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ANDROID APPLICATION FOR EMERGENCY HELPLINE SERVICES

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Abstract — When an emergency occurs, technology can be a helpful support for the resolution of the said incident. This paper proposes the development of an Android application for a quick access to the phone numbers of the emergency helpline services of the respective emergencies. Due to the sudden technological advancements made in the recent years, gathering and transmission of relevant information related to the emergency can be made ever so simple. Modern mobile devices embedded with useful sensors such as GPS receivers, Wi-Fi etc. can help the user in many ways. This system works by creating a digital template of the user which can be sent to their trusted contacts in case of an emergency. This helps the responding team to better equip for the necessary circumstances. Such a system will also allow notification to be sent that alerts your family and friends (trusted contacts) under such unfortunate circumstances.

Keywords—Android Application; Emergency Reporting; Helpline Services; Global Positioning System; SOS Alert Sending; Medical Template

I. INTRODUCTION

In today's fast-paced life; handling fatalities, accidents, and crimes have become integral and we are taught from a young age about how to deal with such situations. One such method is to reach the necessary authorities via the helpline numbers.[1] But the problem with this method is that the helpline numbers vary for every specific problem in each and every state. Thus even a small problem has time to escalate into a disastrous situation. There are helpline numbers present but each state has its own helpline codes and number and the sheer number of them makes it extremely hard for commuters and citizens to reach the desired helpline on time.

The proposed system is a unified collection of all these helpline numbers to be present in a single mobile application. The app allows the user to select the immediate problem that they are facing and the app will return the necessary hotline numbers/websites which can be useful to better the situation. The app also allows the user to directly send a prerecorded text/voice message to their trusted contacts along with their current GPS location. The app utilizes a database to store all the various helpline numbers, their website information and their local address for the user to browse through as well as the user's information along with their trusted contacts and the prerecorded emergency message. The app prompts the user for GPS access permission for live location-sharing services if needed so that your live location can be sent to the trusted contacts as well as the adequate authorities if need be.[2]

II. EASE OF USE

In this day and age, each and everyone has their smartphone within their reach at all times. The statistical data of the number of smartphones users in India has reached a record high this year. More than 35% of the Indian population own a smartphone in 2018.[3] In other words, we could say that 1 in every 3 people have access to a smartphone in the humongous Indian population of 1.324 Billion.

Hence we could easily say that the number of smartphones in India is huge. If there arises an emergency of any sort, there is a very likely possibility that they have a smartphone with them or there is a smartphone near them at that time. No one leaves their phone lying around. In the unfortunate event of an accident, one does not have the time to search for the emergency numbers online as it takes a lot of time. Also, the availability of net and the connection speed is also a factor when it comes to browsing for them online. Availability of these numbers in an offline state is an extremely useful benefit to have. Having the proposed application available to the people at all times can be a hassle free and a potentially life-saving decision.

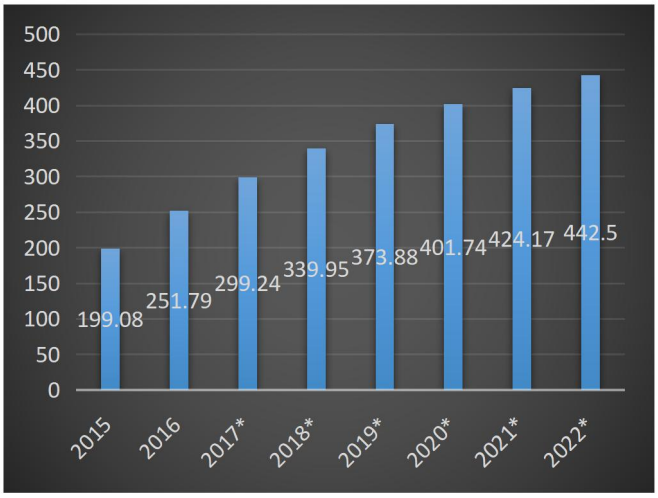

*Fig. 1. Number of Smartphone users in India from 2015 to 2022 (in millions)**

The choice of the creation of the application in the Android OS was also done so as to accommodate the fact that a majority of these smartphones which are available in India run on Google's Android Operating System. As shown in Fig. 2. 71.3% of the entire phones in India run on the Android OS.[4]

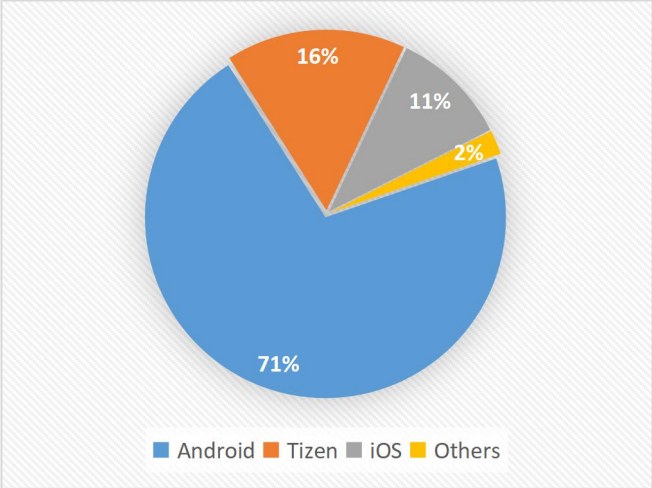

Fig. 2. Mobile market share in India (Operating System)

Among the majority of OS running in Indian phones, those running TizenOS are considered non-smart. Hence the main smartphone OSs are AndroidOS and iOS. If we talk about the smartphone operating systems, 80% of the devices run on AndroidOS which make it an extremely widely used operating system. Hence the creation of the application in this operating system will help most of the demographic.

III. Comparison Between Current and Proposed Systems

When someone is in any unfortunate emergency, their go-to method would be to search for the related helpline number on the web and notify them. This time-consuming task would be indefinitely discarded if all the helpline service numbers were to be present within a single mobile application. There are applications that are present to the public much like this, but all of them do a part of the proposed application. For example, there exists an application which contains all the helpline numbers only. Another application lets the user keep a list of trusted contacts. There are different applications which lets the user send an SOS message to their trusted contacts. The proposed application's working would allow all of the above mentioned tasks to be done from this application alone. The users would only need a single application to be present in their mobile device rather than downloading few different application.

Also, there exists a special module within the application which is unique when compared to the currently available similar applications. The proposed application would have the ability to monitor the users' clicks on each and every emergency services as well as which city/state the user views the most amount of helpline services. For more information regarding this, see the *Section-7* under the System Features of the System Development.

IV. System Development

A. System Architecture

The android application requires the user to create a unique id for their account. The id would be their 10-digit mobile number. Using their phone number as their login id makes sure that every user-id is unique to their own.[5] Once logged in the application would require some prerequisite data to be used to its full extent. Firstly the user would be prompted to update some of the Health-related information about them such as age, weight, height, blood group etc. After that, the user would be required to write an SOS message which is to be sent to their trusted contacts in any unfortunate circumstance. After this, the user has to select their trusted contacts from their phone's memory which are to be sent the previously written SOS message.

Once the initial setup of the application is done, the app would ask the user their current city of residence. Depending upon the selected city, the next page would show the different emergency scenarios. Clicking on a scenario would take the user to that emergency-related page where all the necessary information regarding 'what to do in such a situation' would be present. The application works as a catalogue of phone numbers, websites, organization names, their addresses etc readily available to the user in times of need.

The sign-in process is mandatory for the use of the proposed application. As mentioned later in detail, the application would work on the basis of storing all the data in a database which would not be available to the user at first. As a result, to see the information stored in the database, the user must have to create a login id with a suitable password and is required to fill all the prerequisite information as well. Once the user has done all the above-mentioned tasks, then only the said user is granted access to the database.

The application works on the basic principle of storing all the information on a database server which the admins of the application(developers) would have the full access to. The mobile application would ask the server to have access to some specific information such as the useful information in the times of a flood in a specific city, say Chennai. The mobile application would send the request to access this information to the server and would receive it if the id of the user is genuine i.e. available in our database. Once the data is sent to the mobile application, then the data is displayed on the user's phone.

After the initial setup of the application, the user would be prompted whether they want all the emergency information to be stored onto the mobile's local memory drive or not. Depending upon the user's decision, all the necessary data would be downloaded from the main server onto the mobile for offline use. After this point, irrespective of whether the user's device has an internet connection or not, they can browse through the catalogue of emergency helpline services.

B. Use Case

The Fig. 4. shows us how the user(s) will interact within the application. It showcases the initial startup of the application for the first time where the user is asked to create their account and the account's one time verification process via an OTP. Once the starting process is completed, all the information is sent to the database and stored under the new user's ID.

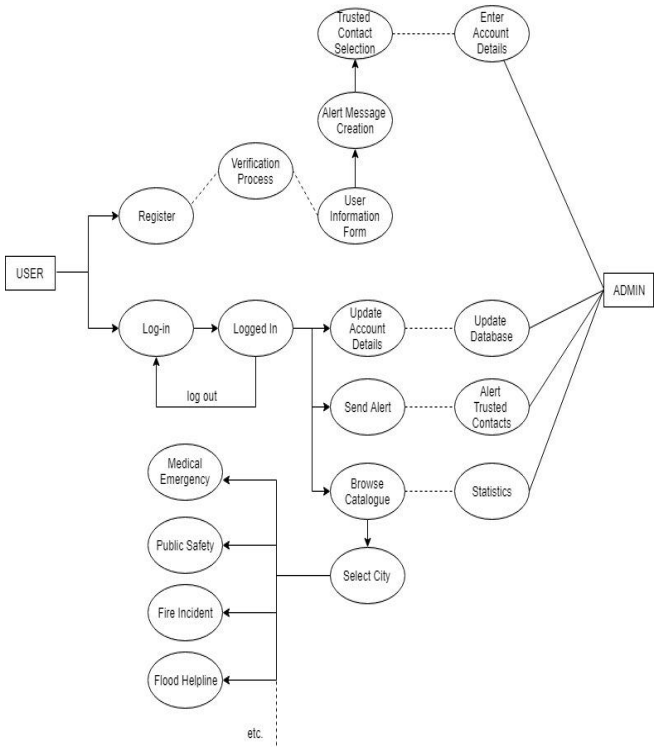

Fig. 3. The System Use Case Model

Thereafter, the app is ready to be used by the user to browse through the catalogue of emergency helpline numbers. The user is provided with an option to change their account's details which can be used to update their personal details. Whenever the user presses the SOS button, the previously scripted alert message will automatically be sent to the 'trusted contacts' of the then logged-in user.

C. System Features

The proposed application would have a number of features to work with. A diagrammatic representation of all the modules present within the proposed application's system architecture is show in the Fig. 4. All the modules present can be sub-divided into those which are visible to the user, and those which are present for the admins convenience. Below are the features that the proposed system would have, explained individually in the sequence of it's interaction with the user.

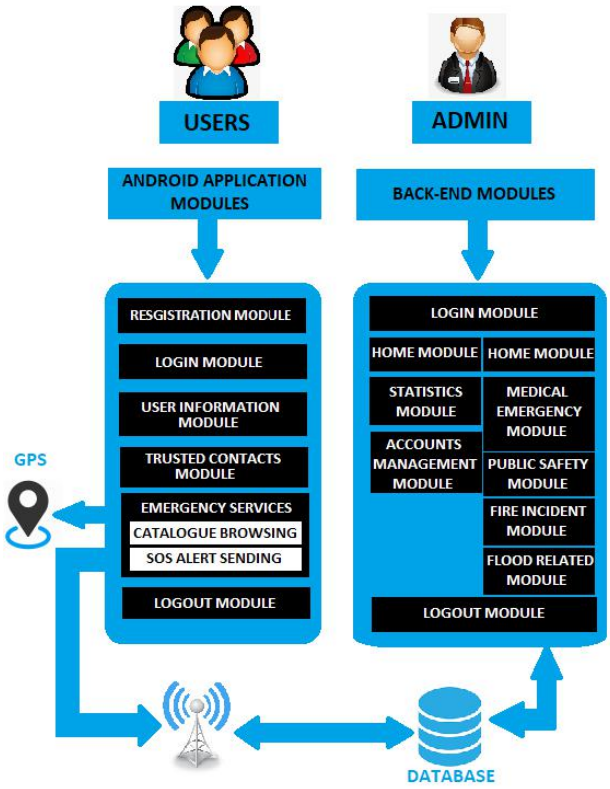

Fig. 4. System Architecture of the Android Application

The android application would consist of the following 8-modules, namely:

1) Register and Log-in Module

The very first screen that the user would see when they download/install the application would be the 'Login Screen', where they are expected to enter their phone number and their password. If the user has not created an account, then they can click on the 'Register Account' link which will be present at the bottom of the screen. On clicking the registration link, a new activity page would open where user is asked to enter their phone number (their account's userID) and a newly created password. When the user presses the enter button, the user is sent a verification OTP (One Time Password) on their mobile phone number which mirrors as their UserID. The user is asked to re-enter the OTP. On correctly re-entering the OTP, the user is taken to the next page where the user's personal and medical information is asked. On successfully verifying their UserID and the password, these details will be entered into our database.

2) User Information Module

Once the verification of the newly made account is done, the user is taken to the next page of the application where the user is asked to fill in their personal and medical details which will be used as a template to be sent to their trusted contacts. The personal details of the user that we ask of are the name, date of birth, place of residence (address) and more such details. These template also contains information regarding the medical background of the user (such as height,

weight, blood type, known allergies, personal doctor's number etc.).

3) Emergency Alert Message Creation Module

After the user has finished filling up the form, the user is then asked to enter a message which is to be sent to their 'trusted contacts' in the times of an emergency. The user can write anything they would wish to communicate with their selected contacts; which could consist of their family members, close friends, their doctor(s) etc; which can be of any benefit to them. This message can be changed to something else afterwards too. So, if the user is travelling to any specific place where the chances of an accident is greater than average, the user can change this message to something related to that so as to inform their contacts of what the unfortunate emergency could be.

4) Trusted Contacts Module

Once the user has submitted these details, they are then prompted to finally select the contacts from their phone's contact list, to whom they wish to send the information as well as the pre-written emergency alert message. All the user's contacts from their phone's contact list would be shown to the user on this page where the user is asked to select those that they wish the message to be sent to. Under this module, the user can also select any specific contact number associate them to your private medical practitioner to whom the message would be sent with an attachment to your medical details as well.

5) Home Module

Once all the above process is complete, the user is then finally taken to the home page of the application. From there the user can start to use the app to browse through the catalogue. On the home page of the app, the user is meant to select their desired state and/or the city so as to go to the selected city's catalogue. In every city's individual page, each and every emergency labels are available onto which the user can click to get that emergency specific helpline number. The home page also has links available for the user to go to their account's setting. There, the user has the ability to update their account's details. These details consist of changing their account's password, personal information (such as their phone number etc.), medical data (if the user is diagnosed with a new disease etc), the user's pre-written SOS message and the user's trusted contacts (adding or removing a number from the list). Also, the user can log out of their account which can be helpful for any other user to log in to their account. This feature is very useful as this allows multiple users to access their accounts via a single hand-held device.

6) Emergency Services Module

This module consists of all the services that the android application would do. Under the emergency services module, the user can look at all the emergency helpline service numbers which are available on the application and has the option of sending the SOS message to the 'trusted contacts'. As a result, we can compartmentalize this module into two sub-modules, namely:

i) Catalogue Browsing Sub-Module

ii) SOS Alert Sending Sub-Module

i) Catalogue Browsing Sub-Module -

In this sub-module, the user can browse through the collection of each and every helpline service's phone numbers and their associated details available in the application. The user's selected city's (which they would've selected in the previous Home module) emergency services would be listed on a single page within the application. Whichever helpline service the user desire to know the helpline number of , the user has to click on that specified label. On clicking that specific helpline service, the user will be shown a pop-up message onto which the user would be provided with two options, one would be to just press the 'OK' button which would just close the pop-up message. The second option would be to call that helpline number. If the 'Call' option is clicked, then the phone's dialler would be opened and the number of the previously shown helpline service would be copied into there. The user would then just need to press the dial button to connect to that helpline service. There would be another option present on the pop-up message for the alert, but that would be covered in the next sub-module section.

ii) SOS Alert Sending Sub-Module -

Under this sub-module comes the ability granted by the application to send a pre-written message to your 'trusted contacts' to alert them if/when they are in any danger. There are two ways to access this feature. One way is to access this feature via the Home module, wherein the ability to send an alert would be shown on the home page of the application. Another way of sending an alert is when the user is viewing any specific helpline number. On the previously discussed pop-up message, there would be an 'Alert' option .On clicking this, the user is prompted to confirm whether they are sure they want to send the message to all their 'trusted contacts'. If they press the confirm option, the message would automatically be sent to the mentioned contacts. Along with the alert message, the user's current location (their device's GPS location) will also be sent to the trusted contacts.[6]

7) Statistics Module

This module is one of the select few modules which is not explicitly visible to the user. This is because this module has more to do with the admin rather than the user (at first glance, at least). This module is used to measure the number of times that specific user has seen the helpline number of every kind as well as the which cities they look at the most often.

The main motive of having this module present within the proposed application is to anticipate which helpline services the user thinks they need to know the helpline numbers of, which could be used to anticipate the emergencies. This can be very helpful in further study of

what the users of our application, or people in general, need the helpline service number of. This is used to know which emergencies the general public want to best prepare themselves up for in the worst case scenario. This data which we can collect via this module can be very helpful in multiple studies which may or may not be researched upon somewhere.

This module basically consists of statistical counter values for every individual states/cities and for each one of those, there also exists an array of counter values. When the user logs in for the very first time, each of these counter values are set to 0. As the user looks at that specific helpline number, their associated counter value is increased by a factor of one. As a result, we can fully monitor the user's movement within the application. These information co-relate to the user's psyche, the fear the user has of being met with a scenario wherein they would eventually need the helpline number. Via this module, data could be extracted to initialize a study on which cities' residents feel the need to be prepared for which emergencies.

8) Logout Module

The logout module is pretty basic in nature when compared to some other modules available in the proposed application. With the help of this module, the user can log out of their account. This may be useful for many reasons. Maybe the user has decided to give their device to someone else and they don't want them to tamper with their settings within the application or send unnecessary alerts to your trusted contacts. Or maybe someone wants to login to their own account and do not have their own android device on them at the moment. One question may arise here as to why would one want to change an account for an application which shows the same helpline numbers irrespective of the user. For that I present the following scenario. What if your friend suddenly starts to have an allergy attack while having dinner at your house. He/She may or may not know about what is causing the attack and the victim might not be able to communicate with them. In this scenario, one can look at that person's medical data which would be available within that person's account. Hence, they can log out and login with their account. Another less unfortunate scenario where the user would need to log out of their account could be if the user is changing their device to a new one.

V. CONCLUSION

The implementation of the proposed android application for emergency helpline services would be an extremely helpful tool for the general public as they don't have to haphazardly search for any helpline service's phone number in any unfortunate event. They could easily and quickly reach out to the concerned emergency service organization and in a life-or-death accident, that may be the deciding factor. The application is a valuable asset to the society. To be prepared for the worst is the best thing one can do and if being prepared is just having an application installed on a device which the user carry everywhere then one should do tha. Having this application in times of an emergency could be very substantial for the user's safety.

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