

# HerShield- Empowering Women's Safety through Technology

Vimal Kumar<sup>1</sup>, Vikas Kumar<sup>2</sup>, Dr. Kaneez Zainab<sup>3</sup>

<sup>1,2</sup>B.Tech Student, Department of Computer Science & Technology, B.N Group of Institution, Lucknow, India

<sup>3</sup>Associate Professor, Department of Computer Science & Technology, B.N Group of Institution, Lucknow, India

Correspondence should be addressed to Vimal Kumar : vk835613@gmail.com

Copyright © 2024 Made Vimal Kumar et al. This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**ABSTRACT-** This review paper critically examines the design, implementation, and impact of HerShield, a women's security system that leverages React.js for web development, Node.js for backend functionality, and React Native for mobile applications. The project, aimed at addressing the pressing issue of women's safety, integrates technology with community engagement for a holistic approach. The paper provides an in-depth analysis of HerShield, key features, including real-time location tracking, an emergency alert system, secure community networking, intelligent route planning, voice activation, and privacy-centric measures. Additionally, the review explores the system's use of machine learning for anomaly detection, evaluating its effectiveness in enhancing proactive response mechanisms. Through a critical lens, this paper assesses the strengths and potential limitations of HerShield, considering factors such as usability, scalability, and user adoption. It also discusses the societal impact of such technologies in empowering women and fostering a sense of community support. Drawing insights from existing literature and comparable systems, the review contributes to the broader discourse on technology-driven solutions for women's safety. By examining HerShield, architecture and functionalities, this paper aims to inform future developments in women's security systems and contribute to ongoing efforts in creating safer environments for women globally.

**KEYWORDS-** — Html, CSS, React JS, NodeJS, React Native, MongoDB.

## I. INTRODUCTION

In recent years, concerns about women's safety have prompted an increased focus on leveraging technology to create comprehensive security systems. One noteworthy approach involves the integration of React.js for web development, Node.js for backend functionalities, and React Native for mobile applications. This amalgamation of technologies aims to address the multifaceted challenges surrounding women's safety by providing real-time tracking, emergency assistance, community engagement, and intelligent navigation. The escalating need for women-centric security solutions is underscored by a growing awareness of safety issues and an increasing reliance on digital platforms. React.js, Node.js, and React Native have emerged as prominent technologies for building responsive, scalable, and cross-platform applications, making them ideal candidates for crafting robust security systems. This review paper delves into the intricacies of these

technologies within the context of women's safety systems, scrutinizing their features, effectiveness, and impact. By examining existing literature, case studies, and real-world implementations, this paper aims to provide a holistic view of the role played by React.js, Node.js, and React Native in empowering women's safety. The subsequent sections will delve into the key features of these security systems, discussing how they contribute to real-time tracking, emergency response, community building, and privacy considerations. Through this analysis, we aim to elucidate the potential benefits, challenges, and future prospects of React.js, Node.js, and React Native-based security systems, contributing to the ongoing discourse on women's safety and technology integration.

## II. RELATED WORK

### A. ABHAYA: An Android App For The Safety Of Women

This paper presents an Android application “ABHAYA” for women safety to prevent situations like the Abhaya case in Delhi from happening again. This application uses 3G/2G data connection for tracking the location of the person in trouble and sends a message with the URL of their location from the device to registered contacts. This message gets sent every five minutes to the registered contacts until the “stop” button is clicked. After the application runs whenever the woman presses the “start” button, the application makes a call to the first registered contact and send a message containing the location URL of the device to all the registered contacts. As it sends location message every five minutes, continuous location tracking of the woman is possible.[1]

### B. S-ZONE: A System For Women Safety & Security System

In paper “S-ZONE: A SYSTEM FOR WOMEN SAFETY & SECURITY SYSTEM”, the authors states that “the best way to reduce the chances of becoming a victim of violent crime (robbery, sexual assault, rape, domestic violence) is to identify to help you get out of unsafe situations”. This paper describes the program, S- site designed for android platform for women's safety with the help of the latest developments in mobile technology. This program helps to track the root device via GPS which will help emergency services to rescue a vulnerable person as quickly as possible from harmful situations.[2]

### C. SHIELD: Personal Safety Application

“SHIELD: Application for Personal Security” as the name suggests is an application which shields, protects, saves,

guards oneself from danger. It sends an instant message with the device's location to all the registered contacts which helps in live tracking of the location of the woman and provide needed assistance. The main functionality of the system is based on tracking the location. It depends entirely on GPS location tracking and updating on the site in real time. In SHIELD real-time changes in the user area are determined and updated on the website. The update appears on the website within 0.5 seconds depending on the internet connection.[3]

#### **D. Women Safety Android App**

In the paper [4] "Women Safety Android App", the authors explain the motto of developing this application is to provide a safe conditions for smartphones as today most people carry smartphones with them wherever they go. It is explained that in the system instead of pressing the SOS on the screen, the victim should press the power button twice to send a notification to the police and to selected contacts even if they do not have internet or GPS connection. and the system will send the continuous location of the victim after one minute i.e. provides a better location, if user or victim relocated from one place to another. It is said to be a key feature of the program is to provide a control panel to the police, so that they have a system where the police and deportees can see any such case or not. When victim press power button then victim's location will highlight, so police nearby to the victim can easily reach to protect the victim.

#### **E. Women Safety Mobile App**

This paper [5] the authors illustrate the working of GPS based "Women Safety Mobile App". This system starts when the woman authenticated to the device does a fingerprint scan. The woman then needs to constantly scan her finger print every minute, otherwise the system will send the device's location to the registered number via SMS message and simultaneously sounds a buzzer to alert the nearby people to the situation. The woman does not need to do anything in case of a critical situation except to just stop scanning her fingerprint. The device makes use of GPS, GSM modem, microcontroller-based circuit to run the system. This system is very useful in situations where the woman may not be able to press or click the emergency feature. The SMS alert message contains her GPS location and can be sent directly to a few of her registered contacts so that they can provide her with help needed.

### **III. EXISTING SYSTEM**

Recently developed women's safety solutions come in various types such as smartphone apps, security systems and fashionable devices which can be worn every day. One of the solutions suggests sending a notification to the police or selected contacts when the victim presses the power button. The system then sends the victim's live location after 1 minute. Hence provides a better location when the user or victim moves from one location to another. Some systems offer a woman authenticated to the device to perform a fingerprint scan. After that, the woman should<sup>1)</sup> always scan her fingerprint every minute. Otherwise, the system will send the woman's location to the registered number via SMS. In the event of a serious situation, the woman does not need to do anything other than simply stop scanning her fingerprints.

### **IV. PROPOSED SYSTEM**

The proposed system aims to develop a comprehensive women's safety platform utilizing React.js for web development, Node.js for backend functionality, and React Native for mobile applications. This section outlines the key components, features, and functionalities of the proposed system. There is a one best solutions to contact with near cybercafé.

#### **Real-time Location Tracking:**

The system will incorporate GPS technology to enable real-time tracking of the user's location through the mobile application. This feature will provide accurate location information in case of emergencies.

#### **Emergency Alert System:**

A robust emergency alert system will be implemented, allowing users to trigger immediate alerts through the mobile app. The system will notify predefined contacts and relevant authorities with the user's location details.

#### **Community Engagement Platform:**

The web application will serve as a platform for community engagement, enabling users to share safety tips, report incidents, and connect with other users for support and assistance.

#### **Intelligent Route Planning:**

The system will incorporate intelligent route planning algorithms to suggest safe routes based on real-time data, user preferences, and community-sourced information.

#### **Voice Activation and SOS Calling:**

Voice activation features will be integrated into the mobile application to enable users to trigger emergency alerts discreetly. Additionally, the system will support SOS calling functionality, connecting users directly to emergency services.

#### **Privacy and Security Measures:**

Stringent privacy and security measures will be implemented to safeguard user data and ensure secure communication channels. This includes encryption protocols, secure authentication mechanisms, and adherence to data protection regulations.

#### **User Feedback and Reporting:**

The system will facilitate user feedback and incident reporting mechanisms to gather insights, improve system functionalities, and address safety concerns effectively.

The proposed system aims to provide a comprehensive and user-centric approach to women's safety, leveraging modern technologies to empower users and create safer environments. By integrating React.js, Node.js, and React Native, the system will offer a seamless and responsive experience across web and mobile platforms, enhancing accessibility and usability for users.

The purpose of this project is to develop a portable women's safety software tool, which performs the following functions:

#### **SOS:**

SOS sends an alert message to emergency registered contact containing the GPS location of the user every thirty seconds.

#### **2) Siren:**

A Siren which sounds a loud police siren. This can alert the nearby people of the situation and in some cases may

deter the assailant from proceeding with his malicious intentions.

### 3) Voice Recording:

We have also provided a Recording function that records the surrounding sounds which can be used by the victim in case of a police investigation as evidence.

### 4) Helpline Numbers:

The woman can directly call emergency services through the feature Helpline Numbers in the application.

## V. METHODOLOGY

### A. Development Requirement

Our application is basically a web-based technology so the system requirement is very low for the application. And as the main data exchange will be happening mostly through geolocation API so low network speed will also work. system requirement for functioning is kept to be low as that it can be used in almost all the parts of the world with low end devices and weak internet connections. We at start are mainly focusing on two types of application.

### B. Web Application

Web application will be a website with most of the code running on server. And we will make sure that the website is light weight so that it can be easily loaded on any browser even over low internet connections. The websites will be designed with the help of html, CSS and JavaScript and python code will be running on server and we will be using MongoDB database to store all the information. As MongoDB stores data in Json format, which is the same format in which google will pass the data to our server, so for the sake of simplicity we will be using MongoDB, which will also save us execution time as we do not have to convert MongoDB into SQL or any-other databases or vice versa. When user will be traveling through any unsafe area, area where she feels unsafe. She can simply login using her google account and if she logs in for the first time then she has to register her guardian details whom she would like to contact in the time of emergency and she also have to choose and answer a security question. And we will store all this information using MongoDB and when she login, google login Api encoded in the website checks her authenticity and if she has a google account then google pass her basic details to us in Json format which we can then directly store in MongoDB database. After login she will have to leave the websites open and running in her browser till she reaches her destination safe. Once she reaches her destination safe she can logout. But if something happens to her then the websites running in background will notice it and respond accordingly. How the application will help someone in need is described below in the case study and the technical functioning is further explained in the internal working section.

### C. Android Application

For making our application fast and simple for initial stage, we will simply use a frame work of React Native code and create a specific type of light weight browser that opens only our site in it. An example of this type of application can be seen in the light version of LinkedIn and Facebook lite application. So, as we will be simply creating an application using framework which is already available in the form of open-source source code, so we will not discussing this

portion much

### D. Internal Working

At first user register all his/her details, first they login using their Google account or they sign up for one. After they login with them google account we receive a Json package from google with all the basic information of the user as provided to google on the time of registration. So, we store all this information in our MongoDB database and after that as user have logged in for the first time we ask user to fill other details such as emergency contact details and their names and we also ask the user to choose a security question or create one with custom security question creation option. Now we take all this information and store it in our database and create a unique id for the user, so that all the data of user can be accessed using that unique id. Now as we have all the details with us whenever the user logs in we use google map APIs embedded on the page that user loads, continuously pass us the latitude and longitudes. And with the help of this latitude and longitudes passed to us after a constant interval of time we keep track of user's movement and then we have conditions in our server for the user and if the condition is not satisfied we will ask the user to answer the security question, as the user might have been in a safe situation but have exceeded speed or stopped somewhere for long. But if the user response is not detected our server will call the user emergency contact details from the database using the unique id we generated and then use SMS API to send them an alert message warning them that user can be in danger. And we will also pass the message to the nearest help center which in most of the case can be the police station. But in case no such response is detected and the user seems safe the server will not respond and the user can logout once reached their destination safe.

## VI. SYSTEM ARCHITECTURE

The following diagram shows the architecture of the proposed system. The main three components needed to work this application are Internet on the client's phone, [2] GPS or GPS to identifying the location of the police and GSM which enables to send data through the messaging system.

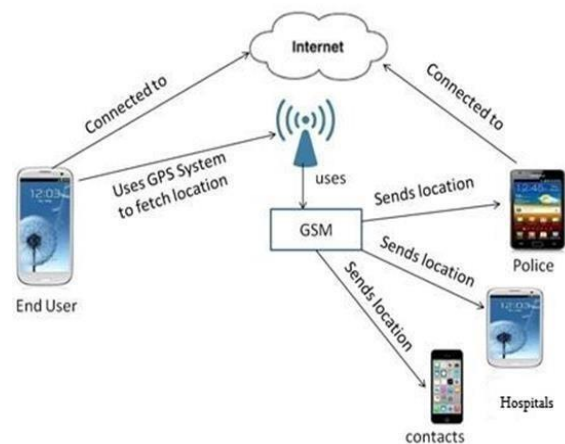


Figure 1: Architecture of women safety APP

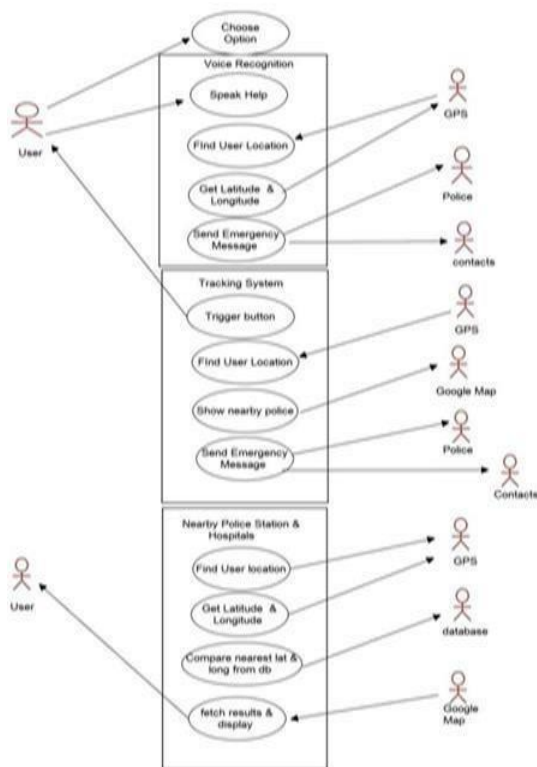
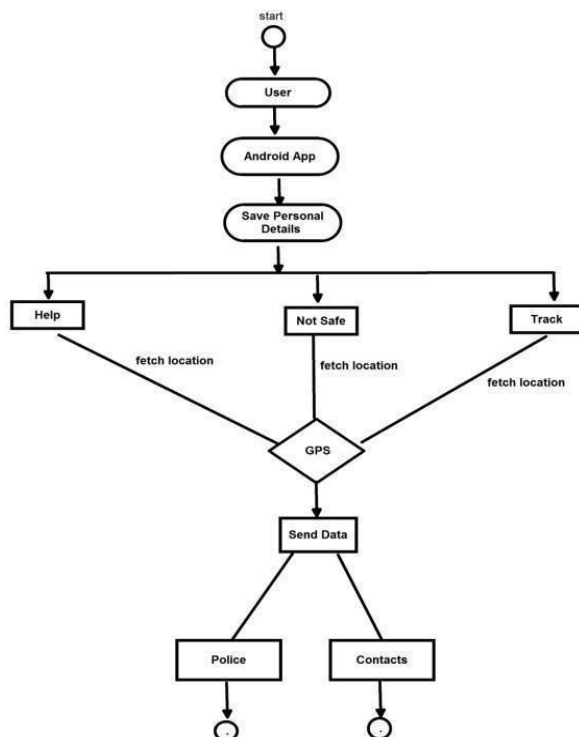


Figure 2 Architecture of the proposed model

The above Figure 2 shows the architecture of the proposed model. The user need not register himself to use the application so that there will be [6] no delay time while using the application during the emergency situation. The user is given a set of options, which they can obtaining depending upon their current situation.

## VII. IMPLEMENTATION



### 7.1 Modules in the Project:

#### 7.1.1 GPS Module.

feel safe and secured. So, we are working on this

#### 7.1.2 User Interface and Mobile shaking.

#### 7.1.3 Identifying the location.

#### 7.1.4 Nearby police station and hospitals Modules

#### 7.1.5 Emergency Calling Module.

##### Module 7.1.1: GPS Module:

This module is developed to provides two options such as NotSafe and Track for the user to provide security. The “Not Safe” Button is designed to protect the user who feels unsafe of her surrounding environment.

When the user selects this option to the nearby hospital are alerted by using the GPS System.

The GPS tracking the longitude and latitude in order to an extract the current location of the user and also sends the pre-saved emergency message by using GSM to the nearby hospitals as well as to the registered mobile contacts. The “Track” button is developed to protecting the user who feels unsafe while travelling in public transports. When she chooses this option, a message will be sent it to the nearby police station and also to the registered contact numbers. After she reaches her destination securely, she could choose the Safe button.

##### Module 7.1.2: User Interface and Mobile shaking

The user interface design is to be designed for providing the user-friendly interface. In the user Interface module, for the first time, the user has to give the details such as name, EmailID and mobile number of their friends. In the settings of the app, the user has to specify the threshold values. If they are alone, they might set their threshold value to the lowest level.

When the user is in danger, they should shake their mobile. Because of the lowest threshold level, the shaking capacity of the mobile also be lesser and the app starts to work automatically. If the user is in very safe situation, then the threshold value might set to highest level.

##### Module 7.1.3: Identifying the location

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS in our smartphones always in ON position only. When the mobile shakes, the app is switched ON and it prompts the GPS to track the user’s location. The location of the user should be automatically identified by the GPS. The Latitude and Longitude values are calculated, and it calculates the exact position of the user. The identified location is saved in the server. The app also finds the user’s friends location through GPS.

##### Module 7.1.4: Nearby police station and hospitals Modules:

This option enables the user to view the nearby police station and hospital with the respective current location of the user limited to 5kms .

##### Module 6.1.5. Emergency Calling Module:

This button enable user to call hospital in case of any emergency. There are two types of emergency calling

## VIII. CONCLUSION

According a survey 53% of Indian working woman doesn’t application and we want to deploy it in large scale, to

decrease this rate and bring a great difference in society and make woman feel more secured and safer, protect them from all crimes. Making woman safe and secured is one of the major steps in bringing gender equality. Initially we will start with Indian metro- Politian cities and then we will scale up to cover complete country and then we will move to foreign lands. And we will continuously make our application better with time. And after we grow our user database we can also implement machine learning and other practices to make our machine more accurate and easier to use for our user. This is application might be based on woman security but it also can be used by man for their protection, if they are passing from an area wherethey do not feel safe.

### CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest

### REFERENCES

- [1] Chand D, Nayak S, Bhat KS, Parikh S. A mobile application for Women's Safety: WoS App. 2015 IEEE Region 10 Conference TENCON; Macao. 2015 Nov 1-4.
- [2] p. 1-5.<http://efytimes.com/e1/118387/> SURAKSHA-A-Device-To-HelpWomen-In-Distress-AnInitiative-By-A-Student-Of-ITM-UniversityGurgaon.pdf
- [3] Sethuraman R, Sasiprabha T, Sandhya A. An effective QoS based web service composition algorithm for integration of travel and tourism resources. Procedia Computer Science. 2015; 48:541-7Safety: WoS App. 2015 IEEE Region 10 Conference TENCON; Macao.
- [4] Women Safety Device and Application-FEMME [3] Sethuraman R, Suprabha T, Sandhya A. An effective QoS based web
- [5] Ravi Sekhar Yarrabothula Bramarambika Thota, "ABHAYA: AN ANDROID APP FOR THE SAFETY OF WOMEN," IEEE ,1 December 2015resources. Procedia Computer Science. 2015; 48:541-7.
- [6] N. Ramesh Kannan , S. Sujitha, S. Ganapathy Subramanian, "Women Safety Mobile App," International Journal on Cybernetics & Informatics (IJCI) Vol. 10, No.1/2, May 2021
- [7] Android Programming Tutorials by Mark L. Murphy Akshata V.S.1, Rumana Pathan2, Poor nima Patil3 and Farjana Nadaf4 , B'Safe & B'Secure The Door to Safety Swings, Department of Computer Science Engineering, KLS's VDRIT, Haliyal, India, (IJCEM), ISSN: 2348 9510 Volume 1, Issue 7, October 2014
- [8] S.Sangeetha1,P.Radhika PG scholar, Application For Women Safety, Department Of MCA, Panimalar EngineeringCollege,IOSR,ISSN:22780661,pISSN:2278 -8727, Volume 17,ISSUE 3, Ver.IV(May- Jun.2015),pp01-04.
- [9] <http://en.wikipedia.org/wiki/android>
- [10] Android Based Safety Triggering Application P.Kalyanchakravarthy1, T.Lakshmi2 ,R.Rupavathi2, S.Krishnadilip2,P.Lakshmankumar2,Assitant Professor1, BTech Student CSE Department, Lendi Institute Of Engineering & Technology,Affiliated by, JNTUK,Jonada, Vizayanagaram, Andhra Pradesh, India, IJCSIT , ISSN: 0975-9646,Vol. 5(1),2014,646-647.
- [11] Bramarambika Thota , Udaya Kanchana Kumar .P, Sauver: An Android Application For Women Safe-ty, MTech , Dept.Of ECE ,Vignan University , Guntur , India , M.sc , Computer Science , TJPS Co- lege,Guntur,India ,I JTEEE ,ISSN:2347-4289.VOL 3,ISSUE 05.