24 X 7 INTELLIGENT SAFETY APPLICATION FOR WOMAN USING ANDROID

[1]**Suprava Ranjan Laha**, [2]**Puja Laha**, [3]**Saumendra Pattnaik**, [4]**Binod Kumar Pattanayak**

[1]Research Scholar, [2]Student, [3]Assistant Professor, [4]Professor

[1]Department of Computer Science and Engineering,
ITER, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, INDIA.

Abstract: In the 21st century, when people are discussing the reasons for assaults taken on women who are uninterruptedly molested and violated in the streets, on public transport, and in open places [4]. Based on the reports given by WHO and NCRB-social-government organizations, 35 percent of women all over the world are facing violence in public places and on public transport. Nowadays, there is various news of women's harassment than their achievements. It is unsafe for women to travel during odd hours. Nowadays, almost everyone has a smart phone, which can be used effectively for personal safety. The hateful incidents that outbreak the entire nation have forced us to go for safety issues, therefore many new apps have been developed to provide security to women through their smart phone's [1]. In this paper, we have done a survey of many papers based on the development of applications for the safety of women and developed a women-friendly safety app for android phones. This paper describes women's safety and security by using an electronic device not only to detect the problem but also to alert the authorities. This paper suggests a new perspective to use technology to protect women. We have used an android based smart phone with an integrated feature that alerts and provides location-based information. It also describes GPS enabled women's safety app that provides the combination of GPS devices with alert messages with an emergency button TRIGGER. Whenever somebody is in trouble they only have to press Volume Key Button. After that, a message alert is sent to the registered contact list and a Voice Call to the Number registered first and gives a message "I AM In TROUBLE PLEASE HELP ME". Nowadays, the safety of women has become very poor. With the help of this application, the project was developed in Android. The Graphical User Interface (GUI) provides a level of reliability, availability, and compatibility. All of these make Android an appropriate language for this project because Android language is based on JAVA language.

Index Terms - Women, WHO, NCRB, Android, GPS, GUI.

I. INTRODUCTION

Women are accomplished at mobilizing diverse groups for frequent causes. They work across racial, sacred, opinionated and intellectual divides to en- courage tranquility [1]. We all are much alert about the importance of women's safety, but we must first ensure that they are well secured. When a woman is in such an unsafe situation, then having a security application can do the needful to come out of the situation by calling for help. The women who are going out of home for work, education and other things face a lot of harassments by the society. Incidents of harassment are rising day by day.

Approximately 35 percentages of women around the world are victims of sexual violence according to a report given by WHO (World Health Organization). The violence occurs with a girl in every three minutes and the police are not able to reach the culprit due to lack of evidence. Ban Ki-Moon, the secretary general of United Kingdom states that "There is one universal truth applicable to all communities and cultures: Violence against women is neither agreeable nor forgiven and not bearable. Harassment against women is a health problem of the public. Women always feel secure within the four walls of the house since decades. Since years there has been an extraordinary shift from their involvement in household than in workplace to create a home for them in the society. But their fear has been increased by the difficulties they face while traveling alone or in late hours. Woman's safety is an essential sphere to be taken care as self-understanding has a strong connection with their empowerment. Therefore, safety and empowerment of women are the two sides of the coin for a developed society.

Whenever we are in trouble or have forgotten the way to come back home, the women safety apps can help you to remain safe and would bring assistance when we require. Women are facing violence in public places, schools, work- places and public transports. Most of the violence takes place when women are alone. Therefore they feel insecure to come out of their houses [2].

In today's world, the safety of women is in danger especially in India. Violence against women is increasing day by day [3]. Although many preventive measures have been taken by the government in order to stop the indecent activities but all are in vain. So, it's very important to provide a mobile application to women in order to deal with this problem and protect them.

The main purpose of our proposed system is to provide highly reliable security system for the safety of women. The needful of the proposed application is to develop a free of cost solution for real time SMS based women safety sys- tem. The main objective of the proposed system is to provide and determine the exact position of the victim person. Using android application, it records& tracks the exact position and gives notification to the nearest help center in the least possible time.

II. TYPE VARIOUS WOMAN SAFETY APPLICATION TECHNIQUES

We have detailed here various woman safety application techniques as reported in the literature.

➢ ABHAYA

Ravi SekharYarrabothu and BramarambikaThota [5] developed an Android app named "ABHAYA" in the year 2015. This app helped in live monitoring the location of the sufferer with the help of GPS. A registered contact received a call from the source device. It continuously sent the location address if it was changed in every 5 minutes. But the limitation is that, it cannot track the location if there is no internet connection and the phone is switched off.

➢ Smart Shield

Rachana B. Pawar and Manali H. Kulabkar [6] developed a "Smart shield for women safety" in the year 2018. It is a wearable device installed in the jacket which consists of different modules such as GSM, GPS, Camera, Buzzer and sensors. It is compact in size, wireless connectivity, easy maintenance, low cost with high performance, fast response and easy to carry. This device may not work properly when there is heavy rain or in bad weather condition as the GPS will fail to locate the area.

➢ Dynamic Safety System

DantuSaiPrashanth and Gautam Patel [7] developed a mobile based women safety application with real-time database and data stream network in the year 2017. It consists of dynamic GPS, police alert, audio/video recording and live location tracking. Dynamic GPS is automatically turned ON when the user moves to another place. The emergency contacts can track the victim through dynamic GPS, when navigation is started.

➢ Safe Band

Muhammad Nazrul Islam [8] developed a wearable device for the safety of women in Bangladesh called "SafeBand" in the year 2018. It consists of micro-controller, GSM-module, GPS, Wi-Fi module and used Dijkstra's algorithm. It is easy to learn and use. It works before and after the crime has been committed. It sends help message to the police and victim's parents in less time. Their limitation is that it would not work without constant power supply and in bad weather condition.

➢ WosApp

RakeshYadav, dadasaheb P. Raut and RambhaVighne [9] in the year 2017 developed an android based women safety app named "WoSApp". The call could be placed to the police just by triggering the call function by shaking the phone. The victim can interact with the user interface of the app by clicking the PANIC option on the screen and then the area of the victim is plotted in the Google Map. Its limitation is the per- son using the app needs to shake the phone 40 times to call and message within 8 seconds but this time should be reduced.

➢ Intelligent Android Application

AbhijitParadkar and Deepak Sharma [10] in the year 2015 developed "All in one intelligent safety system for women security" for android phones. Its advantage is that, it can provide evidences as it can perform audio/ video recording of incidences which acts as the evidences. Its limitation is that these evidences are not accepted by the court, so it should be made accepted.

➢ HearMe

Saad Ahmed Akash [11] in the year 2016 developed a smart mobile based applica- tion named "HearMe". Its advantage is that, the app notifies the victims and their family members simultaneously. It automatically generates short message and sends to family members. It consumes very low memory space such as 3.2 MB. Its limitation is that, it does not send any message to the local police.

➢ Mobile WSS

Dr. Sridhar Mandapati, SravyaPamidi and SriharithaAmbati [12] in the year 2015 developed a mobile based women safety app named "I Safe Apps". If a woman is in danger, then she just needs to click the Isafety apps and then an alert message would be sent to the guardians of the woman. They would also receive a call and the location of the woman. But the limitation is, this would not work well in bad weather condition and if there is some network issue.

➢ Safetipin

PreethaKartik, Sonny Jose and Gayathri Krishna M.K [13] in the year 2017 developed an Android Map based mobile app named "Safetipin". It is simple and easy to use .it empowers users to help others in their city or town and also receives help from others in case of emergency. Its limitation is that, there much information about some cities and no information about some other cities. For the facility to be effective more users are needed.

• Vehicle Tracking System

PoonamBhilare and AkshayMohita [14] in the year 2015 developed a GSM and GPS based vehicle tracking system . It provides security by using alert and emergency button. Panic button is used to generate alarm. It can capture images by connecting an android device in vehicle and sending the images on triggering the panic button. Its limitation is that the location cannot be tracked if the weather is bad and if there is no network.

• M-WPS

Vallidevi Krishnamurthy, Saranya. S, SharanyaSrikanth and SimranModi [15] in the year 2017 developed a mobile based women protection system. This app is hand free and is activated by voice throughout its operation. It is an internet free android app. A voice trigger alarm allows the user to call for help quickly. Its limitation is a precise voice recognition system is required to avoid the sending of false help message. The user should be within a particular range so that her voice will be audible. It can drain the device's power as it runs in background to hear the woman's voice.

- BONITAA

Sharifa Rania Mahmud ,SanjidaNasreenTumpa , AnikaBinte Islam , Chowdhur-Nawrin Ferdous , Nipi Paul and TasmiahTamzidAnannya [16] in the year 2017 developed an android based application called "BONITAA" especially for the women of Bangladesh. This app is in Bengali language so that all types of women can use this app. The information in this app is device independent as it stores all the information in the cloud database. The app can work with or without internet. Its limitation is that it does not track the location continuously.

- Smart Security Device

.Kalpanaseelam and K.Prasanti [17] in the year 2018 developed an electronic sys- tem which consists of sensors, GPS, GSM and Arduino UNO. It detects body temperature, voice, sudden fall and flex motion of the victim. The GPS cannot track the location in bad weather condition or in place where there is no network.

- Suraksha Protection System

Nishant Bhardwaj and Nitish Aggarwal [18] in the year 2014 developed an app named "Suraksha" which is a GSM module based system. It is simple, easy to carry device with beneficent functioning. GSM module is used to send and receive SMS. Its limitation is that it sends message to only one registered number.

Table 1 Summary of the different woman safety application techniques used above

Title	Techniques Used	Advantages	Disadvantages
ABHAYA: An android app for the safety of women.[5]	Android based application	Helps in live monitoring. It continuously sends the location address if it changes in every 5 minutes interval.	Without Internet it will not work.
Smart shield for Women Safety.[6]	GPS, GSM and sensor based wearable jacket	Wireless connectivity, easy maintenance, low cost with high performance, fast response and easy to carry.	When there is heavy rain or in bad weather condition, the device will not work properly.
Research and development of a mobile based women safety application with real-time database and data-stream network.[7]	Dynamic GPS, Police alert, Audio/video, Live location tracking	Dynamic GPS is automatically turned ON while the user moves to another place.	This app would fail in absence of sufficient battery. It would not work in poor signal.
SafeBand: A wearable device for the safety of women in Bangladesh. [8]	Dijkstra's algorithm	Easy to learn and use. It works before and after the crime has been committed. It took less time to send the message to police and victim's parents.	It needs constant power supply to work properly. The system cannot work properly in bad weather condition.
A mobile application for women's safety: WoSApp.[9]	Android based application	The victim can interact with the user interface of the app by clicking the PANIC option on the screen, and then the area of the victim is plotted in the Google Map.	If the person fails to shake 40 times then the police might not get the emergency call and message.
All in one intelligent safety system for Women security.[10]	Android application	It can perform audio-video recording of incidenceswhich acts as the evidences. It can also detect the intrusion inside the home of asenior citizen, handicappedperson or women living are	These data should be stored in the cloud, so that large amount of evidence can be gathered. It is required to make such systems standard and get approval from government so that courts accept the evidence.

HearMe: A smart mobile application for mitigating women harassment. [11]	Smart mobile application	The application notifies the victims and their family members simultaneously. It automatically generates short message and sends it to the family members.	It does not send any message to the local police.
The Mobile based smart women safety device.[12]	GSM based mobile application that uses IoT.	The GSM enables the system which sends the area's ad-dress of the sufferer.	It is not easy to carry as it is very large and is not wireless.
Safetipin: A mobile application towards women safety.[13]	Android map based mobile application	It is simple and easy to use. It empowers users to help others in their city or town and also receives help from others in case of emergency.	For the facility to be effective, more cities information is needed.
Women Employee Security system using GPS and GSM Based Vehicle Tracking. [14]	GPS and GSM based vehicle tracking system.	Provides security by using alert and emergency button. Panic button to generate alarm.	The location cannot be tracked if the weather is bad or if there is no network.
M-WPS: Mobile based Women Protection System. [15]	Object-Oriented design	This app is hand-free and is activated by voice throughout its operation. A voice trigger alarm allows the user to call for help quickly.	The user should be within a particular range so that her voice will be audible.
BONITAA: A Smart approach to support the female rape victims. [16]	An android based application	This app stores all the information in the cloud data-base, so the information is not device dependent.	It does not track the location continuously.
A Novel approach to provide protection for women by using smart security device.[17]	Electronic sensors, GSM and Arduino UNO	Body temperature detection of victim. Voice detection of victim.	The GSM cannot track the location in bad weather condition or in place where there is no network.
Design and Development of "Suraksha"- A women safety device.[18]	A GSM module based system	It is simple. Easy to carry device with beneficent functioning. GSM module is used to send and receive SMS.	It sends message to only one registered number if the person would not see the message then how would they know about the victim.

III. PROPOSED MODEL

The proposed method is an Android based application meant for the safety of women when in danger. It has one primary actor user and three secondary actors GPS, emergency contacts and police as shown in Fig.4. In the figure (1, 2, and 3) shows the graphical representation of the flow of data through an information system. For the visualization of data processing, DFD (Data Flow Diagram) is used. The contact function is used to add the names in order to call in danger. The call function is used to dial the person in danger. The send message function is used to browse the contact list and send message when in danger. The GPS function is used to track the location of the victim. The siren function rings immediately in order to alert those people present in surrounding. The queries function manages the complaints and provides an efficient way to solve the problems faced by public anonymously and helping the society to be a better place to live in. The SOS function automatically sends the emergency contact numbers like police, women helpline, etc as shown in Fig. 3. The Proposed system contains following:

- Hardware Interface: The application works on any android smart phone device. Screen resolution of a minimum 1024X768 is needed for clear vision of screen. The network based system is not a matter as the app would operate on any of the system.

- Software Interface: Android based operating system and Android Studio (using JAVA) – for developing the software. Software mentioned in the above point will be required only for the development of the application. The final application will be packaged as an independent setup program that will be delivered to the clients.

- Product Functions:
  - SOS: - Automatically sends the IMEI number of the user's phone to number 100 (i.e., nearby police station).
  - Contact SMS: - Here the user can browse its contact list or add the emergency contact.
  - Queries: - Complaint Management provides an efficient way of solving problems faced by public anonymously and helping the society to be a better place to stay in.
  - Siren: - Siren rings immediately.

- User Characteristics: - The system has one primary actor which is the user and three secondary actors that include the emergency contacts of the user, police and Government organizations. The application is mainly for women who are in need of security and protection from any kind of situation that could harm them.
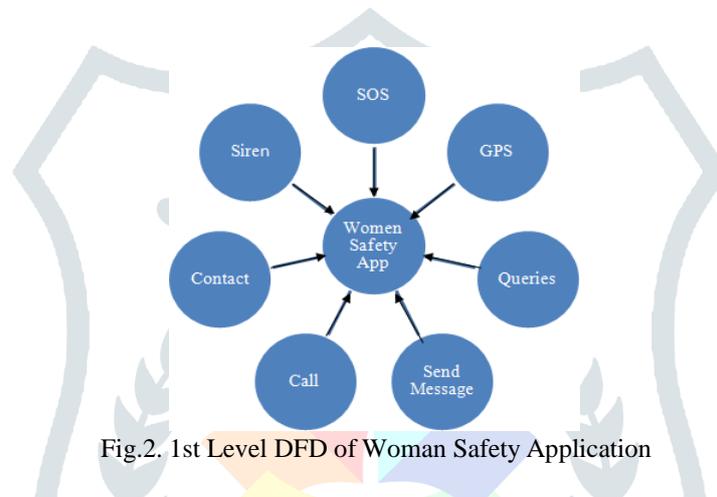

Fig.1. 0th Level DFD of Woman Safety Application

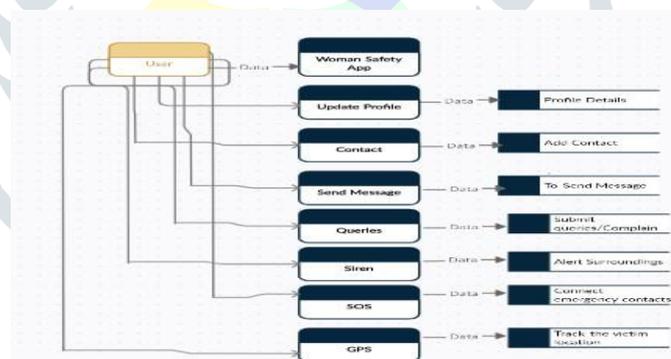Fig.2. 1st Level DFD of Woman Safety Application

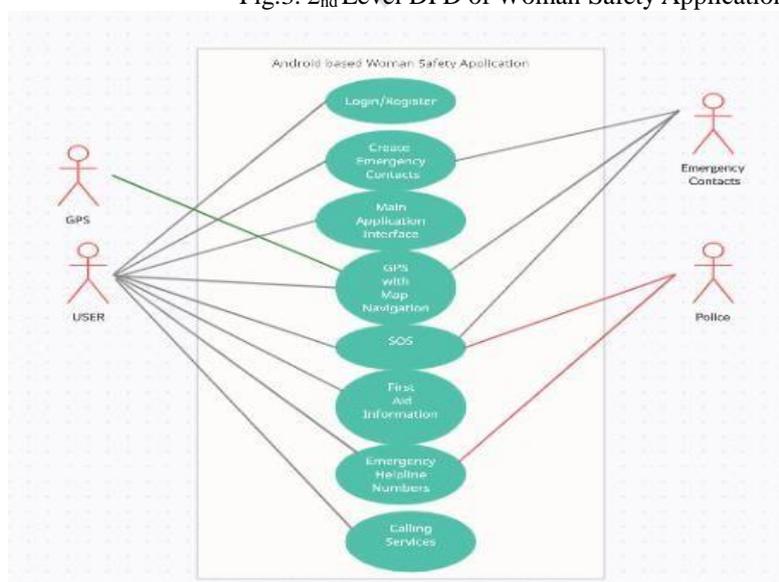Fig.3. 2nd Level DFD of Woman Safety Application

Fig.4. Use Case of Woman Safety Application

IV. IMPLEMENTATION

The application starts with a splash screen after which the main interface is displayed. It is a dashboard from where the user can access all other activities. The application has a logic and registration page where a new user can register them and an existing user can login to the app. The user will enter into the main page from where user can navigate to other activity. The user will enter into the main page from where user can navigate to other activity. The user can use the "contact" icon in the dashboard to add some favourite contacts and when they pretend to be in danger, they can hit the "Send Message" icon, so that a message will be delivered to the favourite contacts instantly. The user can use the "Queries" icon to submit any type of complaint/queries like domestic violence, threats, eve teasing and these queries will be directly stored in database , by which admin can share these to Government organization so that action can be taken. After submitting the queries, it shows a message that "Submitted Successfully". The "Siren" option can be used when the user wants to alert the surrounding people about something. On clicking the icon, an alarm sound is generated. The "Log- out" icon can be used to logout from the account. After clicking the logout button, the user will return to its home screen of the app. The user can click on the "SOS" icon to get the emergency contact like police station, women helpline number and make a call to the emergency organization for saving themselves and others.

V. EXPERIMENTAL RESULTS

Whenever the women is in danger or she gets some glimpse that she is not safe, then this app would help her protect herself. She just needs to click the app, and then a user interface would appear. Then she can send message to her favorite contacts or through SOS, she can find the emergency numbers of police or women helpline. Through the GPS, the location of the victim would be tracked and the exact location of the area would be sent to the police and the guardians. So, they can find her easily, even if her phone gets switched off after sending the message. Meanwhile, she can click on the Siren button which would produce an alarm sound to alert the surrounding people. After receiving the messages, the police and her guardians would come and rescue her from the situation and can also catch the culprit.

A.   User Interface i.e. fig. 5 describes the home screen containing the option to create new account or to login account.

B.   The user has to select add contacts i.e. Fig. 6 to add the contact details and to send the messages in emergency.

C.   Then the home screen will appear with different options shown in fig. 7

D.   The user can use the Queries icon in fig. 8 to submit any type of complaints regarding woman violence.

E.   The user can click the SOS icon in fig. 9 to connect with emergency helpline services and also to sent the current location to woman helpline services or police.
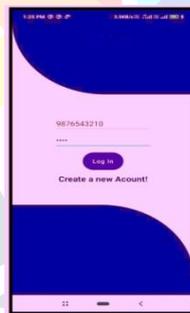

Fig.5. Snapshot of Home Screen

Fig.6. Select Add contacts

Fig.7. Snapshot of home screen with options

Fig.8. Snapshot of Queries icon

Fig.9. Snapshot of SOS Services

VI. CONCLUSION

The security of the women is ensured only when our society pay attention to the violence and teach the community by spreading consciousness. We all are much alert about the importance of women's safety, but we must first ensure that they are well secured. When a woman is in such an unsafe situation, so possessing a security application would help them come out of the situation by calling for help. Woman's safety is an essential sphere to be explored because self-understanding has a strong connection with their empowerment. Therefore, safety and empowerment are the two sides of the same coin. We surveyed different techniques implemented by different authors. The proposed GSM based android application is of a great use for the women safety as when they are in trouble, and then they can easily access the Women Safety mobile app and alert guardians that they are in danger. By simply tapping the "Send Message" button it sends the SMS to the favorite contacts that they are in danger. Also, by tapping the "SOS" button, the user can find the emergency contacts like Police and Women Help Line number. Through this app, people can be alerted everywhere by just tapping the "Siren" button. This application can provide a security through which they would feel se- cured as they are aware that they can inform their guardians and police when they are in need.

REFERENCES

1. Prakash, N., Udayakumar, E., Kumareshan, N., & Gowrishankar, R. (2021). GSM- Based Design and Implementation of Women Safety Device Using Internet of Things. In Intelligence in Big Data Technologies—Beyond the Hype (pp. 169-176). Springer, Singapore.

2. Sreeja, M., & Vijay, V. (2020). A Unique Approach To Provide Security For Women By Using Smart Device. European Journal of Molecular & Clinical Medicine, 7(1), 3669-3683.

3. Tejesh, B. S. S., Mohan, Y., Kumar, C. A., Paul, T. P., Rishitha, R. S., & Durga, B. P. (2020, February). A Smart Women protection system using Internet of Things and Open Source Technology. In 2020 International Conference on Emerging Trends in In- formation Technology and Engineering (ic-ETITE) (pp. 1-4). IEEE.

4. Monalisa, N., Himi, S., Ferdous, N., Islam, E., & Majumder, A. (2021). "SuperWom- en": A Smart Mobile Application for Social Security focusing Threats and Supports for Women.

5. Yarrabothu, Ravi Sekhar, and Bramarambika Thota. "Abhaya: An Android App for the safety of women." 2015 Annual IEEE India Conference (INDICON). IEEE, 2015.

6. Pawar, R., et al. "Smart Shield for Women Safety." International Research Journal of Engineering and Technology (IRJET) e-ISSN 5.4 (2018): 56-2395.

7. Prashanth, Dantu Sai, Gautam 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).IEEE, 2017.

8. Islam, Muhammad Nazrul, et al. "SAFeBanD: A wearable device for the safety of women in Bangladesh." Proceedings of the 16th International Conference on Advances in Mobile Computing and Multimedia. 2018.

9. Chand, D., Nayak, S., Bhat, K. S., Parikh, S., Singh, Y., & Kamath, A. A. (2015, No- vember). A mobile application for Women's Safety: WoSApp. In TENCON 2015-2015 IEEE Region 10 Conference (pp. 1-5). IEEE.

10. Paradkar, Abhijit, and Deepak Sharma. "All in one intelligent safety system for women security." International journal of computer applications 130.11 (2015): 33-40.

11. Akash, Saad Ahmed, et al. "Hearme: A smart mobile application for mitigating women harassment." 2016 IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE).IEEE, 2016.

12. Mandapati, Sridhar, Sravya Pamidi, and Sriharitha Ambati. "A mobile based women safety application (I safe apps)." IOSR Journal of Computer Engineering (IOSR- JCE) 17.1 (2015): 29-34.

13. Kartik, Preetha, Sonny Jose, and Gayathri Krishna MK. "Safetipin: A Mobile Applica- tion Towards Women Safety." Rajagiri Journal of Social Development 9.1 (2017): 5- 12.

14. Bhilare, Poonam, et al. "Women employee security system using GPS and GSM based vehicle tracking." International journal for research in emerging science and technology 2.1 (2015): 65-71.

15. Krishnamurthy, Vallidevi, et al. "M-WPS: Mobile based women protection system." 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS).IEEE, 2017.

16. Mahmud, Sharifa Rania, et al. "BONITAA: A smart approach to support the female rape victims." 2017 IEEE Region 10 Humanitarian Technology Conference (R10- HTC).IEEE, 2017.

17. Seelam, Kalpana, and K. Prasanti. "A novel approach to provide protection for women by using smart security device."2018 2nd International Conference on Inventive Sys- tems and Control (ICISC).IEEE, 2018.

18.   Bhardwaj, Nishant, and NitishAggarwal. "Design and Development of "Suraksha"-A Women Safety Device." International Journal of Information & Computational Tech- nology 4.8 (2014): 787-792.

19. Phan, A., Seigfried-Spellar, K., & Choo, K. K. R. (2021). Threaten me softly: A review of potential dating app risks. Computers in Human Behavior Reports, 3, 100055.