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MERI SURAKSHA-ENHANCING WOMEN'S SAFETY ANDROID APPLICATION

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Abstract— An application has been developed in this project that encompasses features such, as a tracking system, hidden camera, siren, safety updates and news related to issues occurring in the area. The primary focus is addressing the growing problems of privacy and other related concerns in India. To tackle these challenges effectively an app named " Meri Suraksha" has been created. It combines a range of features within an application addressing multiple issues that previous research works have overlooked due to their limited functionality. Some existing apps only offer GPS location services without features or vice versa, which our proposed application aims to overcome. The main objective behind developing this app is to encourage users to utilize it for their safety and well being. By doing we aspire to reduce the crime rate, in India. " Meri Suraksha " provides a solution, by combining crucial features such, as a tracking system, hidden camera functionality, siren alerts, real time safety updates and localized news updates highlighting area specific issues. Unlike existing apps that often focus on one aspect " Meri Suraksha " brings together functions to address the gaps left unattended by previous research endeavours.

Keywords— Tracking System, Hidden Camera Detection, Siren (For creating distraction), Safety News, Android, GPS location.

1. INTRODUCTION

In todays world, where technology has become a part of our lives it is more important, than ever to utilize its capabilities to ensure the safety of women. Women face safety challenges globally. It is crucial that we embrace innovation to provide comprehensive solutions to address these concerns. With this in mind we are proud to introduce "Meri Suraksha," a women's safety application that goes beyond approaches and offers a holistic approach, to personal security. This application exemplifies how technology can empower and safeguard women in the era. Meri Suraksha is more than just an app; it is a commitment to women's safety. It incorporates a host of advanced features designed to equip women with the tools they need to navigate their daily lives with confidence and peace of mind[2]. This multifaceted application is not merely a safety tool; it's a digital companion that women can rely on, ensuring their well-being in a world that sometimes fails to provide the security they deserve. In this in-depth exploration, we will delve into the various facets of Meri Suraksha, examining how each feature

contributes to its overarching goal of enhancing women's safety. From the covert surveillance capabilities of the Hidden Camera to the auditory deterrent provided by the Siren, from the timely Safety Updates that keep users informed about potential threats to the curated News that offers insights into their surroundings, we will provide a comprehensive understanding of how Meri Suraksha is revolutionizing women's safety[3]. Our aim is to shed light on the potential of this application to redefine women's safety in the digital age. One of the features of Meri Suraksha is its ability to recognize and detect cameras, which plays a crucial role in protecting women's privacy. As smaller and more discreet cameras become increasingly common, in both private spaces the risk of recording has significantly risen. Meri Suraksha utilizes algorithms, for image recognition and augmented reality technology to scan the surroundings and identify hidden cameras. Once a hidden camera is detected the app immediately notifies the user by displaying a real time image showing where the camera is located. This empowers women to take action such as leaving the area or contacting authorities thus ensuring their privacy remains safeguarded.. Meri Suraksha takes data privacy and security very seriously. All user data, including location information, is encrypted to protect against unauthorized access. The hidden camera detection feature operates entirely on the user's device, ensuring that no sensitive images or data are stored or transmitted to external servers.[2]

2. RELATED WORK

A tracking app can provide the user who is travelling regularly or living far from home but the problem with this app is that it stores every move of the user in the firebase which is kind of unnecessary and also it doesn't have any other functionality like siren and news update [1]. This application helps the user to find their lost phone using GPS location it can find a phone with or without the sim of the phone but they haven't added different functionality in it. They tackle different problems in terms of using GPS location [2]. This Android app can check 24 hours GPS tracking and give a live update every hour but the main drawback is that the user is updating every hour which kind of breach of privacy, this has been solved by our app. We give the user their own choice of sharing the location whenever they are in danger [3]. They tackle a very crucial element in the existing which is if the user is in danger the existing app will on the emergency contact and type and then click on the call button, they tackled this situation by using a one-click system where the user will put the predefined phone number into the list and by clicking one button it will automatically go to call[2]. But still, it isn't the quickest way to reach this calling system For example if the user is running and then how will the user open the app and click on the button for that we had created one function which will automatically connect to the call by vibrating the phone 3 times [4]. The author of this article has added function which is unique and little smart work in terms of safety of society. The author had created a function in which the user activates the emergency button. It will automatically send GPS location and URL every 5 minutes until the user clicks on the stop button. But the main disadvantage in this is clicking to start button to send a message and there are not any other facilities also in the app [5]. The author has added some functions that are the same we are using, but the main difference in that app is the diversity of functionality. We had used a hidden camera sensor also to scale up the security. But this app doesn't have this kind of functionality in the app [6]

3. METHODOLOGY

Developing a women's safety application with features like hidden camera detection, a siren, location tracking, and news integration requires a well-structured methodology to ensure the successful development and deployment of the application. Here's a step-by-step methodology for creating such an application:

3.1 Emergency SOS :

SOS Sends an alarm message with the user's GPS location to an emergency registered contact. The FUSED LOCATION PROVIDER CLIENT API in the project will supply the user's latitude and longitude. The Fused location provider manages fundamental location technologies like GPS and Wi-Fi and provides a simple API for specifying the quality of service required. The FUSED API key can be found in the Google developer documentation. the protocol used is the Short Message Service (SMS) protocol. SMS is a standard communication protocol that enables the exchange of short text messages between mobile devices. It is a part of the Global System for Mobile Communications (GSM) standard and is widely supported by mobile phones and networks around the world.

3.2 Location tracking :

The system retrieves the current location through the use of Google Map API to track the user through GPS. The API Key is accessible from the google developer documentation. The system Utilize GPS and location services to enable real-time location tracking It first determines whether the application's location and data connection options are enabled. Then, it uses GPS to track the victim's location and transmits the coordinates in the form of a URL to the registered contacts via message. In this context, registered contacts refer to the contact information saved in the application after its initialization. By clicking on the URL in the message, the recipient device may now pinpoint the victim's exact location.

3.3 Siren :

We have used this siren to just create a distraction or get attention from the surrounding people. It will work by clicking the power button 2 times simultaneously. It will get stopped by shutting down the phone otherwise it will not stop. A siren that emits a piercing police siren. This can alert witnesses to the danger and, in some situations, prevent it from occurring. attacker from continuing with his malicious intent.

3.4 News :

News Updates It identifies reliable news sources related to women's safety and gender equality. We have developed a news aggregator module which uses News.org API that fetches and displays relevant news articles. Allow users to customize news preferences and notifications. This API not only fetches news related to women it fetches every news which is relevant for todays life.

3.5 Hidden Camera :

Using this module we can detect both Digital and IR cameras which will help to identify any hidden camera in public areas(Washroom, Hotel, etc.,).there are Digital Camera detectors and IR Camera Detector .a magnetometer present in mobile phones is used for getting the signals from the hidden camera to get the information that there

is a hidden camera or not. Detecting hidden cameras using a magnetometer involves looking for anomalies in the magnetic field that may be caused by electronic components within the camera. a common range for a mobile phone magnetometer might be around ±120 microteslas, meaning the sensor can accurately measure magnetic fields within this range. This range is suitable for providing accurate presence of camera or any electronic device present in surrounding

The fundamental equation of a magnetometer is frequently derived from electromagnetic concepts. Magnetic fields are measured by magnetometers and are represented by a number of physical phenomena, including the Hall effect and the Lorentz force.

The Hall effect is a phenomenon wherein applying a magnetic field perpendicular to the direction of current flow causes a voltage differential (also known as a Hall voltage) to be formed across a conductor or semiconductor material. The following formula can be used to get the Hall voltage:

$V=I\times B/net$

Where:

V is the Hall voltage (in volts).

I is the current flowing through the conductor (in amperes).

B is the magnetic field strength (in Tesla's).

n is the magnitude of charge carriers.

e is the elementary charge (1.602 x 10^-19 coulombs)

for electrons or the charge of the dominant carrier.

t is the thickness of the conductor (in meters).

The term (net) represents the Hall coefficient.

From the above formula magnetic field strength can be calculated as follows

$B= V\times net/I$

The Hall effect is not a reliance of most magnetometers found in cell phones. As an alternative, they usually make use of magneto resistive sensors, including giant magneto resistive (GMR) or anisotropic magneto resistive (AMR) sensors.

Sensors that detect electrical resistance changes in response to changes in an applied magnetic field are called anisotropic magneto resistive (AMR) and giant magneto resistive (GMR) sensors. The magnetic field's strength and/or direction can be directly related to the change in resistance. A sensitivity factor can be used to explain the relationship between the change in resistance and the magnetic field.

The formula can be expressed as:

$\Delta R=S\times H$

The formula used for AMR and GMR sensors typically involves the following parameters:

ΔR: Change in resistance.

H: Strength of the magnetic field.

Sensitivity Factor (S): This factor represents the sensitivity of the sensor, indicating how much the resistance changes per unit change in the magnetic field. It's often given in units like ohms per tesla (Ω/T) or per gauss (Ω/G).

3.6 Chatbot

The Women Safety Guardian Chatbot is specifically created to empower and assist women. We have used API called brain.ai which helps us to create efficient chatbot providing the initial information. It offers safety advice, emergency help and access, to resources while prioritizing user privacy. This chatbot is fully dedicated, to promoting women's safety and overall well being by providing information, guidance and supportive conversations.

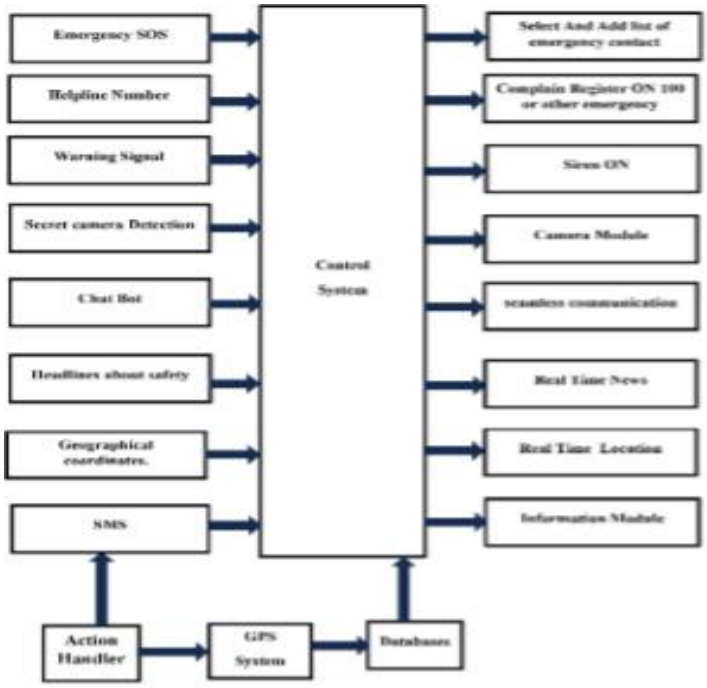


Fig 1: Block Diagram

Reading for AMR and GMR Sensors

Reading	INPUT		OUTPUT
SR. No	Sensitivity (S)	Change in Resistance (ΔR)	Magnetic Field Strength (B):
1	0.002 (Ω/(A·T))	0.001 ohms	0.5 A/m
2	0.0015 (Ω/(A·T))	0.0018 ohms	1.2 A/m

Table 2

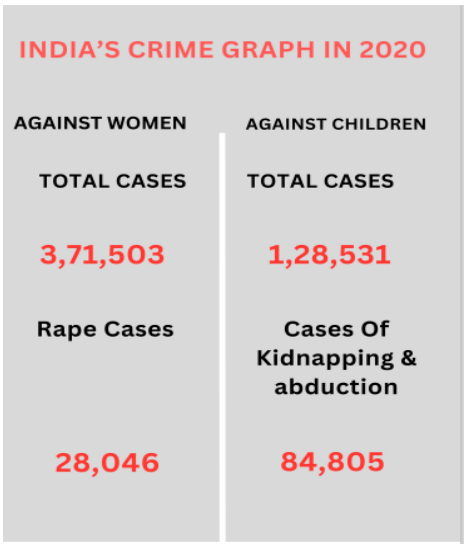
4. Reading and calculation

Reading	INPUT				OUTPUT
SR.No	Current (I)	Hall Voltage (V_H)	Hall Coefficient (R_H):	Hall Effect Sensitivity (S):	Magnetic Field Strength (B):
1	1 Ampere	0.003 Volts	0.006 V/(A·T)	0.006 V/(A·T)	0.5 Tesla
2	1.5 Amperes	0.007 Volts	0.0033 V/(A·T)	0.0023 V/(A·T)	1.4 Tesla

Table 1

5. Technology Used:

The "Meri Suraksha" app development involves the utilization of technologies including;



5.1 Android Software Development Kit (SDK); Developers make use of the Android SDK, a collection of software tools and resources to create applications, for the Android operating system. It encompasses libraries debugging tools, emulator skins, documentation and sample code to assist developers in building, testing and debugging their apps. Additionally the Android SDK is compatible with operating systems such as Linux, Windows 10 and Mac OS X.

5.2 Google Firebase; Firebase is a platform developed by Google for mobile and web app development. It offers a range of services that aid developers in building. Enhancing their apps. These services include real time databases, cloud storage solutions, authentication mechanisms ,messaging capabilities crash reporting features ,and analytics tools. One notable feature of Firebase is its real time database which allows developers to store and synchronize data on a cloud hosted NoSQL database in time.

5.3 JAVA; Java stands as the used programming language among Android developers. Originally developed by James Gosling, at Sun Microsystems in 1995 it is now owned by Oracle Corporation. The popularity of Android development stems from its platforms quality, which is not tied to any programming language. Unlike platform languages using Java, for Android ensures that developers don't need to compile and optimize code separately for each hardware system. This makes Java the preferred option for Android development as it provides benefits, across platforms. Of the platform, which is not dependent on the programming language used. Since Android operates on various hardware platforms, utilizing a language that is platform-dependent would necessitate compiling and optimizing native code for each of these systems to obtain the full benefits, making Java the preferred choice for Android development.

6. NEWS FOR THE CAUSE

Every day 1160 women and 647 children get kidnapped in India. The below [Figure 2] graph shows how many kidnapping, molestation, rape happen in India per reports.[4]

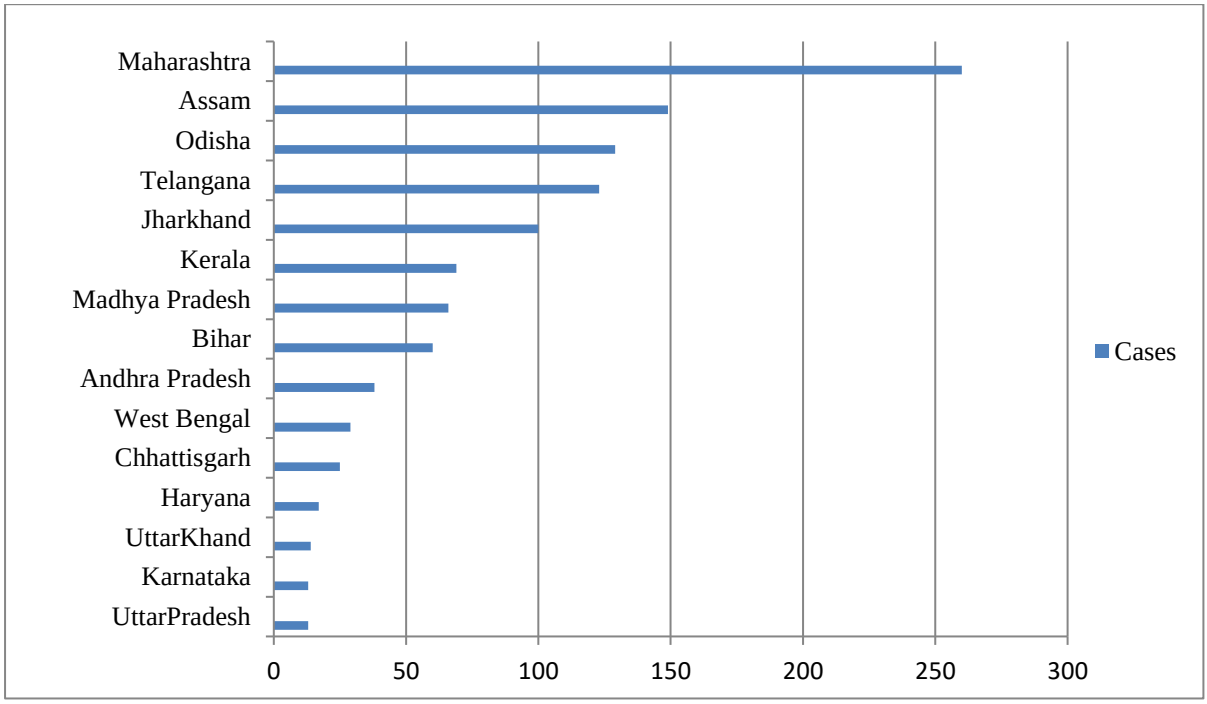


Fig 2:Human Trafficking cases in 2022-23

Fig 3:Human Trafficking cases in 2023

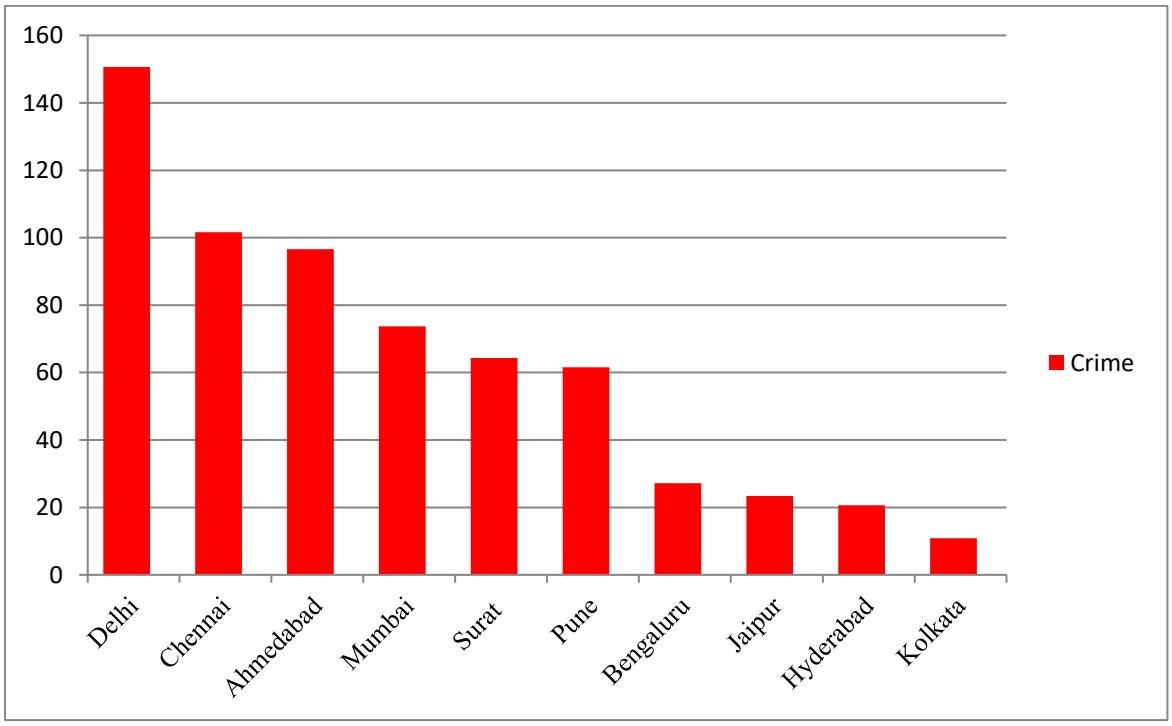


Fig 4: City wise crime in India 2023

5. CONCLUSION

Meri Suraksha is not just an app; it's a comprehensive women's safety solution that harnesses the power of technology to empower women to reclaim their safety and security. With hidden camera detection, a life-saving Siren feature, Safety Updates, and curated news, Meri Suraksha aims to be a woman's best ally in today's world. By providing real-time information, immediate alerts, and tools to deter potential threats, we hope to foster a safer environment for women everywhere.

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