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Citizenguard : A Watchdog for Unsafe-Area Detection to Increase the Safety of Citizens

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Abstract - *Increasing numbers of crime cases over the years in Mumbai have caused concerns on the safety of citizens living in Mumbai City. There are some areas which can be called as a crime hotspot and the citizens can be roaming in such areas with no idea about how much danger they are in. To curb this problem there should be a solution feasible and accessible to each person. The proposed system may serve as a crime deterrent to increase security that enables the user to be notified in various ways and may transform their mobile devices into smart personal emergency phones. The proposed system gives valuable information on crime prone areas in a densely populated city. The proposed project can be summarized as a safety app for citizens of Mumbai, or tourists travelling from other states or countries. The project can assist these users by providing Risk alert notification, Nearby police stations, Nearby Hospitals, Emergency panic button and Emergency helpline contact numbers. With the help of these features it makes it easy for the citizens and tourists to be aware of any danger they might be in.*

Key words **: notification, alert, threshold, middleware, API**

1. INTRODUCTION

Nowadays, the use of modern technologies like smart phones and web applications play a vital role in providing important information to the community. It empowers the services provider in the field of health, agriculture, disaster relief, and even in improving the emergency system. Mobile devices have become increasingly significant in the developing world, facilitating communication between locals, and government officials.

Crime in Mumbai has always been a concern for both the government authorities as well as the citizens of Mumbai. With the increase in the population, the crime rate has also been on an increase which in turn increases the risk factor for the safety of the citizens of Mumbai. To deal with this, the citizens should not only rely on the government authorities to cater the needs but at the same time, the citizens should also understand and adapt with the applications of technology in this very era of technology, to help provide better safety for all the citizens residing in the dynamic city of Mumbai. Safety while traveling can be considered as the major need in Mumbai, as Mumbai is regarded as the city that never sleeps. There have been several attempts made by the government authorities as well as individuals to help provide a model for better safety while traveling but still it has never been completely automated.

To counter common belief, crime is not continually focused in weak areas, with well-to-do elements of the town affected too. Therefore residents and guests would like info to avoid additional vulnerable viewpoints of the city. The idea is to make a reliable source of data instead of supposing episodic news reports that contribute to a way of hysteria. Our goal is to create what is already in public offered statistics accessible and unjust for citizens. Unwary residents can make easy targets because they stand out in a crowd, these citizens are usually unused to their surroundings, or are usually carrying cash, credit vouchers, and costly electronic things like cell phones, cameras. Due to this, the risk of being mugged or robbed is usually high while traveling.

In fact, 72% of the criminal activities that take place in Mumbai are due to avoiding the basic signs which could have been prevented if there existed a system that could help identify and distinguish between the safe and unsafe areas in Mumbai.

So this android application will provide its users with these basic signs to avoid uncertainty happening with the user. This application provides notification for threats such as thefts, murders, kidnapping, robbery etc. This application will also provide means for users to inform their emergency contacts in case of an emergency.

2. LITERATURE REVIEW

Nowadays, millions of citizens go through the streets of Mumbai town. These citizens don't always know which area is safe or unsafe. These people become the victim of the perpetrator. Now, a simple device like a mobile phone is

carried by every citizen in day to day life. Now imagine if this handheld device helps as much as being safe by becoming a victim.

The news of all issues as small as a simple snatching theft to a murder is not always conveyed to a user. In January 2018 there was 80 cases of murder with over 150 cases of attempt to murder. There were 440 robbery cases and two cases of robbery with firearms. There were around 6000 cases of theft. Apart from these cases there were 280 cases of as heinous crime as rape and 880 cases of molestations. So, in total there were 7832 cases in Mumbai city. Now these were not only some small issues, so much of life was destroyed. The number of cases are the number of families who have suffered such losses on their hands.

2.1 Existing System

For literature survey, we have researched some applications that offer similar services for android and also other platforms. The aim was to notice how these applications work and to see how they can be improved further.

Table -1 : Existing Applications

Application	Features
Indian Police app	Name, number and location of police stations.
Rakshak	It sends a text to four different numbers at the time of installation. It also initiates a voice call to an emergency number.
Indian Police at your call	It gives the user directions to the nearest police station from the current location of the user.
Koshish	Emergency data include audio and video of the location along with SMS alerts and emails which would be sent to contacts.
Hospital Finder	It finds the hospitals located in nearby areas.

Apart from these applications there are many more applications for finding the hospital, police stations or to send sms alerts to users emergency contacts, etc.

2.2 Research Gap

We could draw the conclusions were that these applications majorly focused on sending out an SOS alert to the guardians of the users in the times of difficulties and also track the user's location, which in case of the Nirbhaya app could be triggered using a panic button. On the contrary, our application is a combination and aims to treat safety in a more efficient way, by fetching the crime count of every particular area based on the news/articles and the Police FIR's that are about the criminal activities in that area.

We can also observe that there are different applications for different features. For eg. as we saw the hospital finder app, which only provides the hospital location of nearby areas. Another example is Indian police on call app which provides the details of nearby police stations

Table -2 : Features table of previous developments

Work cited	Year	Author	Features
[1]	2015	Ma. Corazón G. Fernando	● It provides the mobile users some pertinent data regarding the nearest Police Station. ● The system notifies the users regarding the closest risky area which may help the ordinary citizen to be aware and be vigilant when they reach an unfamiliar and unsafe environment in Philadelphia.
[2]	2012	Miltos Hadjioannou	● The software developed, allows users to leverage the capabilities of the new phones and submit information in the form of photos or text messages. ● The SMS based method provides an easy, fast, and reliable way for the user to send his coordinates along with a message to the

			server as it uses the GSM network, which tends to be very reliable.
[3]	2018	Sérgio F. Acosta, Jorge E. Camargo	● The proposed method predicts how safe a given street of Bogota City can be. This is done based on people's judgment of the visual appearance of a street image.
[4]	2016	Gusseppe Bravo Rocca, Manuel Castillo-Cara, Raul Arias Levano, Javier Villegas Herrera	● The aim of this application is to reduce the threat risk of the physical integrity of pedestrians by geolocating, in real-time, safer places to walk. ● The service to be developed should allow users to get to know the risks of traversing a given sector or area of a city.
[5]	2019	Lídice Haz, Ivette Carrera, Maria Fernanda Molina, Ginger Viviana Saltos Bernal.	● The main characteristic of the prototype is to inform the community about risk incidents through an alarm audible or silent as decided by the user. The alarm can be activated by anyone registered in the system from any mobile device with an internet connection. Additionally, a missed call is generated and an SMS is sent to registered relief institutions according to the type of event, as it is done with the security button of the National Police of Ecuador.
[6]	2017	Enbo Zhou; Shanjun Mao; Mei Li	● Besides, an optimal safe route method is proposed based on the dangerous index defined. We calculated the number of collisions on each street by hour from 0 to 23 and got a collision-curve for each street to delineate the temporal characteristics of collisions which indicated the inherent functions and locations of each street.
[7]	2018	Arshardh Ifthikar, Saman Hettiarachchi	● A system is proposed to analyze historical accident data and subsequently identify accident-prone areas and their relevant causes via clustering accident location coordinates. This system, once developed, can be used to warn drivers and also to aid fully autonomous automobiles to take precautions at accident-prone areas.
[8]	2017	Meiyi Ma; Sarah Masud Preum; John A. Stankovic	● Identifies unsafe actions and thus helps to prevent the city from safety hazards. ● Detects and resolves two major types of conflicts, i.e., device and environmental conflicts ● Improves the overall city performance.

3. PROPOSED SYSTEM

The proposed system is divided into three different modules and those modules are Web Application, Database and Android Application. We are using a Web server where our database resides. We have hosted this system on the Web Server. This Web Server is connected with the Internet. For developing this system we have first created a Web Application. The database we are using for this system is Microsoft SQL Server. Web application is used as a backend for this system. Admin will be using this web application to add data into the backend i.e. database. All the functionality of adding a new area to the database, entering the number of thefts, murders etc happened in the particular area, updating the number of crimes happened in the particular area, deleting the area, etc can be performed with the help of this web application. Asp.net is used for developing the front end of this web Application. C# is used for performing logical functionality of the web application.

We have used Java for developing Android Application. This Android Application is connected to the internet. This android app will only work when it is connected to the internet. Because data is always stored in the server. All the data that we are using in the android app is coming from the server.

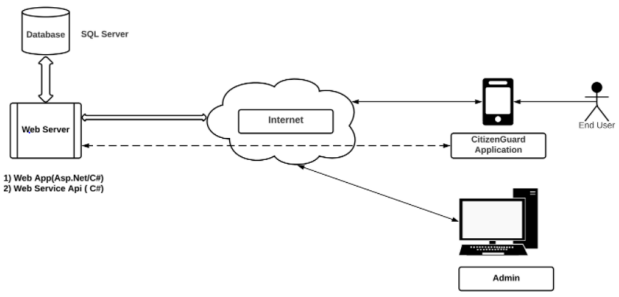

Fig -1 : Proposed System Architecture

An Android app always acts as a client. Server will send data to the client. Whenever a client requests the data, from the background the call goes to the server. This call is called the middleware. Client cannot access data directly from the server. We cannot use SQL server in the android application directly that is why we have created a Middleware. Eg. If I as a client request the police station data. From the client the request goes to the server through the middleware. All the police stations whose latitude and longitude exist in the database ,that is fetched and shown to the user on the map. It will pull the police station data from the database and it will return and add the data to the android design and will show it to the user. This all happens with the help of the web service API. For sending data from the Android app(client) to the server and from server to the Android app we are using JSON. Full Form of JSON is JavaScript Object Notation. It is used for cross platform data communication.

In the background the application is requesting data every 30 seconds. It will check in which area the user is currently and what is the nearest coordinates from the current coordinates of the area. Then it will map the coordinates with area names in the database. Then finally it will check what are the crimes for this particular area. If the crime or crimes are exceeding a threshold value then the user is notified with a notification.

4. CONCLUSION

Safety and security are something that cannot be bought or sold to anyone. It is priceless and it should be treated with utmost care. This project aims at saving troubles caused to an individual and in some cases may even be able to save someone's life by providing insights to the users. These insights will be of enormous value as they will lead the user to be alerted of the unknown danger they might be in. This is a just small stepping stone towards safety, security and a digital future.

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