices. This is useful for many of the real-world applications and services, and one would for example apply it to build a smart residence; windows can be closed automatically when the air conditioner is turned on, or can be opened for oxygen when the gas oven is turned on.

The idea of IOT is especially valuable for persons with disabilities, as IOT technologies can support human activities at larger scale like building or society, as the devices can mutually cooperate to act as a total system [2]. The Internet revolution led to the interconnection between people at an unprecedented scale and pace. The next revolution will be the interconnection between objects to create a smart environment.

The wide variety of potential IOT applications needs a software development environment that ties together the applications, the command, control and routing processing and the security of the node and system. While the importance of software in MCU solutions has increased during the past few years, for MCUs supporting the IOT, even more software, tools and enablement will be needed. A broad ecosystem with easily accessible support is key to enabling the development of embedded processing nodes and IoT applications.

These days, however, with technology growing at a fast pace, automated vehicle tracking system is being used in a variety of ways to track and display vehicle locations in real-time. In this project we are using the concept of tracking the child instead of vehicle. One device is connected with server via internet. Using that device parents will track their children in real time or women safety. The proposed solution takes the advantage of the location services provided by GSM since kids carry that device. It allows the parent to get their child's location on a real time by SMS.

II. Methodology

2.1 LCD Display

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.

Liquid crystal display is composed of several layers which include two polarized panel filters and electrodes. LCD technology is used for displaying the image in notebook or some other electronic devices like

mini computers. Light is projected from a lens on a layer of liquid crystal. These combinations of colour lights with the gray scale image of the crystal (formed as electric current flows through the crystal) forms the colour image. This image is then displayed on the screen.

2.2 Power Supply

Almost all basic household electronic circuits need an unregulated AC to be converted to constant DC, in order to operate the electronic device. The transmitter section is shown in figure 4. All devices will have a certain power supply limit and the electronic circuits inside these devices must be able to supply a constant DC voltage within this limit. That is, all the active and passive electronic devices will have a certain DC operating point, and this point must be achieved by the source of DC power. The DC power supply is practically converted to each and every stage in an electronic system. Thus a common requirement for all this phases will be the DC power supply. All low power system can be run with a battery. But, for long time operating devices, batteries could prove to be costly and complicated. The best method used is in the form of an regulated power supply a combination of a transformer, rectifier and a filter.

2.3 Microcontroller

PIC 16F877 is one of the most advanced microcontroller from Microchip. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. The pin diagram of the controller is shown in Fig.1
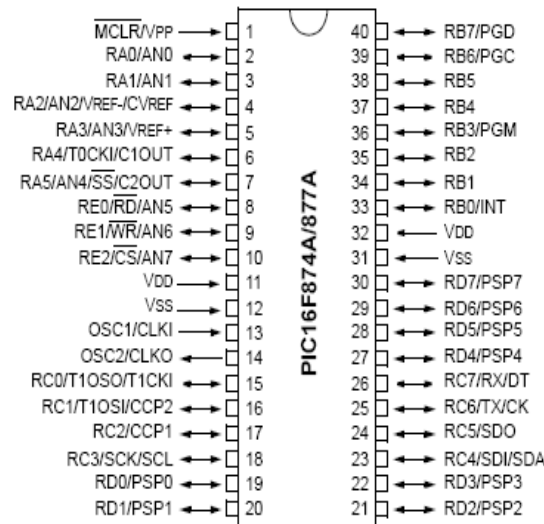

Fig.1 PIN Diagram of PIC Microcontroller

It is ideal for applications such as machine control applications, measurement devices, study purpose, and so on. The PIC 16F877 features all the components which modern microcontrollers normally have.

2.4 EMG Switch

By using tiny electrical impulses from muscle contractions, the EMG Switch is designed to detect and convert electromyography (EMG) signals which are present on the skin through muscle activity in your body into electrical information that is processed and input into a special switch closure used to output/activate assistive wheel

Technology device such as wheel chair. The input to the EMG switch comes from cloth electrodes, which provides contact to the tiny signals on the surface of the skin. The EMG switch continuously monitors the signal under the electrodes, and when the signal level exceeds a user adjustable threshold, a relay is energized providing an isolated switch closure output.

Almost any controllable single muscle on the body can be used to control the Switch, such as pectoral muscles, brow muscles, jaw muscles, cheek muscles, and others. The EMG Switch is very sensitive, even tiny muscle twitches provide enough electrical signals to be detected and used by the EMG Switch. The EMG Switch can control most power wheelchairs that accept switch input.

2.5 IOT Modem

The Internet of Things (IOT) is the network of physical objects—devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity—that enables these objects to collect and exchange data.

The Internet of Things (IOT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.

The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer based systems, and resulting in improved efficiency, accuracy and economic benefit Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

Fig. 2 IOT Modem

2.6 Shock Sensor

A shock sensor or impact monitor is a device which indicates whether a physical shock or impact has occurred. These usually have a binary Output (go/no-go) and are sometimes called shock overload devices. Shock detectors can be used on shipments of fragile valuable items to indicate whether a potentially damaging drop or impact may have occurred. They are also used in sports helmets to help determine if a dangerous impact may have occurred.
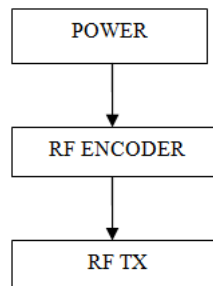
Transmitter Section

Fig.4. Transmitter Section

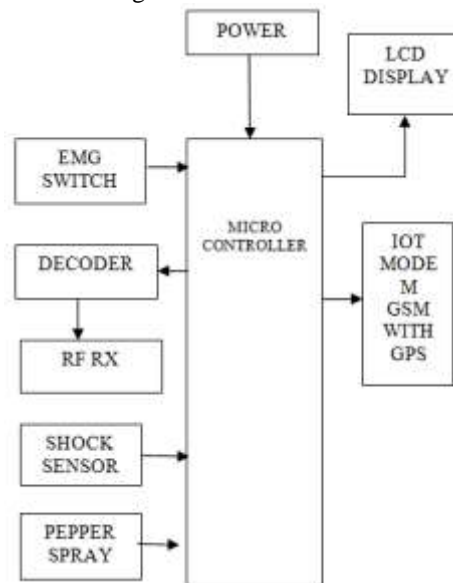The block diagram of the system is shown in figure.3

Fig.3 Block Diagram

By contrast, a shock data logger is a data acquisition system for analysis and recording of shock pulses.

Shocks and impacts are often specified by the peak acceleration expressed in g-s (sometimes called g-forces). The form of the shock pulse and particularly the duration are equally important. For example, a short 1 ms 300 g shock has little damage potential and is not usually of interest but a 20 ms 300 g shock might be critical. Depending on the use, the response to this time sensitivity of a shock detector needs to be matched to the sensitivity of the item it is intended to monitor.

The mounting location also affects the response of most shock detectors. A shock on a rigid item such as a sports helmet or a rigid package might respond to a field shock with a jagged shock pulse which, without proper filtering is difficult to characterize. A shock on a cushioned item usually has a smoother shock pulse and thus more consistent responses from shock detector.

Shocks are vector quantities with the direction of the shock being important to the item of interest, Shock detectors also can be highly sensitive to the direction of the input shock.

A shock sensor can be evaluated:

• Separately in a laboratory physical test, perhaps on an instrumented shock machine.

• Mounted to its intended item in a testing laboratory with controlled featuring and controlled input shocks.

• In the field with uncontrolled and more highly variable input shocks.

Use of proper test methods and Verification and validation protocols are important for all phases of evaluation.

2.7 Pepper Spray

Pepper spray (also known as capsicum spray) is a lachrymatory agent (a chemical compound that irritates the eyes to cause tears, pain, and temporary blindness) used in policing, riot control, crowd control, and self-defence, including defence against dogs and bears. Its inflammatory effects cause the eyes to close, taking away vision. This temporary blindness allows officers to more easily restrain subjects and permits people using pepper spray for self-defence an opportunity to escape. Although considered a less-than-lethal agent, it has been deadly in rare cases, and concerns have been raised about a number of deaths were being pepper sprayed may have been a contributing factor.

III. Hardware Results

The hardware of the proposed system is shown in Figure.5. The model shows high accuracy, more efficient and implemented with low cost.

Figure 5. Hardware Result

IV. Conclusion

There is no product in the market till date which is particularly the best defender cum attacker for women. Pepper Spray or batons are the only devices in market available for women safety but are rarely found with girls. Our team conducted a survey among girls of different colleges in DELHI and it was found that more than 90% of the girls don't have pepper spray and baton with them because handling of them is not an easy task.

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