Vigila: Application for General Safety

Rohit Pai
Department of Computer Engineering
Sardar Patel Institute of Technology
Mumbai, India
rohit.pai@spit.ac.in

Ashutosh Naik
Department of Computer Engineering
Sardar Patel Institute of Technology
Mumbai, India
ashutosh.naik@spit.ac.in

Harsh Sandesara
Department of Computer Engineering
Sardar Patel Institute of Technology
Mumbai, India
harsh.sandesara@spit.ac.in

Prof. Surekha Dholay
Department of Computer Engineering
Sardar Patel Institute of Technology
Mumbai, India
surekha_dholay@spit.ac.in

***Abstract*—Most safety applications already existing in the market send SOS messages to the victim's saved contacts and the police, which could prove to be slow in situations which demand urgency. We propose a system to counter this and to respond to such emergencies. We store real-time location of our users and when anyone presses the SOS button, all users in a 100 meter radius, around that user, are notified about the emergency along with the coordinates of the victim. Our application also maintains a comprehensive first-aid and emergency response guide which the users can peruse so they can be more helpful in such situations.**

***Index Terms*—General Safety, Mobile Application, Geolocation**

I. Introduction

Every day, thousands of people fall victims to such mishaps as accidents, personal crimes, and medical emergencies. Most of the times, help arrives too late. Stats show that 1214 road crashes occur every day in India [21]. In 2015, there were about five lakh road accidents in India, which killed about 1.5 lakh people [22]. In 2016, the number of accidents was 4.8 lakh, resulting in a loss of 1.5 lakh lives [23]. In 2017, the number of accidents was 4.6 lakh, with 1.47 lakh deaths [24]. The number of reported crimes in India were 50 lakh in 2018, and increased to 51 lakh in 2019 [25]. Crimes against women were reportedly more than 3 lakh in 2015 alone. This includes rape, dowry deaths, molestation, attack on modesty, kidnapping and abduction, and trafficking, among others [26].

These numbers are much higher than some of the other countries in the world. This could be because of the high population of India and a lack of attention to personal safety. Fortunately, with the increase in the reach of technology to the population, and the expansion of 4G in the country, technology can play a pivotal and advantageous role in extending some help to people in emergency situations.

Stats show that the usage of internet in India has exceeded half a billion people. at around 627 million in 2019, with 97% of users having access to a mobile device that supports internet [27]. The increase in number of mobile users and the advancement of technology has reduced the crime rate greatly.

Many emergency services applications have been developed to aid those in need. However, all of them are targeted towards women-centered affairs. No applications have been made keeping in mind a general audience. As a result, the scope of these applications is fairly limited.

Such applications are available to aid victims of crimes and people in emergency situations. However, most of them don't provide a feasible solution to the problem of urgency, that is, making help available as soon as possible.

Vigila is a safety application that is developed keeping the urgency of emergency situations in mind. The primary goal of the application is to make help available to victims as soon as possible. Since most people have a smartphone nowadays, we propose a mobile application with an easy-to-use interface and a set of handy features for use in almost any type of emergency situation.

In addition to basic features like emergency alerts and location sending, the application aims to get help from civilians by alerting anyone within a 100 m radius. In the current version of the application, when the victim presses the emergency button, the civilian receives the location of the victim as an SMS and can choose to help the victim. Keeping in mind that civilians may not be aware of the proper procedure to help victims, the application also provides national emergency helpline numbers and basic emergency guidelines like First Aid information and CPR instructions, as well as instructions on self-defense to fend off attackers. The victim can also place a call to the emergency contacts and helpline numbers from the application itself.

II. Literature Survey

The main objective of the survey is to find already existing applications, compare their functionalities, discuss their pros and cons, and find solutions to existing problems. The most

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important feature of any safety application is sending an alert message to emergency contacts along with the location of the user. Papers [1], [2], [4] - [20] propose a solution where the application sends the location of the user to the emergency contacts, papers [9], [12] - [14], [19], [20] also send the details to the police.

SMARISA by N. R. Sogi et. al. [1] is one such wearable device that aims to help women in distress. In addition to providing location services to emergency contacts, it uses a camera module to record the crime for evidence and Messaging services to aid in alerting the emergency contacts with the incident. This is the most basic feature of any app. Some apps provide audio and video recording features to add to the functionality of the app.

In the system proposed by S. Mandapati [8], along with sending location information over SMS to emergency contacts, the users can also make audio/video calls. It also has a feature to imitate calls and also provides first aid information.

G. Toney et. al. [6] proposed a solution with three methods for the victim to switch on the system. The user can either switch it on manually, can twist their wrist (this motion is captured by a flex sensor) or if the user falls it is picked up by a fall sensor which triggers the system to send SOS messages, audio and video to emergency contacts.

B. Thota and U. K. Kumar .P [11] propose a system with continuous location sending to emergency contacts. The user can save up to 4 emergency contacts. Once the "start" button is pressed, the location of the victim is saved to the database after every 30 seconds. This location is sent to the saved contacts through an SMS after every 5 minutes until the application is stopped.

T. Chowkar et. al. [18] propose a mobile application that can track the user's location, record audio and take pictures. The app is connected to a hardware device that can be triggered in times of emergency. This trigger immediately sends the location of the user to their emergency contacts along with an audio recording and a picture taken from the user's mobile phone.

S. Punait and A. R. Askhedkar [17] propose a wearable device that can be embedded into a purse or clutch or also into clothes. When the user is in danger, they can press a switch to send an SMS with location details to their emergency contacts. The user's information is also continuously stored on the cloud so that the last available location of the user can be accessed if the user is disconnected from the internet.

The above papers only provide the location of the victim and do not take into consideration the time taken to respond to the distress signal. Some of the following papers try to do this by alerting the police as well as the emergency contacts.

A. Singh and V. Barodiya [14] propose an application periodically tracks the user's location. If there is a sudden change in the user's speed, the application sends an alert to the user failing to answer which, the alert is sent to the nearest police station and emergency contacts.

SafeBand by M. N. Islam et. al. [9] is a system consisting of a wearable band to be used by the victim, and two mobile applications, one for the victim and one for the police. When the user (victim) presses a button on the band, the location of the victim is sent to the nearest police station their emergency contacts. The police can acknowledge the request on their application which will turn on the light on the wearable device. The system can also detect if the wearable device is disconnected and the police are notified after a set amount of time.

A. Z. M. Tahmidul Kabir et al. [20] assume that there is an active volunteer system in existence and propose a dual device-application solution connected via Bluetooth. In emergency situations, the emergency button can be triggered via the wearable device or with the application, which saves the user's location to the cloud. It is then sent to the nearest volunteers as well as the police and emergency contact list, who can reach out to help.

The application proposed by D. Chand et. al. [13] provides the choice to either press the PANIC button or shake the mobile device 40 times within 8 seconds to trigger the sending of SMS to the police. The police receive a list of the user's details and emergency contacts and can forward the message to the emergency contacts. The application also places a call to the police helpline after the message has been sent for further assistance. There is also a maps interface for the police which contains the location of each emergency.

The application proposed by S. Sangeetha and P. Radhika [12] continuously tracks the location of the user through GPS and stores it on the server. The user can press an emergency button in the application which will send the contact details and the current location to the emergency contacts and the police. The user can also upload their schedule to the application and any deviation from the schedule will also send an SMS to the emergency contacts.

D. S. Prashanth et. al. [4] propose a similar system wherein after login, the user enters their destination address and starts navigating. The live location of the user is continuously recorded for the emergency contacts to view. It also features an SOS button that sends the location coordinates to emergency contacts, a spy camera feature to silently take pictures, a document that consists of First-aid information and emergency helpline numbers.

The application proposed by I. A. Mane et. al. [7] sends an image and location information to the user's emergency contacts, followed by opening the camera to capture images just with the click of a button.

These papers provide additional features like audio and video recording and police contacts, but the response time may still be too long in cases of extreme emergencies.

M. Mahajan et. al. [5] propose a wearable device that after being switched triggers a microcontroller to produce a shock and simultaneously capture video/audio to be stored on a micro SD card. It also enables the user to send SMS with location coordinates to emergency contacts.

B. Sathyasri et. al. [10] propose a hardware-based solution where the location of the user can be sent to the registered contact at the click of an emergency button. It also consists of a vibration sensor which can detect anomalies and trigger the sending of the location, a neurosimulator which can deliver a non-lethal shock to the attacker and an IoT module which tracks the last location of the victim.

SecureU by A. Donde et. al. [15] is a proposed application where the user can send an alert message with the user's location to 5 emergency contacts at the click of an alert button. It also provides required services such as the location of hospitals or pharmacies in case of an emergency. It also has the facility of capturing video and audio. Apart from that, the application has a taxi calling service.

R. R. Khandoker et. al. [19] propose an application which activates on the press of an SOS key or with voice commands. This starts an emergency service that sends an alert message along with the location of the user sent to their emergency contact list and country helpline numbers every 5 minutes. The application also has a live streaming feature so that contacts can watch a live feed of what is happening, and an audio recording feature. The application also shows the location of the nearest police station.

V. Sharma et. al. [2] propose SMART SHOE which is a shoe that has a GSM module embedded in it to send alert messages on flipping a switch and GPS module to send the location of the victim. It also consists of a taser that generates a shock of 400KV and a camera module to live stream video captured by a camera, connected to the shoe.

On invoking this application by S. A. Akash et. al. [3], an SMS is sent to emergency contacts and a loud siren noise is generated even if the phone is in silent mode. This can only be switched off by the user on entering a lock pattern. The user can also schedule a timer-based SMS when travelling through an unsafe area which can be switched off if the user does not face any problems. It also captures images and has a fake call feature if and when the user wants to leave an inconvenient place. The mobile phone of the victim's emergency contacts, on receiving an SMS, produces a loud siren to attract their attention.

D. G. Monisha et. al. [16] propose a two-way system: a hardware solution and a mobile application. The hardware device can be activated with just one click, which sends a distress message to the police along with the location of the person. The device also has audio-recording capabilities. It also has a hidden camera detector to find whether there is any hidden camera in the surrounding. The main feature of the application is sending SOS messages along with the current location. The message is sent to the user's emergency contacts every two minutes. The mobile application has audio and video-recording features, along with a hidden camera detector.

These are some of the most sophisticated apps in the market and have a lot of features that come in handy in various situations. However, none of them have a completely viable solution to make help available as soon as possible. The best way to make help available immediately is to involve civilians.

III. Proposed Solution

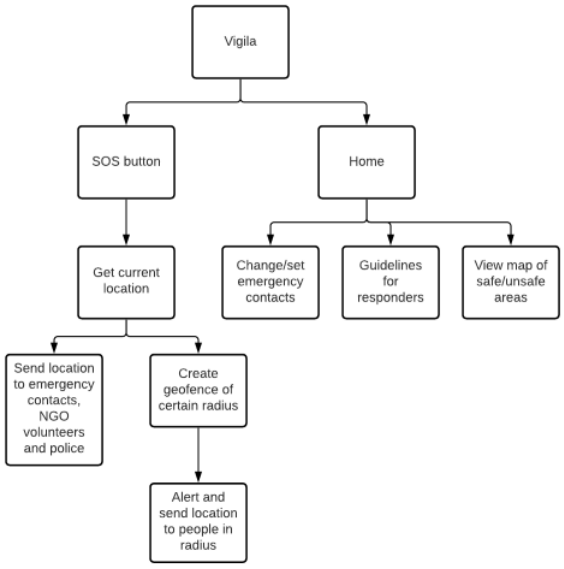


Fig. 1. Flow diagram of Vigila

After going through several existing applications on the market that already cover this problem, we noticed that most of them only notify certain select contacts along with a few applications having some additional features like recording audio [15], [16], [18], [19] or an inbuilt taser [2]. However, such contacts may not be able to respond immediately to the situation. So, we thought of making an application that would notify the nearest people who have the application installed on their phone, ensuring that help is nearby. Another application [20] is quite similar and proposes to notify volunteers at NGOs. However, it still only notifies a limited

number of people and these people may not necessarily be nearby. While brainstorming we also came up with other features like collecting data so the app can then mark areas where it is being used most often. All these features and others we thought of have been described in detail in this section along with a flow diagram of the application.

a) Guidelines for civilian first responders: It is not expected of civilians to know how to tackle emergency situations. They need some guidelines when they reach the site of emergency. Our application will contain guidelines for the first responders to help the endangered victim through first aid, tackle the attackers and control the situation as much as they can before the arrival of the police. The users of the application will routinely be prompted to go through the guidelines for the general awareness.

b) Marking unsafe areas based on app usage: The application will collect data on when and where it is being used. Based on the usage of emergency features in different areas, the application can determine unsafe areas and mark them as such on the map, so that users can avoid these areas or notify emergency contacts before entering these areas.

c) Send Alerts to Emergency Contacts: Users can add any number of people to their emergency contact list. The victim can send an alert to their registered emergency contacts. The alert could be in the form of an SMS which includes the location coordinates of the victim. This would enable the emergency contacts to take action on behalf of the victim. This feature is already implemented in existing work. In our system it acts as a fallback mechanism, where in the worst case scenario even if there are no responders or there is poor network coverage in that area our application would be as good as any other application on the market.

d) Send Alerts to Nearby People: Emergency contacts and police may not be able to arrive in time to help the victim. Hence, it is better to alert the people near the victim for rescue. The application will dynamically create a 100 meter radius when the victim is in danger and presses the SOS button. Any user in this radius, having our application, will be sent an alert stating that there is a victim in the nearby area. If the user chooses to help the victim, the user will be displayed the location of the victim.

e) Police instructions: As soon as a civilian responds to an SOS message, the contact of this person will be sent to the police. The police can then instruct the civilian over the phone on how to handle the situation as best they can, until the police reach the site of the emergency. This is an added feature on top of the already existing guidelines provided by the application.

f) Police collaboration: In our proposed system, we plan to implement a feature which will mark unsafe areas based on the app usage. This data collected by the application in different areas could be made accessible to the police, so that they get an idea of unsafe areas in their locality and increase police patrolling in those areas.

g) NGO collaboration: Along with the police, we plan to collaborate with NGOs that want to work with us. These NGOs could have volunteers as first responders in areas around them so that help can arrive more quickly.

Figure 1 shows the flow diagram of the application. The application will provide an SOS button outside the application, to avoid delay in emergency situations. Once the emergency contacts have been fed into the application, the user can click this button to send their location and alert the emergency contacts, nearby NGO volunteers and local police via SMS. If the user's device has an active Internet connection, the application will create a 100 meter radius around the user and alert and send the location to the people having this application in that radius. The users can also access the application to add or edit or delete the emergency contacts, view a map of safe and unsafe areas around them and view the guidelines for emergency situations.

IV. Implementation

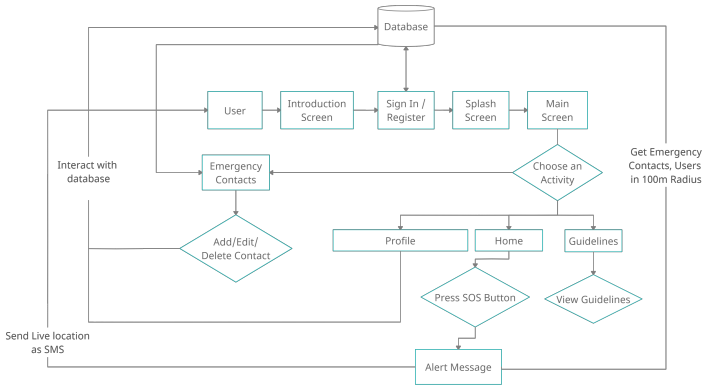


Fig. 2. System Architecture of Prototype

The prototype of the application was built using Google's Flutter (version 1.22.2) and Cloud Firestore and several public Flutter packages. It has been designed to work on any Android device starting from Android 5.0, but the intended version is Android 11.0. The prototype also requires a stable internet connection and various permissions such as location, SMS and calls.

When a user first starts up the application, it shows an introduction screen that summarises the main features of our application. This screen is only shown once to save time in case of an emergency.

The application makes use of Firebase email authentication for verifying the user. After the user signs-up, their details

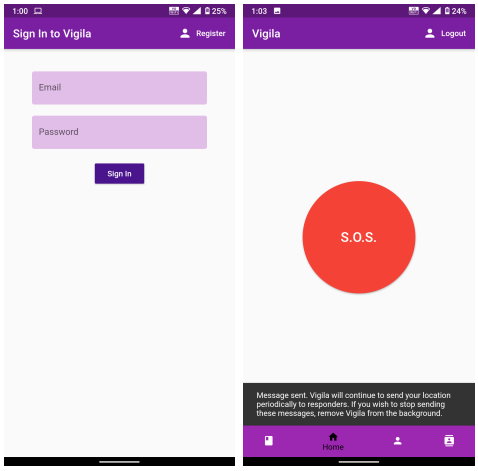
(first name, last name, email address, contact number and blood group) are saved to the database. Once a user logs in or registers, they remain logged in until they manually log out. This ensures that the app directly opens up to the SOS button screen and no time is wasted in emergency situations.

The application also has a comprehensive first-aid and emergency response guide, which would enable first responders to handle the emergency situation to the best of their capability until professional help arrives. It also has a list of helpline numbers who can be contacted from the application itself in an emergency.

The user is routinely prompted to store their emergency contacts in the application and read through the guidelines so as to be prepared for an emergency situation.

When a user presses the SOS button on their device, the application fetches that user's location, using the geolocator package[1]. The application then fetches the details of the emergency contacts as well as the users in a 100-meter radius around that device. The users' location is periodically updated to the database and the geoflutterfire package is used to check if they are in the 100 m radius [2]. The application then proceeds to send an SMS (as shown in Figure 2), using sms_maintained package[3], consisting of the device's location, to these contacts. The application continues to send the SMS every minute till the application runs in the background. This ensures that the latest location of the victim is continuously sent and they can be easily tracked.

The screenshots of the prototype have been shown in Figure 3:



[1]https://pub.dev/packages/geolocator
[2]https://pub.dev/packages/geoflutterfire
[3]https://pub.dev/packages/sms_maintained

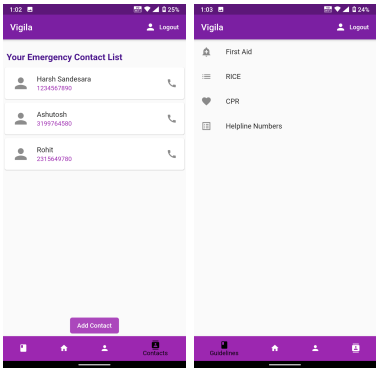


Fig. 3. Prototype Screenshots

V. System Evaluation and Results

In order to evaluate whether our application would actually be used by civilians, we conducted a survey of over 375 people in all age groups and genders. We created the survey using Google Forms and circulated it amongst people we know. The respondents were asked several questions to the check whether they would be comfortable using the features of our application. This section explains the details of the survey responses.

Of all the responses we got, 42.4% of responders were male, while 57.1% of responders were female. The majority of responders were of age group 25-54 (40.7%) and 15-24 (36.8%), while 18.8% of the responders were of age 55-64, and 2.6% people were older than 65 years.

A majority of the responders (75.7%) felt somewhat safe while roaming alone in the city, but almost everyone (98.1%) said that they would prefer a mobile application to help them in case of an emergency.

When asked if they would trust civilians to help them during a crisis, around 29.6% of people said they would, while 54.2% of people said they might. However, a majority of people (97.1%) said they would readily help or at least think about helping victims near them. This percentage increased to 97.4% when they were informed that the application would help them and guide them through the crisis.

Finally, we asked them if they thought whether an emergency application that had features that we plan on implementing would help reduce crime stats in their area. 63.2% of people said they thought it would, while 32.3% of people said they thought it might.

The survey conducted shows that the application would be really helpful in attending to crises. The features that we add to already existing services would significantly help reduce the response time and bring aid faster during an emergency. At the very least, it does not cause any harm to the people using it and protects the privacy of users.

VI. Conclusion & Future Scope

After a thorough literature survey, we observed that already existing applications propose a solution that is essentially a different take on notifying friends and family, and in some cases, the police and the nearest volunteers, directly with the location of the victim so they can take the necessary action.

The main issue with these solutions is that help may not arrive immediately and that it might actually take a few minutes before the victim is safe. However, in life-threatening situations, it is imperative that the victim be relieved of their predicament as soon as possible. Our proposed solution, apart from sending alerts to the users emergency contacts, also sends alerts to nearby people within a 100 meter radius. The purpose behind this is that it reduces the response time for help.

The current implementation is a prototype of our application, and has a few shortcomings. The prototype has no way to stop sending SMS other than completely stopping it. It also lacks some of the features mentioned in Section III. These will be worked upon by us in the future. We plan to collaborate with the police and share some of the data stored in the database to avoid misuse of the application. We also plan to seek help from NGOs for volunteers that would serve as first responders.

References

[1] N. R. Sogi, P. Chatterjee, U. Nethra and V. Suma, "SMARISA: A Raspberry Pi Based Smart Ring for Women Safety Using IoT," 2018 International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, 2018, pp. 451-454, doi: 10.1109/ICIRCA.2018.8597424.

[2] V. Sharma, Y. Tomar and D. Vydeki, "Smart Shoe for Women Safety," 2019 IEEE 10th International Conference on Awareness Science and Technology (iCAST), Morioka, Japan, 2019, pp. 1-4, doi: 10.1109/ICAwST.2019.8923204.

[3] S. A. Akash, M. Al-Zihad, T. Adhikary, M. A. Razzaque and A. Sharmin, "HearMe: A smart mobile application for mitigating women harassment," 2016 IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE), Pune, 2016, pp. 87-90, doi: 10.1109/WIECON-ECE.2016.8009093.

[4] D. S. Prashanth, G. Patel and B. Bharathi, "Research and development of a mobile based women safety application with real-time database and data-stream network," 2017 International Conference on Circuit ,Power and Computing Technologies (ICCPCT), Kollam, 2017, pp. 1-5, doi: 10.1109/ICCPCT.2017.8074261.

[5] M. Mahajan, K. Reddy and M. Rajput, "Design and implementation of a rescue system for safety of women," 2016 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET), Chennai, 2016, pp. 1955-1959, doi: 10.1109/WiSPNET.2016.7566484.

[6] G. Toney, F. Jabeen and Puneeth S, "Design and implementation of safety armband for women and children using ARM7," 2015 International Conference on Power and Advanced Control Engineering (ICPACE), Bangalore, 2015, pp. 300-303, doi: 10.1109/ICPACE.2015.7274962.

[7] I. A. Mane, J. R. Babar, S. S. Patil, S. D. Pol and N. R. Shetty, "Stay Safe Application," 2016 International Research Journal of Engineering and Technology (IRJET), 2016.

[8] S. Mandapati, S. Pamidi and S. Ambati, "A Mobile Based Women Safety Application (I Safe Apps)," IOSRJournal of Computer Engg (IOSR-JCE), 2015, vol. 17, no. 1 (Version I),pp. 29-34.

[9] M. N. Islam et. al., 2018. "SafeBand: A Wearable Device for the Safety of Women in Bangladesh". In Proceedings of the 16th International Conference on Advances in Mobile Computing and Multimedia (MoMM2018). Association for Computing Machinery, New York, NY, USA, 76–83. doi: 10.1145/3282353.3282363, 2018.

[10] B. Sathyasri, U. J. Vidhya, G. V. K. Jothi Sree, T. Pratheeba, K. Ragapriya, "Design and Implementation of Women Safety System Based On Iot Technology", International Journal of Recent Technology and Engineering (IJRTE), vol. 7, no. 6S3, Apr. 2019.

[11] B. Thota, U. K. Kumar .P, "Sauver: An android application for women safety", International Journal of Technology Enhancements and Emerging Engineering Research 3.05, 2015, pp. 122-126.

[12] S. Sangeetha, P. Radhika, "Application for Women Safety", IOSR Journal of Computer Engineering (IOSR-JCE), vol. 17, no. 3, pp. 01-04, May - Jun. 2015.

[13] D. Chand, S. Nayak, K. S. Bhat, S. Parikh, Y. Singh and A. A. Kamath, "A mobile application for Women's Safety: WoSApp," TENCON 2015 - 2015 IEEE Region 10 Conference, Macao, 2015, pp. 1-5, doi: 10.1109/TENCON.2015.7373171.

[14] A. Singh, V. Barodiya, "Woman safety application - MwithU", International Journal of Research in Engineering, Science and Management, vol. 1, no. 10, Oct. 2018.

[15] A. Donde, A. Dhole, P. Rekhata, M. Goel, "SecureU Emergency System using GSM and Android Application", International Journal for Research in Applied Science & Engineering Technology (IJRASET), vol. 5, no. 2, Mar. 2017, doi: 10.22214/ijraset.2017.3003.

[16] D. G. Monisha, M. Monisha, G. Pavithra, R. Subhashini, "Women safety device and application - FEMME", Indian Journal of Science and Technology, vol. 9, no. 10, pp 1-6, Mar. 2016, doi: 10.17485/ijst/2016/v9i10/88898.

[17] S. Punait, A. R. Askhedkar, "An Improved Personal Security System", International Journal of Engineeing Research and Application, vol. 7, no. 6, Jun. 2017, pp. 102-105, doi: 10.9790/9622-070604102105

[18] T. Chowkar, A. Shukla, S Shaikh and V. Anand, "People Safety APP - Belief," International Journal of Computer Science Trends and Technology (IJCST), vol. 5 no. 2, Mar – Apr 2017.

[19] R. R. Khandoker, S. Khondaker, Fatiha-Tus-Sazia, F. N. Nur and S. Sultana, "Lifecraft: An Android Based Application System for Women Safety," 2019 International Conference on Sustainable Technologies for Industry 4.0 (STI), Dhaka, Bangladesh, 2019, pp. 1-6, doi: 10.1109/STI47673.2019.9068024.

[20] A. Z. M. Tahmidul Kabir, A. M. Mizan and T. Tasneem, "Safety Solution for Women Using Smart Band and CWS App," 2020 17th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON), Phuket, Thailand, 2020, pp. 566-569, doi: 10.1109/ECTI-CON49241.2020.9158134.

[21] "Road Accident Statistics in India". NDTV.com. https://sites.ndtv.com/roadsafety/important-feature-to-you-in-your-car-5/ (accessed October 24, 2020).

[22] "Overview of Road Accidents in India". PRSIndia.org. https://www.prsindia.org/policy/vital-stats/overview-road-accidents -india (accessed October 24, 2020).

[23] Kishor Kadam. "India road accidents in 10 charts: Daily death toll in 2016 hits 413; Delhi tops in overall fatalities". Firstpost.com https://www.firstpost.com/business/india-road-accidents-in-10-charts -daily-death-toll-in-2016-hits-413-delhi-tops-in-overall-fatalities -4015581.html (accessed October 24, 2020).

[24] "Road accidents in India claim more than 1.4 lakh lives in 2017". Autocar. https://www.autocarindia.com/industry/road-accidents-in-india -claim-more-than-14-lakh-lives-in-2017-410111 (accessed October 24, 2020).

[25] "Crime in India". Wikipedia. https://en.wikipedia.org/wiki/Crime_in _India#Crime_by_location (accessed October 24, 2020).

[26] Gazal Noor. "Violence against women in India and some changes". LegalServiceIndia.com. http://www.legalserviceindia.com/legal/article -3660-violence-against-women-in-india-and-some-changes.html (accessed October 25, 2020).

[27] Internet users in India to reach 627 million in 2019: Report. The Economic Times. https://economictimes.indiatimes.com/tech/internet/internet-users-in -india-to-reach-627-million-in-2019-report/articleshow/68288868.cms (accessed October 25, 2020).