A CONCEPTUAL DESIGN APPROACH FOR WOMEN SAFETY THROUGH BETTER COMMUNICATION DESIGN

Dolly Daga, Haribrat Saikia, Sandipan Bhattacharjee and Bhaskar Saha

ABSTRACT

In this digital world, where everything is just a click away, and people adapting to the new technologies have enlarged speedily and hence, digital tools can be used proficiently for individual security or various other protection purposes. The heinous case that outraged the entire nation have wakened us to go for the safety issues and so a host of new apps have been developed to provide security systems to women via their smart watches. This paper presents Suraksha, an Android Application for the Safety of Women installed on a smart watch, this app can be activated automatically by the use of the sensors inbuilt in a smart watch or by a single click, whenever need arises. As soon as any causality occurs, identified by the changes registered by smart watch sensors the application generates an alarm can be snoozed within 10 seconds, identifies the location of place through GPS and sends a message comprising this location URL to the registered contacts and also a notification to the nearby users of the application for help. The unique feature of this application is that it is designed for smart watches and to make the sensors useful for women safety, sending the message to the registered contacts continuously for every five minutes until the " stop button in the application is clicked and also a generation alarm of 10 seconds before sending to stop sending messages for help if wanted to. Constant site tracking info via SMS supports to catch the location of the victim quickly and can be rescued securely. Smart watches Sensors are used with the application to make the Emergency Alert Automated and rescue the Victim by the help of Digital Technology.

Reference to this paper should be made as follows:

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1. INTRODUCTION

In Today's evolving world where the technologies are changing rapidly and everything is just a click away also came with new challenges. India has been actively participating in the change but also lacking behind in facing the challenges it came up with. The de facto spokesperson of United Nation Ban Ki-Moon, once stated that "There is one universal truth applicable to all countries, cultures and communities: violence act against women is never acceptable, never excusable and never tolerable" [1] and Women Safety has been the most perturbing provocation in India and the country is still working hard to come up with best feasible solution. This problem has been disturbing the life of the people of the society and has been a barrier for the development of the country. This paper presents the design approach on the principle need of Intelligence Security System with the latest technology requirements and challenges to build the system. Since it is not possible to predict the whole situation or circumstance at any instance and design accordingly hence to cut down the possibility of any sexual assault or physical violence to the best possible extent by keeping up all the Safety tools available to safeguard oneself in the situation up.

A System installed in the smart watch that will be providing with the nearby assistance with just a press followed by informing all the emergency contacts or will automatically start the system if felt any unusual changes in the body (Through the senses) in case of violent situations. This will reduce the risk of the uncertainty in any Emergency Situations and provide an escape. The System will also provide the information of the nearby Health Care Centers and Police Stations. A First-aid Kit tool to cure or get a temporary solution for the situation is also inserted in the system.

As a design solution of the problem we have built an Application for the smart watch working along with the senses of the Smart Watch to provide the Safety of the Women of the Country.

There are various applications developed for Women Safety till now. Here are the descriptions of some of the Applications.

- Safetipin: Safetipin is one of the great alternatives with regards to wellbeing applications for ladies. The application is planned remembering the idea of individual wellbeing. It fuses every one of the fundamental highlights, for example, GPS tracking, emergency contact numbers, directions to safe locations etc. The application likewise sticks the protected regions alongside their security scores to go at the hour of any issue. It likewise empowers the clients to stick dangerous territories and help other people. Safetipin is accessible in Hindi, Bahasa, and Spanish, other than English. [2]
- Abhaya: Abhaya, an Android Application for the Safety of Women and this application can be actuated this application by a solitary snap, at whatever point the need emerges. A solitary snap on this application recognizes the area of the spot through GPS and communicates something specific involving this area URL to the enlisted contacts and furthermore approaches the main enrolled contact to help the one in hazardous circumstances. The remarkable component of this application is to send the message to the enlisted contacts persistently for at regular intervals until the "stop" button in the application is clicked. Constant area following data by means of SMS assists with discovering the area of the casualty rapidly and can be protected securely. [3]
- Himaat: The Himaat application is a free wellbeing application suggest for ladies by the Delhi Police. To utilize the application, the client needs to enlist at the Delhi Police site. When the enrollment is finished the client will get an OTP, which must be entered

at the hour of finishing the application setup. In a risky circumstance, if the client raises the SOS alert from the application, the area data, and sound video will be straightforwardly communicated to the Delhi Police control room following which the police will arrive at the area. [3]

- Sauver: Sauver, an individual wellbeing application produced for cell phones of the android stage. This application can be initiated with a solitary snap when the client feels she is at serious risk. This application reports the client's area to the enrolled contacts at regular intervals as a message. Accordingly, it behaves like a sentinel following behind the individual till the client feels she is protected. The critical highlights of this application are alongside the client's area, one of the enrolled contacts gets a call. Additionally, the enrolled contacts and GPS area are saved every once in a while in an information base. [5]

- Smart 24x7: The Smart 24x7 app is supported by the various states' police just to ensure the safety of women and senior citizens. The app sends panic alerts to emergency contacts in a problematic situation. It also records voices and also takes photographs during the panic situation and transfers these to the police as well. It also has call center support, which will track down the primary movements of the user. Users just need to press the panic button and select the type of service required and then finally click on submit. [6]

- I Safe: The I Safe app let the family and friends know that you are in danger and where you are? Declare an emergency whenever you sense a danger, when you can disengage the emergency. Provides necessary first-aid measures that should be taken at the time of some dangerous situations. Let your family and friends know your path to the destination. Creates emergency contacts that will be notified by default of all the actions you make in the application. Also display a list of detail contacts of cops, firemen, hospitals etc., nearby your location. [7]

- B'Safe & B'Secure: The B'Safe&B'Secure app ensures the safety and security of women. It allows contacts follow you through a live GPS trail and also set a timed alarm which goes off if you haven't 'checked in'. Moreover, it will also make your phone ring with a fake call and also notifies the emergency contacts with the location, video and even siren. Along with this, there is also a Guardian Alert button, which will immediately tell your friends or family members with the GPS location and video at the time of distress. [8]

- VithU: The VithU App lets a potential victim skip through the number-punching, and lets you push your power button twice to instantly send an SOS alert to contacts. Alert messages are sent out every two minutes to listed contacts, who will receive a message along with the physical location, which will get updated each time the message goes out. [9]

- Nirbhaya: Nirbhaya application centers around a social framework centers around a security framework that is planned exclusively to effectively provide security and wellbeing to ladies while they travel alone and late around evening time in Public Transport. The proposition utilizes Speech Recognition and Image Processing Technology. Cycle procures a shrewd framework that can recognize an oppressive circumstance and gather proof of a crime location. [10].

- WeRSafe: Apps has been developed which is dedicated to provide relief to the person in trouble. In emergency situations the app will send an alert message to the user's

emergency contact numbers along with user's current location. There are many other key features like," Alarming neighbors by loud noise"," Autodialing"," Single click SOS generation", finding location of nearby police station or hospitals etc. The apps 'WeRSafe' is of ladies, developed by group of young ladies but takes care of all Young, Adult or Old who need some help from others in the society [11].

The aspect of sexual abuse on women is a crucial and eminent issue prevailing in the society and adequate measures are required to deal with it accordingly [12]. Street violence is one of the major issues directed towards women in India especially in urban and sub-urban areas [13] [14]. At a glance, the working sector is majorly prone to sexual harassment and abuse in the society as their line of work demands late durational travelling and workspace environment [15].

With the adequate impression of technology and its proper implementation could possibly bring up effective measures to many issues pertaining in the society. Implementation of technological gadgets and digital solutions such as Smart Watches, Augmented Reality, Virtual Reality, New Media platforms could provide innovative design solutions to the problem in hand [16].

In the study of the existing applications there might be cases where the Victim may be unable to search for their mobile phones and press the buttons i.e., the application requires a click or a press to activate. What if one can't press the button? So, in such situations, if the application is processed through some automation, which would automatically activate the application when an unusual change occurs in the body, would be more beneficial to the users. Hence, there might be room for improvement in the Application in the sector of automatic activation, looking out for the device, nearby emergency care and instant preventive measures.

In Today's Technology, Sensors has been the detector device of any Events or Changes in its Environment. Hence, Sensors can be formulating with all the possible combination of changes that occurs in the body in an unusual situation and the information from the sensor can be inserted in the application for the automatic activation of the Application. On the other hand, the application can be installed in a Smart Watch to avoid the search for the Mobile Phone in the situation and promptly call for a help by just a press in the Smart Watch wore on the Wrist. This paper aims towards safe guarding women and bring the atrocities against women to an end. The study ventures through upgradation of security of a woman in distress, providing the victim with the nearby assistance during casualties, automatically activating the application if somehow the victim is unable to do so, eliminate looking out mobile phones while in distress and can access through the watch wore in wrist, knowing the primitive measures for small casualties, finding the nearby health care centers in case of emergency.
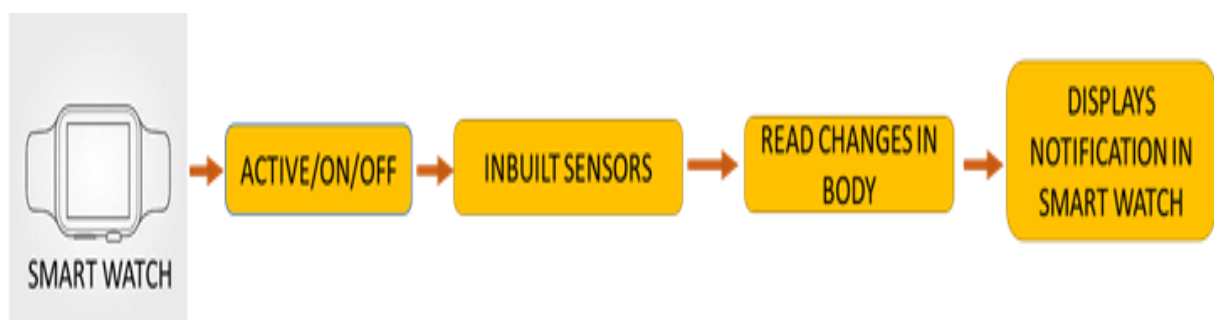
2 DESIGN PROCESS & METHOD

Figure. 2. The Flow Diagram of the working of the Application in the Smart Watch.

2.1 METHODOLOGY

To overcome the loopholes of the existing applications and make a more beneficial application, the application can be tied up with a Smart Watch, having the responding property towards the changes in the Human Body with the help of its sensors. The property of reciprocating to the data collected by the sensors will develop the application to a more usable extent. The significant sensors which are the base of the Smart Watch are Accelerometer, Gyroscope, Barometric Pressure Sensor, Ambient Temperature Sensor, Heart Rate Sensor, Ox Meter Sensor, Skin Conductance Sensor, Skin Temperature Sensor, GPS [17].

The functionality of the inbuilt Sensors in Smart Watch are given below

- Accelerometer: This is used to quantity body movement to track your steps and sleep patterns.
- Gyroscope: This actions pivot for an assortment of purposes. They can detect when you turn your wrist to check the time face, hence awakening your showcase
- Magnetometer: This is used for improved accuracy in motion tracking.
- Barometric pressure sensor. This is utilized to quantify changes in elevation, which is pertinent to any sprinter or cyclist who climbs slopes.
- Ambient temperature sensor. This is used to compare the skin temperature in the service of determining exertion levels.
- Heart rate monitor. This action and shows the Heart Rate ceaselessly.
- 7.Ox meter sensor. This actions blood oxygen, a key information point for announcing precise heartbeat rates (and hence pulses).
- Skin conductance sensor. This actions galvanic skin reaction and the exertion levels - or, to put it in gross layman's terms, how much you sweat.
- Skin temperature sensor. This compares skin temperature to ambient temperature to get a better idea of how hard you're exercising.
- GPS. This is used to track any location or find the way to a location in the Map.

So, among all the sensors a few of them will be used to sense the changes in the body during any sexual violence.

Now, coding the sensors according to our requirement i.e. formulating the sensors in a way that will automatically activate the Emergency Mode.

Here, is the design process approach that may lead to a development of the Women Security Application as well as Smart Watches. The Flowchart is divided in two Sections Flowchart 1 describes the automation with the help of sensors in Smart Watch and Flowchart 2 describes the Steps taken after Emergency Button is pressed either Manually or Automatically.

2.1.1 PHASE I: The Flow chart shows the automated process of the Emergency SOS button.
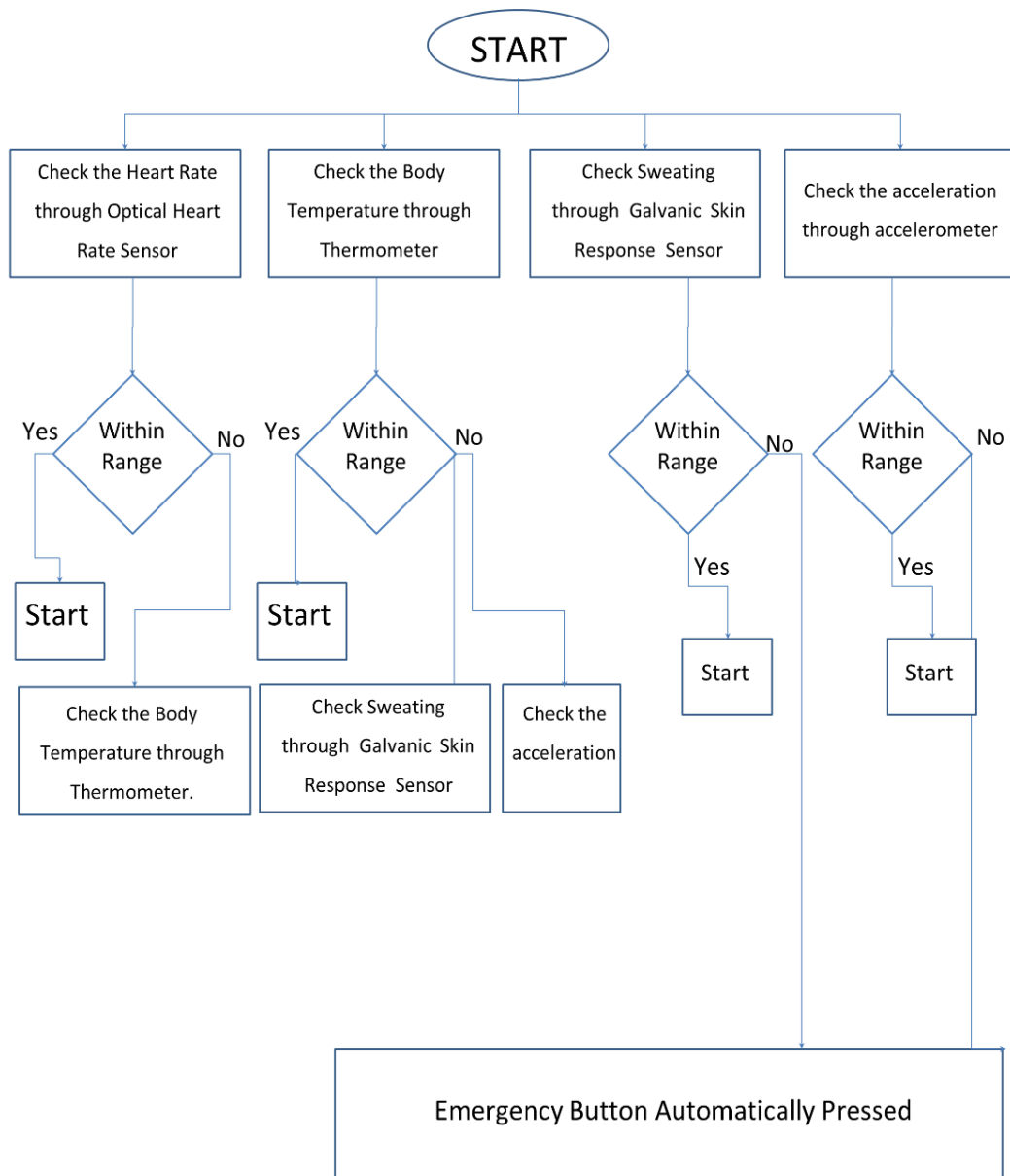

Figure: 2. Flowchart of the Automation of the application

The above flowchart, Fig. 3, describes the Automation in the Smart Watch through Sensors. Once the Smart Watch is Activated all the sensors get Activated and continuously preforming their respective features. Now, the design approach for Automation is, as the Optical Heart Rate Sensor keeps on checking the Heart Rate of a Human body. So, as soon as the Heart Rate increases, the application will check for the Body Temperature with the help of Thermometer Sensor and then will Check for either Sweating of body through Galvanic Skin Response sensor or any sudden rise in Accelerometer Sensor, if any of them shows a positive response then automatically an Emergency Button is Activated.

2.1.2 PHASE II: The flow chart shows the processes that takes place after the Emergency SOS help Alert is generated.
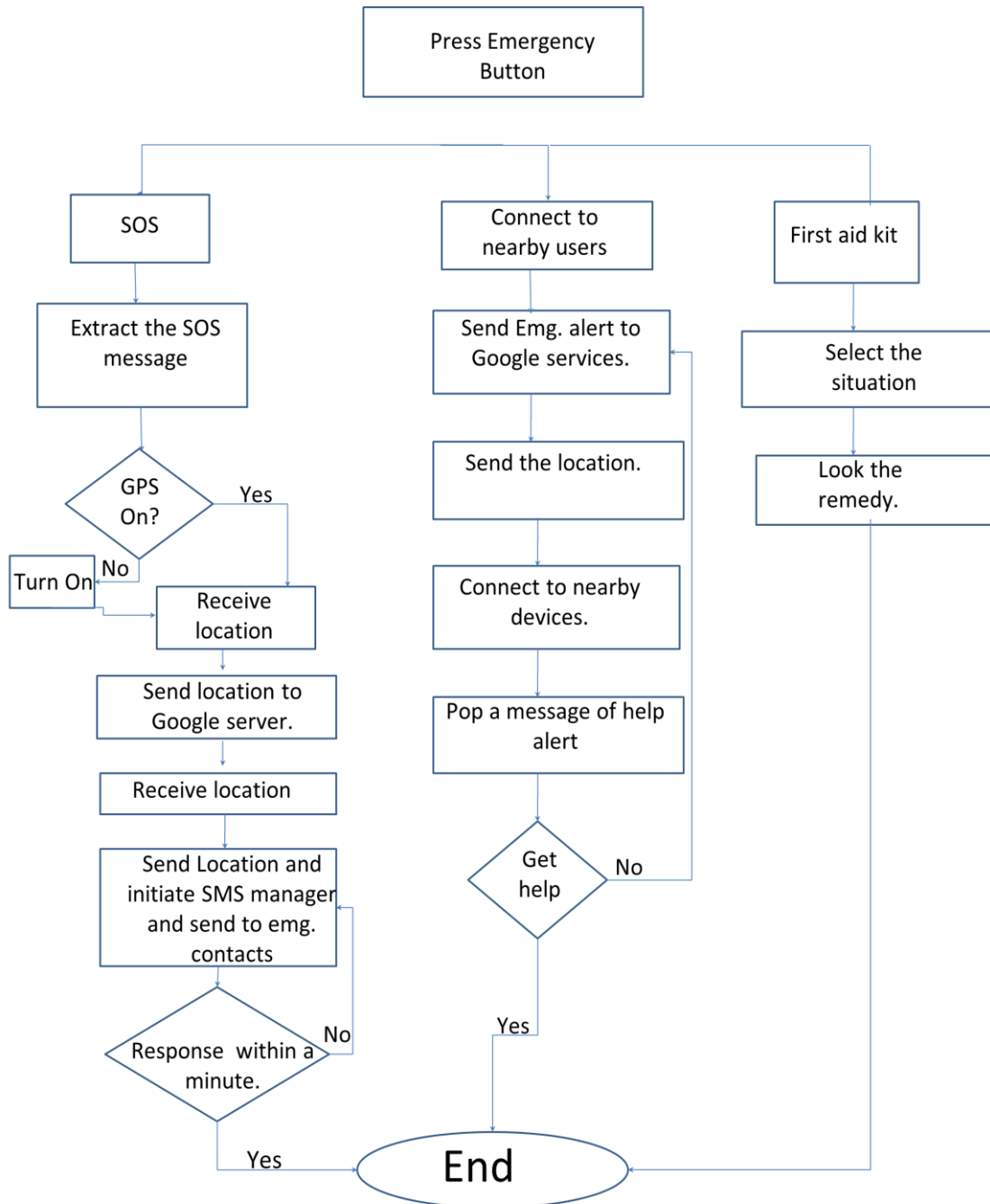

Figure: 3. The flowchart of the process after the SOS help Alert is generated.

When the Emergency Button is pressed either Manually or Automatically then the application starts running with the features of shown Fig. 4, (i)Sending SOS Message to the Emergency Contacts (ii)Connecting to the nearby users using the application and asking for Help (iii)Suggesting the primitive measures for small panic situations.
(i)The SOS message is firstly extracted from the predefined or user defined message, then to send the location along with the message the GPS must be Turned ON and the location is to be extracted

from the Google Services and after receiving the Location the SOS message along with the Location is sent to the User defined Emergency Contacts.

(ii)The Help alert is not only sent to the Emergency Contacts but also to the nearby Application users. The Emergency Help Alert Message along with the Location is sent to Google Services and then a Help Alert to all the nearby connected applications. The message is popped till no Response is received.

(iii)The First Aid Kit is an overall pack of primitive measures for a prompt remedy of a panic Situation by just a Click in the Mentioned Situation.

3 RESULT & DISCUSSION

The Flowcharts of the links of the Interfaces of the proposed Application is given below with their User Interfaces Screens:
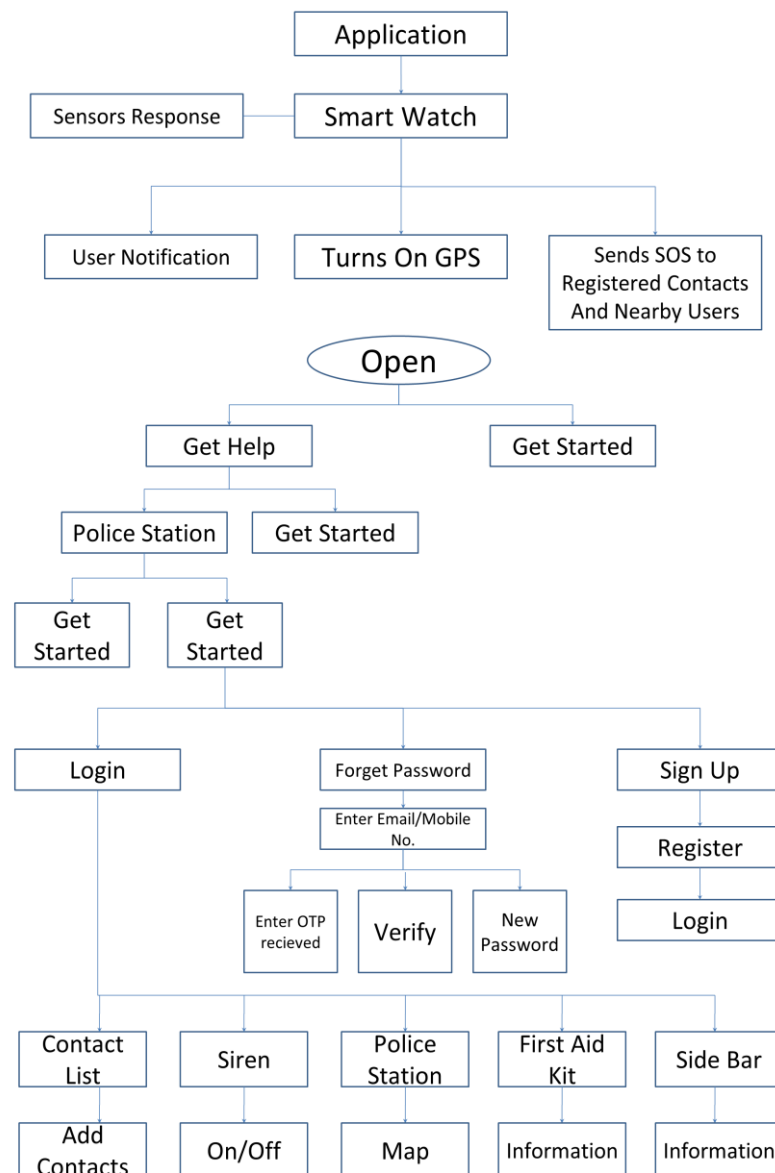

Figure: 4. The Flowchart shows the overall working and methods of the application inbuilt in smart watch and flow of the application

Figure: 6. The Interfaces showing the Features of Application before it get Started. The flow is referred in the Figure: 5.
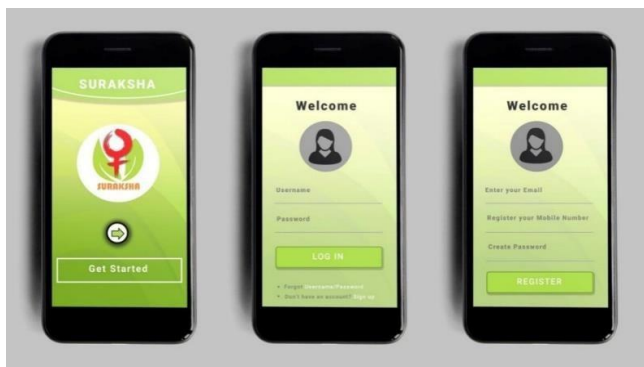

Figure: 7. The Interface showing the Login and Signup Page of the Application. The flow is referred in the Figure: 5

Figure:8. The Interface of the Application showing the Forgot Password page, the home page and page to add contacts. The flow is referred in the Figure: 5.
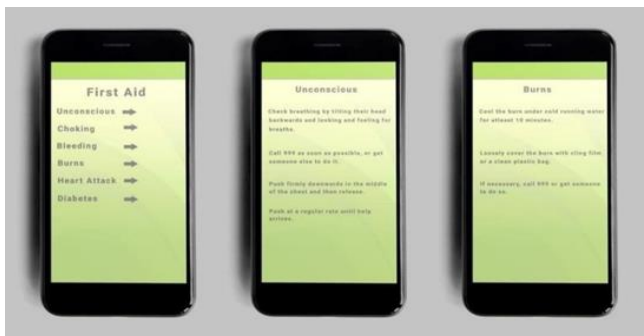

Figure: 9. The Interface of the Impromptu first aid in the application to tackle situations till assistance arrives. The flow is referred in the fi Figure: 5.
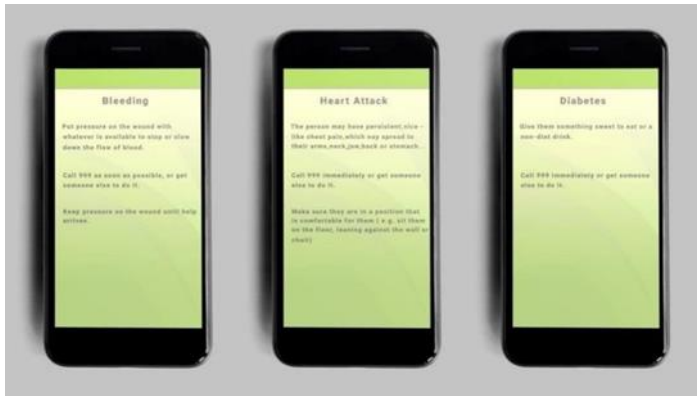
Figure: 10. Some tips to tackle common health hazards.

India has actively participated in the advancement process in the field of Technology and het has lacked in addressing the challenges that came with it. The practical implementation and feasibility is always at test in a scenario where there is an enormous amount of masses involved. The most troublesome challenge that the country has faced is ensuring safety for women. There have been numerous digital applications regarding the issue in hand and yet none could proficiently serve to that extent due to flaws in implementation and feasibility factors. The entire design approach has been directed towards the ideation of an innovative and efficient measure for women safety with some exploration done in the technical and practical feasibility of the solution. So, the previously existing troubles with actual implementation of digital solutions could be extensively addressed. The digitization of the solution was an essential criterion to have a wider reach and efficiency. The use of a technical gadget which is a Smart watch has greatly increased the feasibility of the approach which the existing applications and solutions have

This design approach greatly requires collaboration of multidisciplinary domains and departments such as Electronics and Computer Science Engineers to make the design approach into a actual application to serve women safety. The involvement of people from different fields would also ensure proper exploration of the issue and innovative design solutions could be created through comprehensive brainstorming. A systematic planning structure is required for the application, in the context of future extension and upgradation.

CONCLUSION

Safety of women can be ensured and upgraded through the ever-evolving technology and its elements in the world. Technology would play a vital role in solving societal issues such as woman safety with new and innovative ideas with a novel approach. The design approach initiates collaboration with other branches and departments for both research and technical requirements which would positively lead to its full setup and implementation. The future scope for further research into the matter in hand is greatly encouraged so that more scenarios and aspects could be explored and addressed accordingly. Implementation of such approach where the help is initiated automatically in the practical world, would be helpful towards women Safety as well as an upgradation in the existing Smart watch features.

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