

# IOT BASED SMART SYSTEM FOR WOMEN SAFETY

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**Abstract:** There is been different wireless technologies several recent trends have produced student tracking systems to monitor the students' performance. Along with the performance, student's movement tracking is also necessary since it concerns to safety measure. In that case the tracking will help both parents & teacher to know where the student is. The main aim of this proposed scheme is to keep track of the student & if any unusual activity is found then the parents/teachers are informed with an alarm. With this project the parents will easily get to know where their child is. The whole project consists of two units; first one being the school unit where BLE (Bluetooth Low Energy) device is like a watch. The second one is the bus unit where a Mobile module with the App is placed. With the help of an Android application all the details of the student are sent to their parents respectively.

**Key Words:** : Smart Band, GPS, GSM, Sensor, and Bluetooth.

## 1. INTRODUCTION

Parents always worry about their child's safety. Since a child spends its most of the time in school, the school plays an important role in a student's life. Tracking of the students' movement will provide information to the parents. The proposed system contains Bluetooth Low Energy model. The BLE as the name indicates it consumes less energy compared to the normal Bluetooth. There will be a database which contains all the details of the teachers & students in a school. Each student will be provided with an ID card which will contain the Bluetooth low energy and Media Access Control IDs. As the students enter classroom with the ID card being on them, reader will read the MAC ID present on the ID card. Then those are compared with the already present data in data base & mark the student as present in attendance report. At the transportation level, for the bus unit we have a Message module. By mistake, if the student gets down at the wrong stop, it will also be informed to the parents. The bus unit will inform if there is a delay in reaching to the dropping point. In this way every activity of the student will be captured.

Women are accomplished at mobilizing diverse groups for frequent causes. They often work across racial, sacred, opinionated, and intellectual divides to encourage tranquillity. We are aware of importance of women's security, but we must recognize that they should be well secured. A Woman is not much powerful when compared to men physically, in a crisis situation and needs a helping hand to relieve them. The best way to minimize chances in becoming a victim of violent crime (robbery, sexual assault, rape, domestic violence) is to identify and call on resources to help you out of unsafe situations. Whether you are in instant trouble or got separated from friends during night and do not know how to get home, having these apps on your phone can diminish your risk and bring assistance when you require it.

## 1.2 KEY FEATURES

The key features of our app that makes it different from other apps designed till now are as follows:

- 1) Initially, we have to enter the four contact numbers of police, family members and friends in to the application say and click on "save" button.
- 2) While travelling, run the application and whenever need arises, click "start" button.
- 3) As soon as "start" button pressed, it firsts make a call to the first saved registered contact number and also sends the message containing location URL of the victim to all the contact numbers.
- 4) Unique feature of this app is message with location URL is sent continuously to the registered contact numbers for every five minutes until "stop" button is clicked. So, continuous location tracking of victim is possible with this application.

## 2. LITERATURE SURVEY

### Paper[1] Bluetooth Smart Support for 6LoBTLE: Applications and connection questions

#### Abstract:

The Bluetooth Low-Energy transport, trademarked Bluetooth Smart, is now a market fact. Worldwide sales of Bluetooth Smart devices and Bluetooth Ready mobile devices are measured in several billion units per year. The two most exciting new markets are wearable devices and home networking. The Bluetooth Special Interest Group (SIG) has identified three different kinds of smart devices that need Internet connectivity. The Internet Protocol (IP) is the principle communications protocol for relaying datagrams across network boundaries. Its routing functions enable internetworking, laying the foundations of the Internet. **Published in:** IEEE Consumer Electronics Magazine ( Volume: 4 , Issue: 2 , April 2015 )

### Paper[2]: Watch What You Wear: Preliminary Forensic Analysis of Smart Watches

#### Abstract:

This work presents preliminary forensic analysis of two popular smart watches, the Samsung Gear 2 Neo and LG G. These wearable computing devices have the form factor of watches and sync with smart phones to display notifications, track footsteps and record voice messages. We posit that as smart watches are adopted by more users, the potential for them becoming a haven for digital evidence will increase thus providing utility for this preliminary work. In our work, we examined the forensic artifacts that are left on a Samsung Galaxy S4 Active phone that was used to sync with the Samsung Gear 2 Neo watch and the LG G watch. We further outline a methodology for physically acquiring data from the watches after gaining root access to them. Our results show that we can recover a swath of digital evidence directly from the watches when compared to the data on the phone that is synced with the watches. **Published in:** 2015 10th International Conference on Availability, Reliability and Security

### Paper[3]: Self-Organizing Watch Platform for Assisting and Reminding Personal Activity

#### Abstract:

Tracking and monitoring of personal activities by using wearable device can be applied in various different ways. For example, if one analyzes activity of people with dementia by using such device, then the identification of the illness and the diagnosis of the symptoms become much more efficient. In this demo, we propose the watch platform, Personal Activity Assisting & Reminding (PAAR) watch, which tracks the user's activity and suggests various services based on the history of personal activity accumulated inside the watch. In order to realize self-awareness and self-organization concept in PAAR watch, some advanced concepts such as peer-to-peer direct communication between the watch and external devices and ultra-low power consumption schemes are designed and implemented in the proposed platform architecture.

**Published in:** 2013 IEEE 7th International Conference on Self-Adaptation and Self-Organizing Systems Workshops

### Paper[4]: Road watch radar system development

#### Abstract:

Multi-mode road watch radar system has been designed and implemented using pulse Doppler and monopulse technique. This paper gives an overview of RWR system and shows the operation of the system as well as several results. The system operation modes are traffic monitoring and collision avoidance. The algorithms of traffic monitoring are MTI, CFAR, FFT, angle estimation, and tracking. IMTI, pulse integration, and change detection is applied to collision avoidance mode. The field campaign is successfully performed on test highway after validation of system performance. The performance of collision avoidance mode shows 99.9 % of detection probability and 10<sup>-3</sup> of false alarm rate at a distance of 500 m using the reference RCS of 30×30 cm. The tests result of traffic monitoring mode show that RWR detect vehicles at 500 m and is possible to lane discrimination at about 350 m. **Published in:** 2013 Asia-Pacific Microwave Conference Proceedings (APMC)

**Paper[5]: Self M2M based wearable watch platform for collecting personal activity in real-time****Abstract:**

Tracking and monitoring the history of personal activities by using wearable device can be applied in various different ways. For example, by analyzing the personal activities can be used to diagnose the symptoms of certain illness such as Parkinson's disease. The activity data can also tell the severity of the user's chronic illness. In this paper, we propose the watch platform which keeps the record of the user's activity data. This activity history is collected automatically inside the user's watch through peer-to-peer direct communicating with other devices. In order to implement self-awareness and the opportunistic computing manner in the watch platform, some advanced concepts such as ultra-low power consumption schemes and peer-to-peer direct communication between watch and external devices are included.

**Published in:** 2014 International Conference on Big Data and Smart Computing (BIGCOMP)

**Paper[6]: The web is watching you: A comprehensive review of web-tracking techniques and countermeasures****Abstract:**

Web tracking is a commonly-used practice on the Internet devoted to retrieve user information for activities such as personalization or advertisement. These techniques are said to drive the web economy, although they are commonly used to invade users' privacy. In the last years, a general concern raised about web tracking, looking forward to combat it in many ways like regulations, anti-tracking methods and even standardization. In this paper, we analyze and discuss the current techniques for web-tracking as well as techniques for its detection and analysis, and countermeasures to prevent web tracking.

**Published in:** Logic Journal of the IGPL ( Volume: 25 , Issue: 1 , Feb. 2017 )

**Paper[7]: Visualizing eye tracking data with gaze-guided slit-scans****Abstract:**

The slit-scan technique is applied as a means to create artistic static and dynamic representations of motion in videos by arranging small slits of each video frame next to each other. This technique produces compact representations even for long timespans of recorded video material. We adapt this approach for the comparison of eye tracking data from multiple participants watching video. We adjust the slit position according to the current gaze coordinates of a participant and display the visual attention in context of the underlying stimulus over time. With additional encodings for the absolute horizontal and vertical position of a gaze point, we present a new visualization technique for scanpath representation.

**Published in:** 2016 IEEE Second Workshop on Eye Tracking and Visualization (ETVIS)

**Paper[8] Gesture detection system using smart watch based motion sensors****Abstract:**

We are about to step into a world where we would be surrounded by a large number of extremely smart wearable devices. Most of them can be considered motion capture devices in disguise owing to the sheer number and quality of sensors they possess. These devices are capable of providing data like linear acceleration, angular velocity, gravitational acceleration, compass heading, pressure and temperature with an update rate that is just enough to be interesting and useful, yet cheap and easy to acquire. We are further seeing incredible innovation in motion tracking chips present in cell phone that provide better and always-on data with minimal impact on battery life. Innovations like the Motorola X8 architecture and the Apple M7 chip are now the torch-bearers for the next era in motion tracking. It would be a waste if all this real-time data is only used by the cellphone or the smart watch that generates it.**Published in:** 2014 International Conference on Circuits, Systems, Communication and Information Technology Applications (CSCITA)

**Paper[9]:SWAG Demo: Smart Watch Assisted Gesture Interaction for Mixed Reality Head-Mounted Displays****Abstract:**

In this demonstration, we will show a prototype system with sensor fusion approach to robustly track 6 degrees of freedom of hand movement and support intuitive hand gesture interaction and 3D object manipulation for Mixed Reality

head-mounted displays. Robust tracking of hand and finger with egocentric camera remains a challenging problem, especially with self-occlusion - for example, when user tries to grab a virtual object in midair by closing the palm. Our approach leverages the use of a common smart watch worn on the wrist to provide a more reliable palm and wrist orientation data, while fusing the data with camera to achieve robust hand motion and orientation for interaction.

**Published in:** 2018 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)

### **Paper[10] Design and implementation of an accurate real time GPS tracking system**

#### **Abstract:**

GPS tracking has many uses in today's world; the system can be used for children tracking, asset, car or any equipment tracking and as spy equipment. This paper presents an accurate and reliable real time tracking system using GPS (global positioning system) and GSM (global system for mobile communication) services, which was designed and implemented successfully in university of Khartoum labs. The system permits localization of a portable tracked unit and transmitting the position to the tracking centre. The GPS tracking system consists of portable device attached to a person, vehicle or any asset, and the tracking center where the portable device's location should be monitored. The mobile tracked device receives its coordinates from the GPS and sends these coordinates as SMS via GSM modem to the tracking centre, which is simply a personal computer with many interface programs to display the location on Google maps using free version of Google Maps APIs (application programming interfaces). **Published in:** The Third International Conference on e-Technologies and Networks for Development (ICeND2014)

### **3. EXISTING SYSTEM**

The system maintains the record of the students of a class with the help of RFID tags-based tracking and GSM module. System consists of RFID tags that are given to each of the student. The readers are kept in the classrooms and other places so that it could receive the tags easily. The transmitter will transmit its location regularly. The receiver will receive the location of the tags. The GSM module is used to send message to respective parents. There also has been use of Wi-Fi model and system to track the attendance of student. The access point is put in the classroom. When the student mobile phone interacts with the access point attendance is marked. Attendance is marked with the of unique identity number. Then the data is sent to server with the help of AES encryption algorithm.

Another proposed system uses Mifare technology; it will consist of Mifare tags and readers. They have considered Mifare technology which is simpler. In this system the reader has to be placed at all the places. As the student enters the school/college premises the readers are kept on different places of the different locations. The drawback of the system is the range of the Mifare reader and tags are very less. Area coverage is less i.e. in terms of centimeters. There also been use of the Bluetooth smart and beacon to take attendance of the student. As the student enters the classroom the Bluetooth will consider the student as present and mark him as present. And all the data will be maintained in the server.

They have made use biometrics and Radio Frequency Identification technology. The student needs to wear RFID tag and also he has to scan his finger on the fingerprint scanner, then the student will be marked as present. The proposed system in [5] is web based automated system for attendance recording; SMS alerts are introduced in the system so that the regular attendance record of the student can be sent to their parents.

### **4. PROPOSED SYSTEM**

There is been different wireless technologies several recent trends have produced student tracking systems to monitor the students' performance. Along with the performance, student's movement tracking is also necessary since it concerns to safety measure. In that case the tracking will help both parents & teacher to know where the student is. The main aim of this proposed scheme is to keep track of the student & if any unusual activity is found then the parents/teachers are informed with an alarm. With this project the parents will easily get to know where their child is. The whole project consists of two units; first one being the school unit where BLE (Bluetooth Low Energy) device is likes a watch. The second one is the bus unit where a Mobile module with the App is placed. With the help of an Android application all the details of the student are sent to their parents respectively.

Unlike mobile phones, a Bluetooth modem doesn't have a keypad and display to interact with. It just accepts certain commands through a serial interface and acknowledges for those. These commands are called as Serial commands. Which having the continuous data transaction to the application. If the application stops receive dummy values then we will get alert in the application about missing the student.

## 5. EVALUATION

The total evaluation can be done in three major steps which are described individually. Evaluation describes the whole working of the application in three major steps.

The first major step is to enter the contact details in the application created. Those contacts can be our relatives, friends and chief cop of the particular city the person we live in. When the application is installed in the smart phone for the first time the above contact details should be provided. The application will save the given information.

The second major step is to send the GPS information (GPS information can be in the form of the Co-ordinates or the URL which leads to the location of the person any stock map application in the likes of third party application like Google, Nokia etc) to the registered contacts at danger times or when the person is needed to be rescued. This step is followed only when the rescue button is pressed in application. The whole process of this step is done only when the device is connected to the proper mobile network and location service in the device is switched on (GPS).

The third major step comprises of work done in sending the message containing location URL continuously to the registered contacts. Here, we have set the time interval as 5minutes, so for every five minutes of time-lapse, SMS is sent to the registered contacts. Therefore the exact location of the person can be tracked by the application continuously which is the primary aim of the proposed system and the person can be rescued

### A. Uniqueness

In the existing systems, we have mentioned many Android applications having similar feature to my application. In all those applications, victim's location is sent only once to the registered contacts in different forms like SMS, EMAIL etc. But in practical situations, the victim may not be kept at one place standing, she may be moving around. So, in all those applications, we can know only one location immediately after the start of the application, but practically after sometime she may not be present at that place. The unique feature of my application is location is sent continuously for every five minutes till "STOP" button in the application is pressed. So, even if the woman is made to move around in the city, because of this feature of continuous location tracking, she can be rescued quickly and safely. Also, one of the contacts will be receiving a call, sometimes there may be chance for people not seeing the SMS, but after receiving the call they get alert and can look at the SMS and can identify that their near ones is in danger quickly.

### 5.1 BLOCK DIAGRAM

*BLOCK DIAGRAM:*

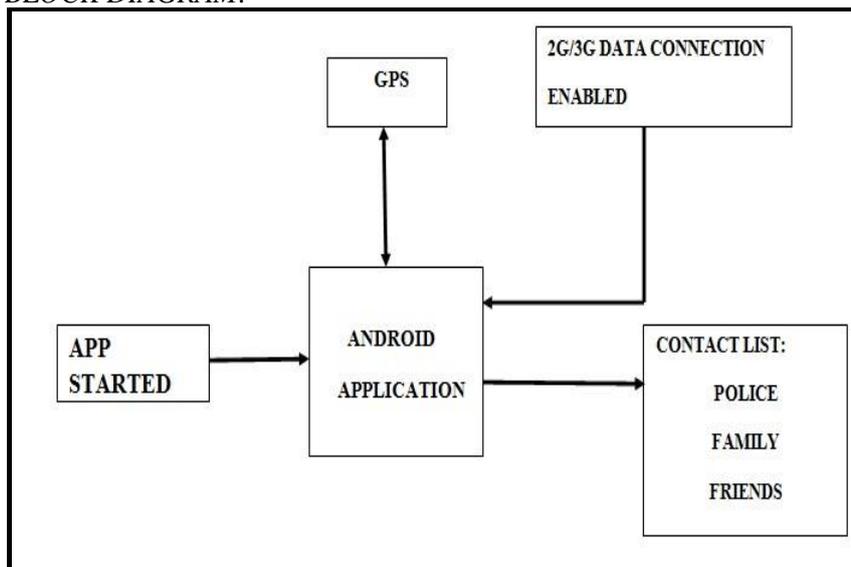
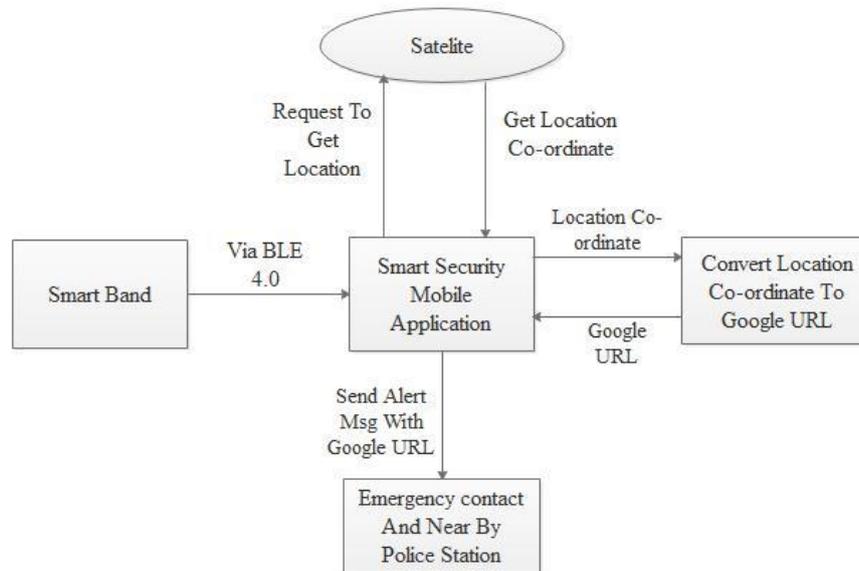


Fig. 1. Block Diagram for the Proposed System



## 6. RESULTS

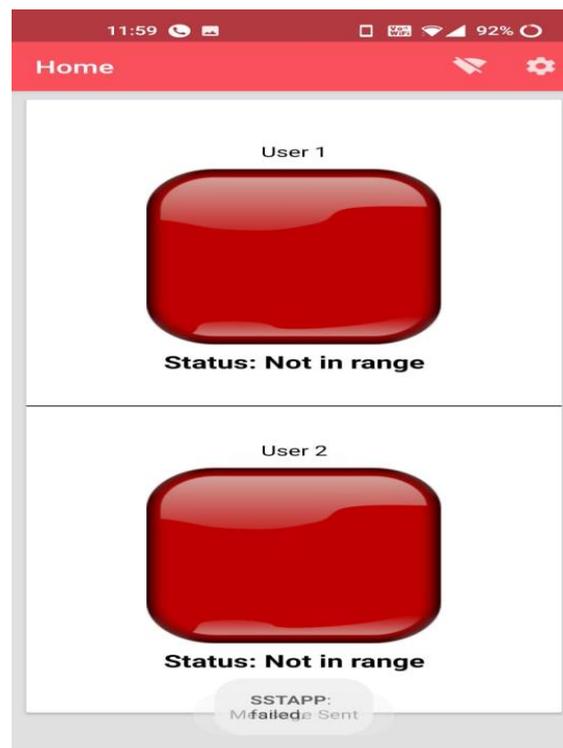


Fig 2 Screen Shot of Women Safety App just after opening the application

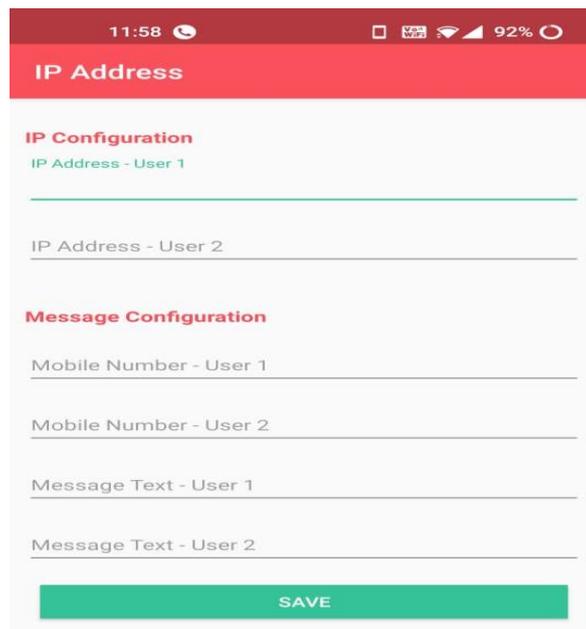
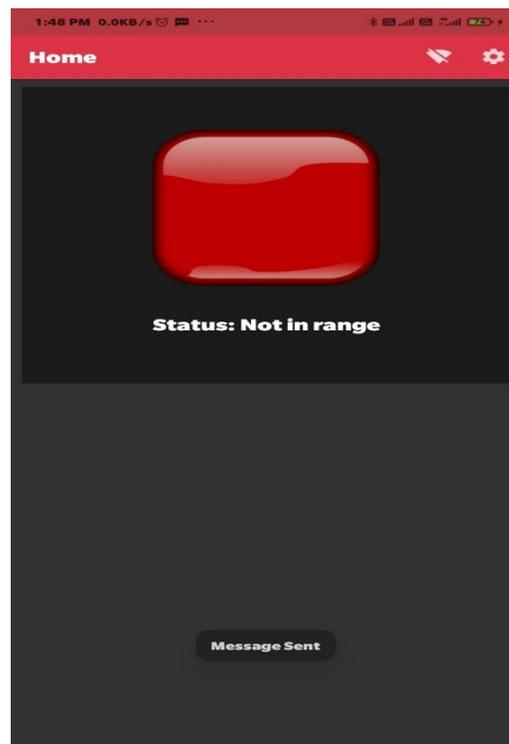


Fig 3 represents screen shot of the application immediately after opening the WSTAPP app on the root device (device on which the application is installed). It contains four contact numbers to be filled of which first phone number receives call and SMS, the other three phone numbers receive only SMS. Also, the layout contains three buttons "Save Config". After filling the phone numbers, "Save Config" button must be clicked such that all those contact numbers will be saved in the WSTAPP application and these given phone numbers are called Registered Phone numbers.

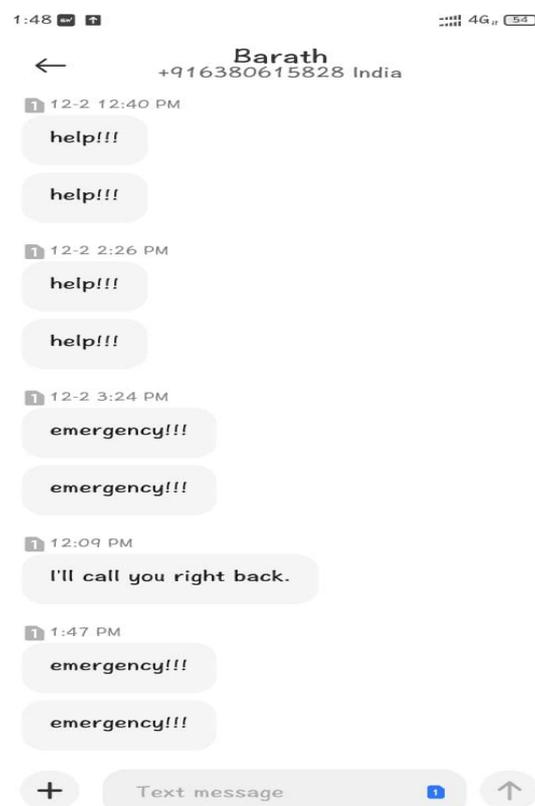


Saving Configuration..

Fig. 4 depicts the screen shot after entering the contact details in the application. Fig. 3. Screenshot after entering the contact details in WSTAPP Application



“Fig. 5” depicts the screen shot after clicking the start button in the WSTAPP application. It displays “SMS will be sent for every 5 minutes to the provided contacts Here, if we want to stop the application, we have to click the “GoBack” button then it goes to page as depicted in fig 3 and “Close App” button must be clicked. Fig. 4. Screen shot of WSTAPP App after clicking Start button in the application.



"Fig 6" represents the SMS received by one of the contact numbers that are entered in the WSTAPP Application. The SMS contains a message of I am in Emergency.

## 7. CONCLUSION

In this paper, we have described an Android Application for the safety of women. This application helps in live tracking of the location of the victim through GPS along with one of the registered contacts receives a call from the root device. The merit of this application is even when the location of the root device is changing rapidly; we can identify the exact location. As a future scope, this application can be integrated with the law enforcement database, which includes all the phone numbers of regional cops. Some use cases such as rescuing victim, when the mobile network is not available, after initial alert or switch off condition. Further, it can be developed for IOS and Windows mobile platforms. Thus, this application can help the women in a big way from unsafe conditions. The smart band is designed with low frequency method to track the person remotely. Mainly it is more accurate than the existing they approached with gps technique here we using Bluetooth to achieve the main frame of communicating band to the android application.

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