IMMEDIATE PERSONAL SECURITY SERVICE

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Abstract

In the current scenario, the main question in the mind of every girl is regarding her safety, as the number of problems related to abuse and harassment of women in the recent past is seen to be rising. Such crime against women can be minimized with the help of new and innovative technologies. To help overcome these problems, this paper describes the development of a prototype, which includes a portable "wrist band" and "belt" which interacts with Smart phone and web application. The portable wrist band has a button that enables women to click and transmit a message at the time of emergency. A message sent to a smart phone of the nearest police base camp will contain coordinates of victim's present location. With these coordinates, police can help victim anytime, anywhere. On the other hand, there is a belt for the alternative purpose if in case the victim is not able to press the wrist band button then one can click on the button of the belt which functions same as the wrist band. With the convenience of the victim, they can press either wrist band or the belt.

Keywords: *Arduino UNO, GSM /GPRS, GPS, Xbee (receiver and transmitter)*

1. INTRODUCTION

The surging number of crimes, notably in terms of rape, kidnapping, harassment, robbery and murder has instilled fear in people's mind and created upheaval in many society threatening the lives of the inhabitants. The innovative deployment of technological devices in such cases can rescue the lives of the victims. Thus, this paper focuses on immediate personal security and in providing service designed to serve the determination of providing security to all those in need. It is possible to build an advanced system capable of detecting the position that will allow us to make measurements based on electronic devices, such as GSM/GPRS A6, GPS, Arduino Uno and switches through which users can be located.

When the user presses the button on a wrist band, the switch will send a signal to the belt through a Xbee transmitter and will be received by the Xbee receiver in the belt. The belt will consist of Arduino, GPS and GSM/GPRS A6 which consist of SIM card to trace the location of victims. Arduino Uno will be programmed to send the victim's location as a message to the nearest police base camp as soon as the button is pressed and the signal is received from the victim.

It is seen that women are not safe to hang out with boys especially at night. A 19-year-old woman was raped in a group where the group consisted of her boyfriend and friend under the influence of alcohol (Four men detained for alleged gang rape, 2019) . Whether it be day or night, it is not safe for a woman or a girl. The bullying issue has been growing, where students have been forced to do something under someone's compulsion. A first year student had been bullied by a 24-year-old boy (Cheki, 2018). The idea of developing smart devices for people is because it is completely comfortable and easy to use. The intelligent band integrated with the position locator on the personal computer has an additional advantage, as it will provide immediate service by pressing the button once. The device will have a reasonable price and a small size that is portable anywhere.

2. PURPOSE

To minimize the crime happening especially against women and children.

Help the police department find crime scenes and solve problems as soon as possible. Also, the risk areas for women and children can also count on additional security and patrols.

To raise awareness in society about places at risk and vulnerable to crime.

3. LITERATURE REVIEW

In the design and construction of Woman Security using GPS and GSM technology with Arduino, (Helen et al., 2017), (Nandhini & Moorthi, 2018) and (Punjabi et al., 2018) discusses on the designs of a wearable smart watch for women. A smart watch uses sensor to detect the heartbeat. When sensor exceeds the threshold limit, it activates the device and tracks

the position using the GPS and the GSM module to send location to the registered phone number. Since the sensor has limited ability to accurately measure heart rate, this project focuses on using button, which is user friendly and save victim on time. However, in a paper by (Sathyapriya & Mary, 2018), they use low energy Bluetooth connection for synchronization with an application on the user's smart. The app also transmits the wearer's location along with the audio. Similarly, (Chougule et al., 2014) came up with a system to help women but they design in the form of a smart belt which is activated to track the user's position via GPS. The user does not require a smartphone in this design.

The conference paper on an Emergency location tracker for women safety by (Hegaje & Pathan, 2018) implemented a device that works at the push of a button and sends a SOS text along with the location of the user to the registered mobile number. Similar to that the paper by (Uma et al., 2015) uses "An Android application for women's safety based on voice recognition" which introduces the use of voice as a keyword to activate the system. With the voice system it is activated even if the mobile keyboard is locked. Both documents describe the use of GPS to track your current location and send messages to the people selected by the user.

4. MATERIALS AND METHODS

1.1 The Central module

The most standard board currently used is Arduino Uno because of the fact that the board can be connected to PC via a USB cable and as a result, it serves a dual purpose. To interface the Arduino and the computer, it acts as a serial port and to supply power to the board.
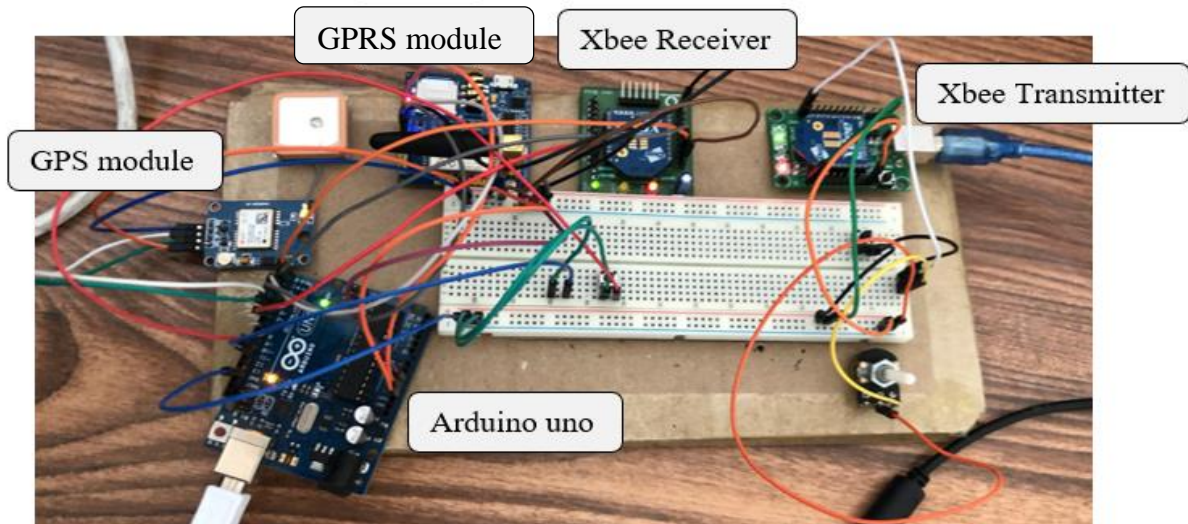

Fig 4-1 : Proposed System

1.2 GSM GPRS A6 module

GSM/GPRS A6 uses AT commands to demonstrate the module, such as connecting to networks. This module acts as a computer-based SMS and MMS service. The module also has all the features of a mobile phone such as calling and receiving calls. This module also supports Long-Term Evolution (LTE).

1.3 GPS Module

GY-NEO6MV2 board is a GPS module and can be used for navigation. The module checks the position on the ground and provides output in the form of longitude and latitude. A GPS module is used in order to feed the position and time data to the Arduino Uno board over a serial connection for the processing of data through GSM and finally the position and time could be known to the authorities.

1.4 Xbee-S2C 2.4GHz RF Transceiver Module
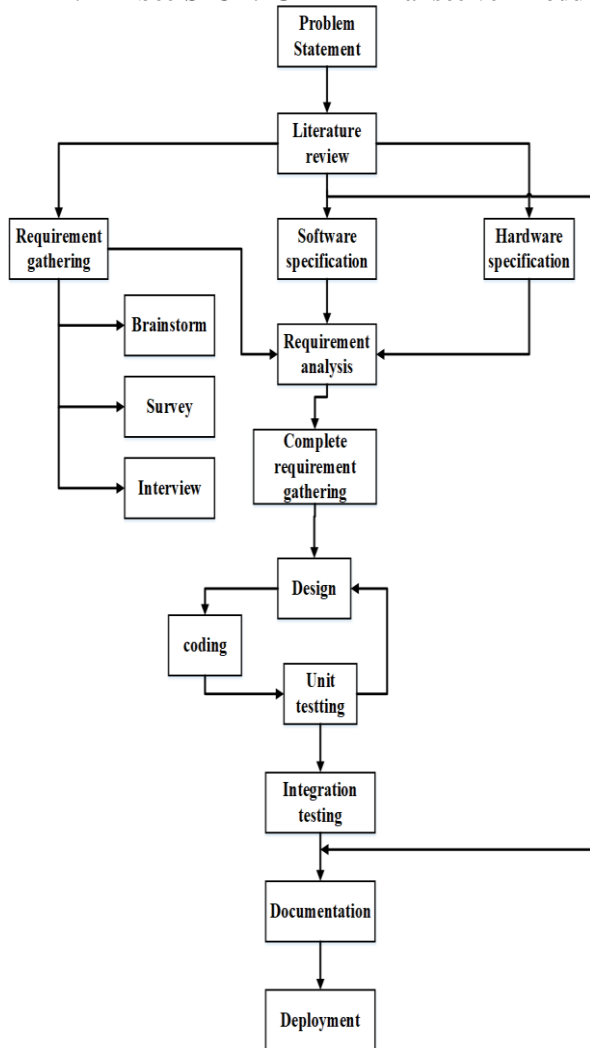
Digi XBee DigiMesh S2 4 has an integrated EF module that provides wireless connectivity to electronic devices with the help of the globally applicable 2.4GHZ transceiver. The peer-to-peer mesh network provides users with an additional network stability through a dense self-healing network operation, which prolongs the operational life of the battery-dependent networks. The XBee module is used to ensure the strong connectivity between the server and the end user.

1.5 Web Application

The admin gets notification on the web server which will notify the coordinates of the victim while the push button is pressed. The API is built in such a way that the map appended in the web app will provide the victim's close location when initiated with the product.

1.6 Wrist Band

The wrist band is made up of buttons to configure and restore functionality. It also consists of a Xbee transmitter to communicate with the Xbee receiver located on the side of the belt.

1.7 Belt

The belt is made up of GSM/GPRS, GPS and the Xbee receiver, Arduino Uno and buttons. The belt is connected with a smartphone and also with a web server.

5. METHODOLOGY

For the proposed system, the activities will be carried out according to the methodological process. It starts by finding the problem that can be solved by implementing IT knowledge. The next phase is to review the papers (articles, journals, videos, etc.) that are related to our problem and the solutions that are recommended. Literature review should be done throughout the process so that it identifies appropriate requirement gathering. After the requirement gathering, team has to produce a circuit diagram for the proposed design and database design, the user interface and web application design will continue. The Web application development and its features are done in the coding phase. In each component, the unit test is run to check if all components are working. The components will then undergo integration tests to make sure they communicate with each other. With this, xbee transmitter in wrist band ought to send message to xbee receiver in the belt for the full communication of the integrated device. In the final stage, there will be a project document and a fully functional application.
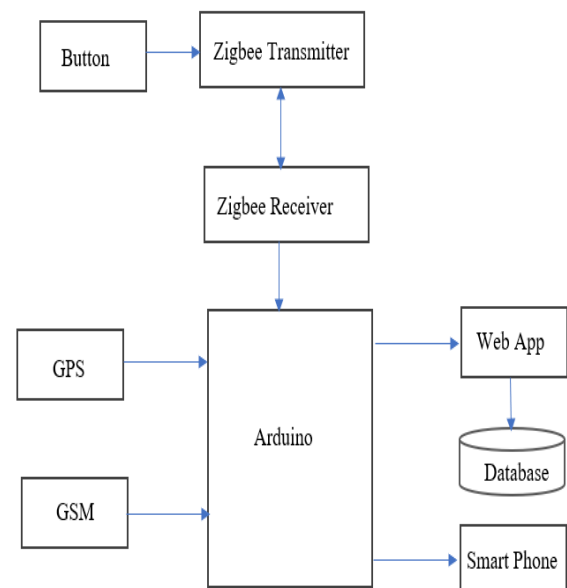
**Fig 5-1 :** System Architecture

Fig 5-1 : Methodology

6. SYSTEM ARCHITECTURE

This system architecture is the skeleton of the project that describes the structure and functionality of a proposed system.

The proposed women security system will consist of wrist band and belt. At the point when the victim press on the button of wrist band, xbee transmitter will advise xbee recipient in belt that the button is squeezed which will for sure make an impression on the closest police headquarters for the assistance. Even the belt works the same way: when the victim presses the belt's button, a message with the victim's location is sent to the police for aid.

7. RESULT AND DISCUSSION

The device is designed for the personal safety system specifically to help women in torment. It is a portable product with beneficial features. The basic approach is to alarm a message (latitude and longitude) to the concerned police. This project mainly aims to avoid unfortunate incidents and to help the police department to get real-time evidence of instant actions against the perpetrators of crimes against women. The female security system that allows an instant response in situations of harassment emphasizes two different parts, the web application development (Web API) and the proposed system. When the victim presses the button, a notification will be received in the web app containing the coordinates of the victim's location as shown in Figure 7.1 and Figure 7.2 shows, a message consisting of the victim's location link is sent to a cell phone at the police headquarters. A notification with location coordinates to save the victim is sent in both cases. It offers women more confidence in their safety hence women physical empowerment will be partially fulfilled. An accurate location of the places is a complex matter, however, the scope for improved accuracy is promising.
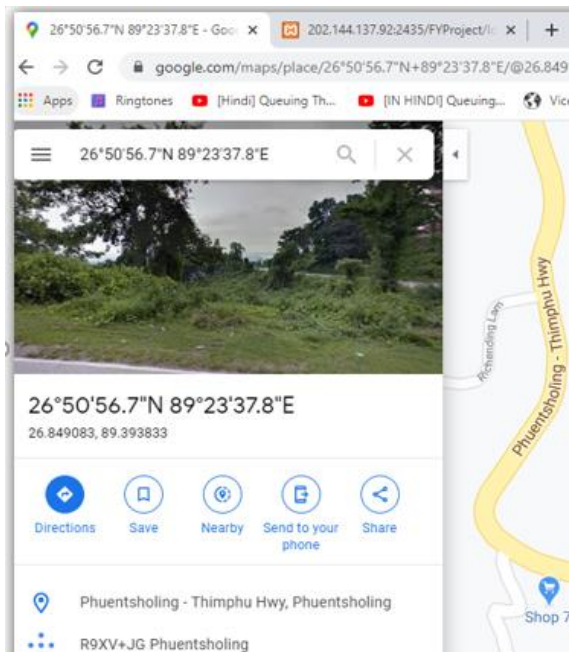
Fig 7-1 : Location displayed on WebApp
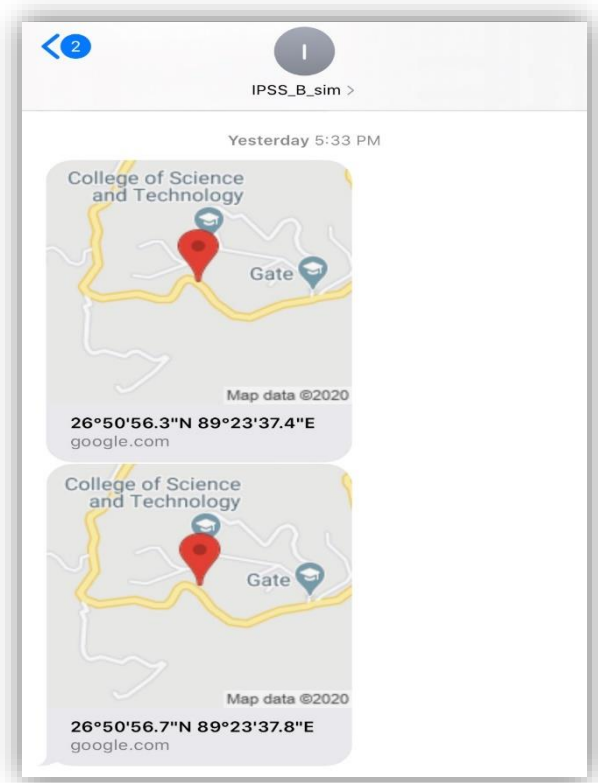
Fig 7-2 : Location sent as a message

8. CONCLUSION

The proposed project idea being the first in the country Bhutan plays a vital role to help women and children in the fastest way possible. The device will not only help reduce women and child harassment, but will also help the police department in finding the culprit as soon as possible. This will give women a better and safer place in the society. With more research and advancement, this project can be applied in the various field of security where women are not safe. The precise location of places is a complex issue, however the possibility of improving accuracy is promising.

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