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Women Safety Application for Safe Route Prediction

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Abstract - — *Not a day goes by where you do not hear of the news about a crime against women in India. In fact, there are at least five news articles daily that tell us about the horrific details of the various crimes. It is extremely painful to watch the status of women's safety in India, especially in a country where women are given the stature of goddesses.*

As per the latest NCRB data, Mumbai reported 6,519 crimes against women last year, while Delhi reported 12,902 cases. However, about the rate of crimes against women, Mumbai has ranked ninth with a crime rate of 76.5 against women. Jaipur has the highest crime rate against women at 235, followed by Lucknow at 175.4, Delhi at 170.3, Indore at 169.1, Patna at 102.3, Kanpur at 98.5, Nagpur at 93.6, and Bengaluru at 85.9.

With the increasing use of technology, these safety problems can be avoided by individuals using their own smart devices and staying alert. Here we try to come up with a solution that suggests the safest route for the person to travel with at most safety from current location to its destination.

Key Words: **Flutter, Safe routing, Women Safety, Android, Alert System, Tracking**

1. INTRODUCTION

Swami Vivekananda stated that "The best thermometer to the progress of a nation is its treatment of its women." Violence against women is a significant public health problem, as well as a fundamental violation of women's human rights.

The phrase "Violence against women" is a technical term used to collectively refer to violent acts that are primarily or exclusively committed against women. Like a hate crime, which it is sometimes considered, this type of violence targets a specific group with the victim's gender as a primary motive. [5] The United Nations General Assembly defines "violence against women" as any act of gender-based violence that results in, or is likely to result in, physical, sexual or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or private life." According to the reports of WHO, NCRB-social government organization, 35% of women all over the world are facing a lot of unethical physical harassment in public places such as railway-bus stands, footpaths, etc. 4 years ago, on the night of December 16, 2012, the brutal gang rape of a paramedical student by six men on a moving bus in the national capital shook the nation for the sheer brutality and torture inflicted on the hapless girl. Thousands of youngsters protested on the streets of Delhi demanding justice for her. She finally succumbed to her injuries on December 29, 2012 [5].

The family members and colleagues of TCS software engineer Esther Anuhaya found her body with the help of a Vijayawada police team. Her parents spent the entire Thursday looking for her in Bhandup (East) as her last call signal on January 5th was from Bhandupeshwar Kund in Kanjurmarg, which falls under Bhandup (East) jurisdiction. The family had been trying to trace her whereabouts by showing the locals her photographs. Locals said that the spot where her body was found is a hangout for criminals. The body of Anuhaya has been procured by the Vijayawada police [4].

Gender-based violence kills and disables as many women, aged 15-44, as cancer, malaria, traffic accidents, and war combined. Hence there should be a system to protect them in such times. So, after much research work based on women's security systems and keeping in mind that a smartphone is one technology which almost every woman carries all the time, we are developing an app to help women in such emergencies [4].

2. RELATED WORKS

A. Fightback:

This app is developed by the Mahindra faction. In earlier days, this app was not complimentary, customers have to compensate for this app. But after Delhi gang rape incident, this app is on hand at no cost. This app sends a message to your friend or contacts that "user is in trouble" through Email, SMS and GPRS. This app works on those mobiles that support Android Java Programming [1].

B. Secureme Beta:

This app is developed by Think MPI Consulting Private Limited. It helps us to raise alert and we can get help in case of life-threatening emergencies. After installing the app, initially we have to give a pin number for security purposes and then after emergency contacts must be registered in the app. By pressing a tap on the secure button, it notifies the contacts with location coordinates [1].

C. Vanitha Alert:

This app is developed by ABC Mobile Learning Communication click on " HELP" button on our mobile's home screen in an emergency situation can deliver a distress text message to the registered mobile number, E-mail id, Facebook Id seeking help and indicating the user's location. [1]

D. Raksha – Women Safety Alert:

This app was launched by BJP on May 15, 2014. By clicking on this app, it sends the location of the user to the contacts registered and the user can also get the details of the location of the contacts. A distress signal just by pressing a single key sends out a loud buzzer to our near and dear ones. We can add multiple contacts to this app and when there is no data connection, this app alerts the contacts by sending SMS. [1]

E. Glympse – Share GPS Location:

This is the recent application developed on January 28, 2015. This app is a fast, free and a simple way to share our location using GPS tracking in real time with friends and family. This app does not need any sign up and does not need any contacts to manage [1].

3. SYSTEM ARCHITECTURE

The Proposed Solution is to create a Women Safety App to assist women in case of emergency and to provide a more personalized experience for our user. Advancements in artificial intelligence, machine learning techniques, improved aptitude for decision making, larger availability of domains and corpus, have increased the practicality of integrating a personal touch of a companion in the form of our App in case of inappropriate situations [2].

1. Emergency Alert System (Distress Call):
   - Auto-generated alert
   - Alert Generation (Emergency Situation)
2. Safe Routing:
   - Dataset Modeling and Analysis
   - Safe Routing
   - Destination Prediction
   - Tracking Feature
   - Time Estimation
3. Android Application (UI)

A. Emergency Alert System (Distress Call):

Our system proposes to incorporate an Emergency button which would generate immediate alert messages to the listed emergency contact along with nearby helpline contacts along with audio, image messages and frequent location updates. In case of any mis-happenings [67].

Initially the User needs to enter some particulars while App Registration details including emergency contact,

- Work, and home address also we ask the user to enter a rating-based review on their home locality only, which would further be added in the database and will be useful in generating accurate safe routes.
- We will try and generate the user input for the emergency button through multiple ways along with an emergency button in our app viz through multiple clicks of the power button and more. Also, after the emergency button is clicked a message will be generated for the next 10 sec in case if it was a false alarm the user can terminate the alert process. After this alert message will be generated and sent to users listed emergency contact and the nearby helpline numbers like the police. The alert message would comprise of the location information and an audio clip along with images taken by the rare and the front camera. the location information will be updated continuously to maintain a track of the victim.

B. Safe Routing:

- Initially we will work upon a dataset for Mumbai only later which can be scaled to a larger geographical length. We will use a Crime base dataset for analyzing and suggestion of safe routes also the reviews entered by the user will be used for further processing [8].
- The user can enter any desired destination and our system will suggest a safe route based upon our database and time of the day. Also, a user cannot use our suggested route in case of using public transport or other services. The user can enable tracking features of our app just to maintain assurity.
- We are trying to make our system smart using predictive analysis were based upon the current location and the route the user is using their destination can be predicted based upon their past activities which are stored in the database [8].

- Since the destination is known either entered by the user or machine predicted. And also, the route used our app will generate an estimated time for the user to reach its destination if the user fails to reach the destination after a decided buffer time an automated intimation will be sent to a contact along with the last active location with a message saying that the person is on its way. This is a preventing measure that we try to add in our application. So, the family members can be updated with the whereabouts of their loved ones [9].

- Lastly our system offers tracking features which a user can enable while traveling as a safety precaution. Rather than keeping location on for the entire route the location is switched on between intervals this allows battery optimization, and our system also tracks whether the user is on any of the suggested routes or being detoured then an alert message will be generated and sent to the family members.

C. Android application (UI):

- Provide a user-friendly interface to the user.
- Provide options to search for safe routes.
- Provide an emergency distress button that can be used in case of emergencies [7].

D. Analysis/Framework/Algorithm

1. Flutter :

Flutter is an open-source UI software development kit created by Google. It is used to develop applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web from a single codebase. The first version of Flutter was known as codename "Sky" and ran on the Android operating system.

2. Dart :

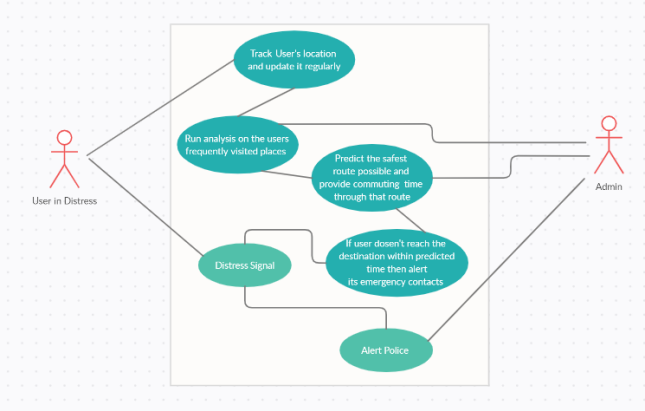
Dart is a programming language designed for client development, such as for the web and mobile apps. It is developed by Google and can also be used to build server and desktop applications. Dart is an object-oriented, class-based, garbage-collected language with C-style syntax.

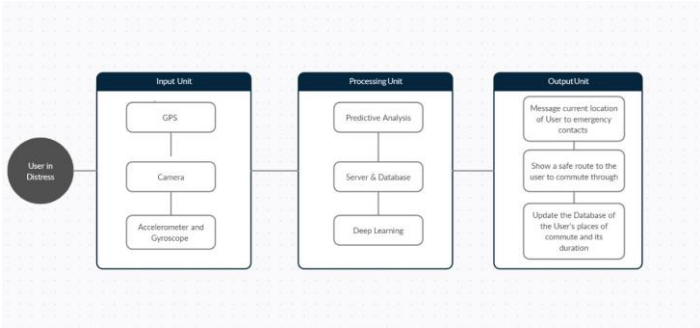
3. Google Maps API :

Google Maps is a web mapping product developed at Google by Lars Rasmussen and Jens Rasmussen. It offers satellite imagery, aerial photography, street maps, 360° interactive panoramic views of streets, real-time traffic conditions, and route planning for traveling by foot, car, air and public transportation.

4. Firebase :

Firebase is a platform developed by Google for creating mobile and web applications. It was originally an independent company founded in 2011. In 2014, Google acquired the platform and it is now their flagship offering for app development.





5. IMPLEMENTATION

Our project proposes two different modules:

1. The Emergency Alert System (Distress Call).

2.The Safe routing Feature

I. The Emergency Alert System:

Step 1: Registration:

At the point of registration, the user is asked to enter certain details including trusted contact details and the location details. This is further used as a key point in the implementation of this module.

Step 2: Emergency case:

As the user presses the emergency button immediately an SOS message is sent to the listed contact numbers along with emergency helpline numbers. along with the continuous location details, an audio clip and images taken from both the front and rear camera.

II. The Safe routing Feature using predictive analysis and deep learning

Step 1: Database Extraction and processing:

Using different algorithms, we are going to get the safest route out of all possible routes to the destination using a safe routing dataset. Also, there is a feature that predicts the time of reaching a destination based on the history of the user and their daily activities such as which path and locations the user travels daily and what is the average time taken to reach the destination [5].

Step 2: Safe Routes:

Based upon the database our product should be able to provide safe routes for the entered destination among all the available routes. Our database covers the crime factors occurring in the location; public reviewed .

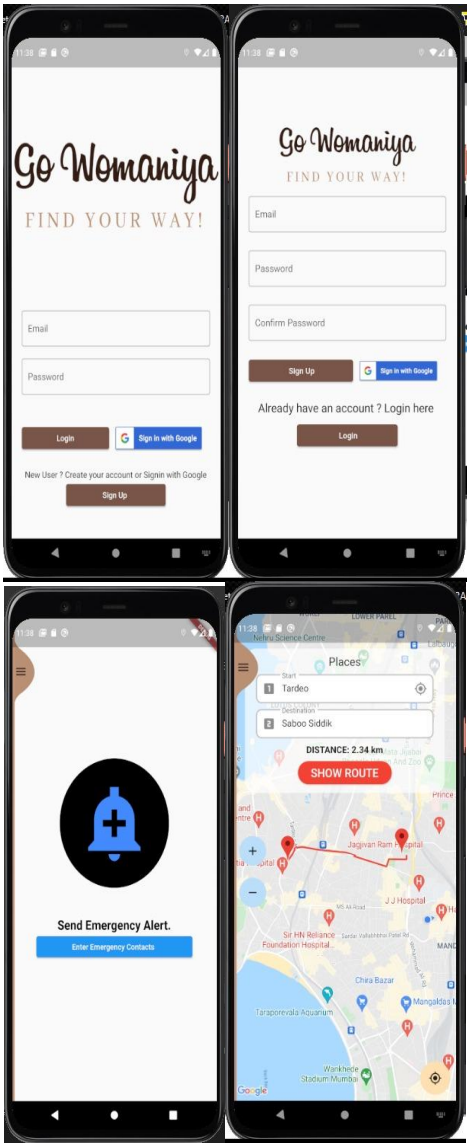
Step 3: Automated Intimation:

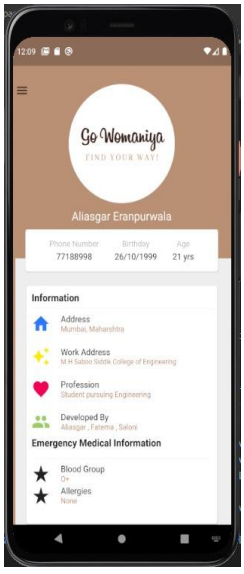
As Prevention is better than cure this step is considered as a preventive measure. Since the destination is either entered or predicted an estimated time span is generated with a buffer after which an automated text with the current location would be sent to the contact entered while registration.

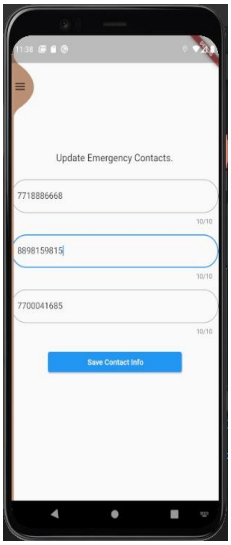
Step 4: Tracking Feature:

Our product also enables a tracking feature when a user is traveling to an unknown destination or feels the road to be unsafe. They can enable the tracking feature where their location will be updated every 5 mins to the listed contact [5].

6. APPLICATION DESIGN







7. CONCLUSIONS

Our primary goal of this project is to ensure every woman in our society to feel safe and secured. According to a survey in India, 53% of working women are not feeling safe- Overall, 86% of working women in India, women facing hurdles are high in Delhi, Mumbai, Hyderabad, Kolkata, and Pune comparatively to other places. "GoWomaniya" can play a major role by providing women a safe environment in situations of torment and distress. "GoWomaniya" is going to be much helpful for those in distress especially women around us. It will help us to predict the timeline of the user and based on that suggest the safest and shortest route possible for commuting.

Predictive Analysis of the user's timeline will also help us in alerting the emergency contacts if the user hasn't commuted to its predicted destination within the said time. On the other hand, the SOS button implementation will also help those in distress by alerting the nearby police stations and safe places. While the distress signal is being placed, the camera will take some pictures which can be helpful for purposes like identification in the future.

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