

# Safety for You

## A user-friendly safety based Android Application

Anvita Sodhi

Dept. of Computer Engineering  
Vishwakarma Institute of Information Technology  
Savitribai Phule Pune University  
Pune, India

Divyansh Chaturvedi

Proprietor  
Auverk Technologies  
Pune, India

Nikita V Kumar

Dept. of Computer Engineering  
Vishwakarma Institute of Information Technology  
Savitribai Phule Pune University  
Pune, India

Yogesh Sharma

Dept. of Computer Engineering  
Vishwakarma Institute of Information Technology  
Savitribai Phule Pune University  
Pune, India

**Abstract**— We live in a society where there are peace-loving and law-abiding citizens. However, like any other civil society, there are certain security issues, and a few people break the law every now and then. Very often when we visit a new area, even in our own city, we have no knowledge about the overall conditions of that area and its surroundings in terms of its safety. Street Care is an application which keeps the user safe by informing him about the safety index of the street he is walking on, thereby empowering him to take precautionary measures as per the statistical data provided by the application.

Street Care is an android based application focused on providing the android-users crowd sourced security ratings of the current location, or any particular location. It locates the user and provides him information regarding the security of his area. The user can review and rate a place based on his judgement of it. The user can give reviews freely for any location he chooses; as this application does not require any kind of personal information to be given by the user (e.g. email id, phone number, etc). Street Care also provides an additional option for sending ICE messages when in distress to his close contacts. In this way, the application delivers these and many more useful features to the android user.

**Keywords**—Android, Safety Index, Review, Rating

### I. INTRODUCTION

A report published by National Crime Records Bureau shows that in the year 2013, the number of cases reported for murder were 33201, for rape were 33707 and kidnapping were 65461. The safety of women in India has always been a matter of grave concern. The National Crime Records Bureau reported in 1998 that the growth rate of crimes against women would be higher than the population growth rate by 2013. Street Care provides a safeguard against these conditions to its users, based on eight fields for reviews<sup>[1]</sup>. They include “eve teasing”, “high crime rate”, “no transport” easily available and “lonely streets”.

Every year more than 40,000 people die and over one million are injured in road crashes in areas with low luminance. Also, roads under construction have high risks involved for travelers. Street Care provides reviews for these cases as well through fields such as “no street lights” and “under construction”. Many a times, people travelling in their vehicles face difficulties and would want to avoid roads with heavy traffic, which is also one of the review fields covered in this application.

### II. APPLICATION FEATURES

#### A. User's Location and it's Safety Index

As soon as the user opens the application, in the first activity, the map gets loaded, fetching the user's co-ordinates and displaying his current location on the map, in the form of a red marker. Surrounding the user's location are other markers shown to him in various colors, based on the safety of that location. An even more detailed information about and safety of an area can be viewed by the user, by clicking on any of these markers. When he does so, a card pops up, showing him the reviews and ratings of that location. In this way the user of this android application can judge the safety of an area he is in.

#### B. Viewing Ratings and Reviews for an Existing Location

As mentioned in the previous functionality, the user has the ability to view the reviews and ratings of any location (shown in the form of a colored pin on the map) with the help of the card. This is applicable for any specific area for which reviews/ratings have been given by a previous user of the application. The ratings are calculated as an aggregate of all the ratings previously given for that area, around a radius of ten kilometers. And the reviews are shown as the top five most frequently given reviews.

### C. Giving Reviews for Existing Locations

If the user of the application wishes to give his own reviews and ratings based on his experience of that area, he may do so, by simply clicking on the “Give Reviews” button provided in the card itself. Through this button he is navigated to a new activity altogether wherein he is shown the address of that location. He can give his ratings in a range of 1 to 5, 1 being extremely unsafe.

For giving reviews, the user is provided with eight fields which he can “check” if he feels they hold true for a particular location. These fields are namely high crime, eve-teasing, isolated area, no street lights, under construction, heavy traffic, stray dog and no transport.

### D. Adding a new Location and Giving Reviews

Adding a new location for which reviews have not been given previously is exceptionally simple. All the user has to do is long press on the map activity on the area he wants to give reviews for. A pin is immediately dropped to that location and by clicking on this pin the user is navigated to the new activity wherein he can give his reviews/ratings for it. This review/rating is now added in the location table in the database, wherein a new field for this new location gets added.

### E. Sending SOS message to contacts

In times of distress, people obviously need someone/something to fall back upon. Street Care extends to the user the functionality of sending SOS messages to his closest contacts when in trouble. For this purpose, the user must have saved at most three of his closest contacts previously while using the application, so that during an emergency he can instantly send an SOS text message to these contacts with the single click of a button.

### F. Creating SOS shortcut on home screen

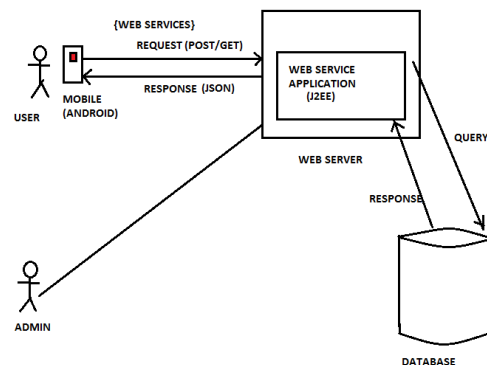
The application provides a feature to the user to “Add a SOS Shortcut” on his phone’s Home screen. In this way, it prevents the user from wasting precious time in opening the application and sending the messages from there. An icon is created on the user’s home screen and all the user has to do in times of distress is, click on this icon and the message sending is automatically triggered. The user is also given a five second window to cancel the sending of these messages, in case he wishes to do so. In this way, the user of Street Care can get help from his near and dear ones at the drop of a hat.

### G. Changing the content of the SOS message

The user does not have to stick to the customary SOS message provided in the application to send to his contacts. He is provided with the option to change the content of this SOS message. Although it is recommended that he includes the coordinates and the address of the location which have been provided by default in the message text.

## III. DETAILED WORKING

The diagram above shows the basic system architecture of the application. The android system works with user interface



making it very easy for users to understand and use. The first thing that is done as soon as the application is started up is the creation of a session, which is requested from the server. This session is maintained throughout the course that the application is being run, and is stored using the Shared Preference mechanism. There is no login and the user is not required to give any kind of information about himself.

After the session is created the user’s current location is captured, using which we request the server for places around it which have some ratings/reviews given for it. These surrounding locations are shown with the help of colored markers. The reviews include reviews such as heavy traffic, eve teasing, high crime rates, etc. The user is given an added functionality to navigate to any location and get reviews for places around it by searching for that particular location. This is especially useful for people travelling from one city to another as it gives the user the option to search for locations even without being physically present there. The coordinates of the user’s location or the searched location are sent over to the server and ten locations with their reviews within a ten kilometer radius are returned to the android phone, which are then populated on the map. The user can not only view the reviews of places but also give his own reviews for places if he wishes to, which are then stored in the database. These reviews can be given for already reviewed places or new places can be added by dropping pins.

The application lets you view the safety of a place as well as provides with a measure to ensure safety in times of danger. This is done using the SOS text messages which can be sent to three contacts informing them that the sender of the message is in danger. Apart from the three contacts the message is also sent to the server, which initiates a notification to the user as well as to the police and emergency contacts. An alert message with a timer of five seconds is flashed on the user’s screen before the message is sent. The SOS message sending button can be added as a shortcut to the home screen which makes it easily accessible when needed.

Retrofit is a library that will let you define your API in a simple Java interface and will automatically convert it into a full-blown REST client. Retrofit uses GSON by default to convert HTTP bodies to and from JSON. GSON is Java

library that can be used to convert Java Objects into their JSON representation. Thus this application makes use of Retrofit and GSON to send requests to and receive responses from the server in JSON format.

Moving on to the server side, we have a RESTful Web Service application running on a Tomcat Server and the REST Web Service is supported by Spring Dependency Injection and Inversion of Control. Dependency Injection (DI) is a design pattern that removes the dependency from the programming code so that it can be easy to manage and test the application. Dependency Injection makes our programming code loosely coupled. Inversion of Control (IOC) is a process whereby objects define their dependencies, that is, the other objects they work with, only through constructor arguments, arguments to a factory method, or properties that are set on the object instance after it is constructed or returned from a factory method. The container then injects those dependencies when it creates the bean. A session is always maintained, and the Session ID is used for all the Web Services in order to authenticate the user on a per request basis.

Every request has a Session ID attached with it, which is validated at the server end. If the Session ID sent does not pass the validation test then this is conveyed to the client by sending an unauthorized response back to the client. If the Session ID is authentic then the operation for a particular location is performed.

Listing of locations is carried out using complicated aggregation framework queries to find the locations near the user's location or the searched location. The locations are stored in MongoDB which has the advantage of fast read/write and hence gives the result to the server immediately. When the user reviews a place, the Session ID validation is performed and then the record is validated before inserting it into the database.

We use MongoDB's aggregation framework queries to process the average ratings for a particular location for listing of locations at the database level. Similarly, to find the reviews of a location, we take advantage of MongoDB's aggregation framework Map Reduce functionality, to find the maximum count of a particular review which we return to the client while listing the locations. Aggregations operations process data records and return computed results. Aggregation operations group values from multiple documents together, and can perform a variety of operations on the grouped data to return a single result.

- **Aggregation Pipeline**

The aggregation pipeline is a framework for performing aggregation tasks, modeled on the concept of data processing pipelines. Using this framework, MongoDB passes the documents of a single collection through a pipeline. The pipeline transforms the documents into aggregated results, and is accessed through the aggregate database command.

- **Map-Reduce**

Map-reduce is a generic multi-phase data aggregation modality for processing quantities of data. MongoDB provides map-reduce with the mapReduce database command.

GeoNear returns documents in order of proximity to a specified point, from the nearest to farthest. This is used for

locating the places nearest to the user. GeoNear requires a geospatial index. Spatial queries are special type of database queries supported by geo-databases and spatial databases. MongoDB offers a number of indexes and query mechanisms to handle geospatial information.

#### IV. APPLICATION REQUIREMENTS

##### A. Internet Availability

The entire application is centered on conveying to the user how safe his current location is. Thus to get his co-ordinates, or to search for another location on the map, the application requires a steady internet connection whether it's his network service provider or a WIFI connection.

##### B. Android Compatibility

Google has released the latest Android figures and as on 2<sup>nd</sup> March, 2015, 42.6% of android users use Jelly Bean (versions 4.1.x, 4.2.x, 4.3.x), 40.9% use Kit Kat(version 4.4) and 3.3% use Lollipop(version 5.0). Thus this application targets most android users by deploying this application on versions 4.0 and above.

##### D. Minimum Balance

One of the main features of this application is sending ICE messages (in case of emergency) in times of distress. Thus, when the user wants to send these messages, it is an absolute necessity that he has enough credit in his account to be able to send these messages. Once the messages are sent, the balance gets deducted from his account accordingly.

#### V. INTENDED AUDIENCE

Using the application Street Care one can get the information related to reviews and ratings of the location one wants to visit and also can submit the ratings and reviews for the location. Looking at this, the main audience in consideration are android users. People who want to visit a new location especially at night, those who travel to locations they are not familiar with can check the reviews and ratings of the location thus forming an image about location even before visiting and women especially, as it acts as their personal safeguard. However, Android users must have internet connection in their mobile phones for the functioning of this application. Thus, a safeguard has been deployed on something that more than one billion of us own - our android smart phones.

#### VI. COMPETITORS

Android providing the vast platform, Google Play store has had over one million Android applications published, and over 50 billion applications downloaded, quarter of them are the safety applications providing a way to contact people at times of danger by way of sending alert messages. Therefore, there are many safety applications like "bSafe" which sets network of family and friends with whom you can share your locations. The Guardian Alert button in the app will send an alarm message in times of need. One can also make their phone ring when needed using the Fake Call feature. The application "I AM SAFE" can be configured to notify one's location and send the details consistently to the user's partner or loved one automatically.

In the application “Street Care”, users can send SOS messages in the times of danger and a shortcut will be created on the home screen to send the message without opening the application. Moreover the user can submit ratings and reviews for location thus helping other people to get an idea about how safe a location is. This application is not only a safety application but also a review application.

#### VI. CONCLUSION

The android application “Street Care” is very user friendly. With this application users will be able to identify dangerous locations even before they visit them. Moreover in this application, the user’s identity is not revealed as there is no log in. Thus the user can give his personal reviews for a location without any hesitation, as he does not have to worry about the consequences he may have to face for rating a place.

#### VII. ACKNOWLEDGMENT

Our first and foremost thanks are to our parents for showering their blessing on us and for guiding us every day of our lives.

We are extremely grateful to our mentor Divyansh Chaturvedi, Proprietor at Auverk Technologies without whose guidance, this project would not have been possible.

We convey our heartfelt thanks to our Department HOD, Dr. S.R Sakhare and our internal guide Yogesh Sharma, Assistant Professor, Dept. of Computer Engineering, Vishwakarma Institute of Information Technology, Savitribai Phule Pune University, and all other staff members who have given their valuable suggestions for refining and enhancing our project.

We also extend our thanks to our friends, who deserve all praise for their encouragement.

#### REFERENCES

- [1] <http://ncrb.gov.in/>
- [2] ‘Android Based Safety triggering Application’ by P.Kalyanchaakravarthy
- [3] ‘An Improved GPS Location Tracking with Velocity Estimation’ by Mohammad Zahaby, Prof. Ganesh D. Bhutkar, and Prof. M. L. Dhore, Vishwakarma Institute of Technology, Pune, India.
- [4] ‘Online GPS Track Simplification for Mobile Platforms’ by Rosen Ivanov on 20.10.2009.
- [5] ‘Android Application Development (With KitKat Support)’ – Black Book.
- [6] ‘IPROB-Emergency Application for Women’ by Mr. Magesh Kumars
- [7] ‘Software Testing Principles and Practices’ – Pearson by Srinivasan Desikan and Gopaldaswamy Rames.
- [8] ‘Research on mobile location service design based on android ’- Xianhua Shu, Zhenjun Du, Rong Chen School of Information Science and Technology, Dalian Maritime University, Dalian, China.