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> Safe Path: A Real Time Women safety Application

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Abstract: The safety of women has become a matter of increasing concern in many parts of the world. The mobile app Safe Path was created to address women's safety concerns in public and private places and for longer-distance travel around the world. Safe Path is an all-inclusive, real-time women's safety application, and Safe Route Suggestion is its key feature. Based on realtime traffic density, crime information, and geolocation facilities, it gives users the safest alternative route within the shortest time ranking from safety level. Safe and Danger routes utilizing polylines of data accessed through GPS Integration with Traffic layer, React Native Inbuilt markers to Track locations all over the globe i.e., Highlighting safer routes with visual cues like Color-coded lines. Use different colors to indicate the relative safety of different routes (green for safest, red for least safe). It provides a unique system of integrating several modules that come together to shield the user during an emergency. Furthermore, emergency assistance such as SOS activation, back camera recording, spy camera detection under privacy protection schemes, and location sharing in realtime with emergency contact alert messages will also work as a fake siren to ensure women's safety effectively. Safe Path also includes a panic mode that instantly notifies emergency contacts and law enforcement with live location tracking.

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1. INTRODUCTION

1.1. The app supports an advanced emergency contact system which empowers the individuals to directly connect in case of emergency with pre-defined ones, while Safe Path boasts an in-depth alert system that informs users in real-time about any safety hazards in the area 2 Definition.

1.1.1. Vision To enable a woman to walk and feel secure in her world without being afraid of attack, making available easy-to-use and effective devices that would manage to improve personal security. Essentially, Safe Path employs a diversified approach to enhancing user safety. Emergency contacts are really monitored and may share close friends, where loved ones and friends can remain informed of the individual's well-being and help at the right time if need be. The app accommodates an advanced emergency contact system able to engage in quick communication while on an emergency with prespecified individuals during such an eventuality; furthermore, Safe Path also has a comprehensive alert system that notifies users promptly regarding possible safety hazards in their locality.

1.1.1. Vision To empower women to be able to move about and feel safe in their world without fear of harm, by providing them with easy-to-use and effective tools to enhance their personal safety.

1.1.2. Mission To develop and offer an innovative and user-centered mobile application empowering women with information, tools, and resources allowing them to self-assess and minimize safety risks, access timely assistance in a time of need, and enhance personal safety and well-being.

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1.1.3. Target Market

Safe Path : the women of every age and every class worried about safety- SOS Button, emergency services and contacts at a touch, Direct Calling Messaging, finger touch calling and messaging to earmarked emergency contacts, Integrated Emergency Services offer instant response from emergency services along with location and emergency contact information.

1.1.4. Value Proposition Safe Path offers a unique value proposition by: Proactive Safety Features: Live Location Sharing: Enables users to share their location with trusted family and friends who can then track it in real time and get them assistance right away.

Suggest Safe Routes: Uses mapping APIs to suggest routes based on crime rate, traffic density, and intensity of light. Personalized Safety Tests: Gives personalized safety tests according to the user's location and time of day so that the users received personal tips and alerts based on their own safety. Community Safety Reports: Users anonymously report unsafe occurrences that will build up a community safety database and help the users maintain safety in their neighborhood. SOS Button: It gives access to emergency contacts and services at a

touch of a button instantly.

Integrated Emergency Services: Speed up the response of emergency services with location and emergency contact. Young women enabled to roam in cities alone. Most women take work or play trips regularly. Women in areas where there is frequent criminal activity. Women who feel fear or apprehension because of threat to physical safety. Any woman who would like to take steps to protect herself and become a healthier and happier person. Empowerment and Education: Personal Safety Tips: Provides personal best practice safety, self-defense counsel, and community resources to its users. Community Awareness: Provides a feeling of community awareness and enables the users to inculcate in themselves the sense of making the community safe for all.

User-Centric Design: Intuitive Interface: Provides an easy and intuitive user-centered interface which is easy with navigation, legible commands, and disable usability features in it. Data Security and Privacy: It uses strong encryption and user access-controlled privacy maintained by users to secure and protect user data. Continual Improvement: Continuously improves and updates application on the basis of user feedback and changing safety requirements.

1.2 Problem Statement: Every woman has specific safety concerns in almost all settings. This app solves such needs with a user-friendly interface having salient

features for increased safety and comfort levels. Women face significant safety concerns when traveling, especially in unfamiliar areas or during late hours.

2. LITERATURE REVIEW

Introduction: For our daughters, wives, and sisters, safety is of utmost importance. In recent years women have become empowered to contribute to various fields of science and technology. Because of their varied roles, they are required to travel frequently. Under such a situation, safety becomes a primary concern." Because of the growing exposure of women in every aspect of life, violence against them has grown higher by many folds. Women were confined within the four walls of their houses and have gained opportunity to stand equally in all the sectors after globalization came in. Women are exploring themselves in the various arena in this world while facing several challenges and threats in their professions. Ever since this became an issue due to the fear of assault most women cannot have the required strength to even protect themselves. They often find themselves to be unable to help So,

this application will help empower their emergency contact to turn on the user's camera while she travels alone upon her consent.

The Women's Safety Application "NiDar" is intended to change that; NiDar, a Hindi term that means fearless. This app allows the contact to be reached in emergency situations. The user can also send GPS messages to track down their current location and discover their safe route. There are sirens options that can be faked just to attract attention. This app can use front and back camera images alongside the victim's geolocation to alert their emergency contact lists with images. Not every situation does require an emergency to find out the safest route to the destination; in such a case, this application determines the current location and the required destination to provide the safe route. Gender-based violence has achieved prominence as one of the pressing national and international issues, thanks to decades of civil society activism aided by women's organizations.

Though every country has an enormous number of laws against domestic violence, sexual assault, and other forms of violence to shield its women from such crimes, their enforcement is a colossal task. But through the use of technology in our application we aim to make it much easier and better for protecting our women from getting into these kinds of situations. Women who are the subject of abuse are usually denied rather trivial human rights. A very basic problem stands in the way of protection for women with respect to police handling of these occurrences: these officers are not exactly swift in attending distress calls. These restrictions are not knowing where the crime is taking place and not knowing that the crime is happening at all: it is hard for the victim to call the police confidently and quietly. Therefore, it must assist in abolishing these restrictions: presenting here the Women's Safety Application for smartphone consumers.

II. RELATED WORK: As part of the literature survey, we do a study on some existing women safety applications offered in the market. This is done to note the working of these applications so they can be improvised and compared with one another. So far, the identified Android Apps concerning women's security that are considered to be more or less the same in function are the following.

[1] A Mobile Application for Women's Safety: WoSApp Women's Safety App provides secure means of help from any police services. The user can easily trigger such help by simply shaking her phone or just by clicking on a PANIC button on her screen. There is thus an immediate direct tie-up of WoSApp with the local police; this may grow with the further geographical spread of this application.

WOMENS SECURITY, Android App [2] developed by AppSoftIndia, December 17, 2013 This app developed by App Soft India goes on to explain: User must enter detail. This information set avoid includes the user's email address and password, which are so conflicted, recipient's email address and mobile number; and text messages to be sent. Thus the app acts as a gadget, whereby any time the user engages it, the recipient is immediately alerted. Another invaluable feature of this application is that the ambient sound is recorded in the background for approximately 45 seconds; this recorded voice, along with a text message containing the user's geolocation coordinates, is forwarded to the recipient's mobile phone.

[3] Be aware: An Android Application for the Safety of Women" Abhaya is an Android application for the safety of women. The application is with one click activated in times of need; sending the location of the site through GPS by just one click on the app, sends a message with the URL format location to the number in the register, or calls the original registered number in a situation of peril.

The app presents an unparalleled feature that it will continue sending messages to the registered mobile number in every 5 minutes until the stop button is clicked on the app. Continuous location information gives chances increasing locating of the victims and help to rescue them safely. With the advancement in technology and digital services, almost everyone today has a smartphone, so, an efficient android-based application can be utilized to provide security to the person travelling alone or in case of an emergency.

3. DATASET DESCRIPTION:

With the Safe Path Mobile Application, women can finally feel safe traveling alone. Started as a brandnew idea, this revolutionary application aims at making women's safety an all-weather term in various private or public places. For even longer-distance travels, this application provides almost all kinds of real-time safety functions, which include but are not limited to AI, geolocation services, and real-time traffic information. The central application functionality is Safe Route Suggestion, which determines routes of travel by dynamically prioritizing from real-time inputs of GPS integration, traffic layers, and crime. The application uses graphical representation for different routes: safe routes are coloured green and risky routes are coloured red, thereby allowing informed decisions to be made when traveling.

Apart from Smart Routing, Safe Path also incorporates some safety features for emergencies such as SOS button that sends instant distress messages to prestored contacts, location sharing, and harassment notifications in case of emergency messages. It also includes the ability to record through the back camera where users can record the environment for evidence or security reasons. More sophisticated hidden camera detection systems detect spy cameras in the vicinity. To deter threats, the application offers a decoy siren that makes a loud noise to attract the attention of bystanders, thus possibly deterring the attacker.

When these features are combined with user empowerment capabilities and advances in technology, SafePath ensures travel security for women within their daily movements and keeps them feeling confident and safe. Routing with the use of AI would mean that only the safest route-taking options will be available, while geolocation tracking would monitor real-time movements of the user for assistance if an emergency arises. Based on a focus on emergency assistance, all emergency numbers, and security options, SafePath has managed to deliver an all-around application in women's security travel.

4. WORKFLOW

The Safe Path Mobile Application looks to remedy women-related safety problems in the public and private arenas, as well as during the long-distance journeys, by rendering a complete, real-time solution to safety. After registration, the users may specify emergency contacts and activate the geolocation functions for their safety. Safe Path's most important feature is Safe Route Suggestion, a feature that dynamically recommends the safest routes to travel based on real-time traffic density data, crime reports, and geo-location services. The routes are then displayed on a map with color-coded lines: green for safest route, yellow for medium safety, and red for most dangerous route. The app tracks the user's location while moving and provides real-time tracking and status updates to the emergency contacts for additional safety.

For the user's security in an emergency, the app sends an immediate alert to emergency contacts, showing the location in real-time. It can record the environment through a rear camera for evidence or security purposes, while the fake siren mode emits blaring alarm sounds to scare off potential threats to safety. Safe Path also includes hidden camera detection to find nearby spy cameras to ensure privacy and safety.

Emergency services would include real-time location sharing with emergency contacts, allowing them to track the user's location, and SOS messages with preset texts. If the user deviates from the safest route, the app will prompt a notification alongside suggesting an alternative route. In case of an emergency, while creating an incident report with positional information, footage will be sent for review by authorities. Direct calling to enlist the aid of emergency services is also integrated into the app.

The Safe Path app is all about keeping you safe and keeping it simple. Sign up and login with your email and password, and don't worry—your password is locked down with bcrypt so it's really secure. They even include email verification and optional multifactor authentication (MFA) to add some extra security. You can even handle your profile, adjust your privacy settings, and even request deletion of your data, complying with privacy legislation like GDPR and CCPA.

For extra security, the app has Emergency Contacts, through which users can add, edit, and rank their trusted contacts, e.g., family, friends, or local police. All contact information is encrypted for security, and group messaging allows instant notification of numerous individuals in the event of an emergency.

The SOS feature features a highly visible emergency button with long-press activation to avoid accidental triggering. An audible siren may also be activated to scare away potential attackers. When triggered, the app will automatically send an emergency message with the user's real-time location via SMS, email, WhatsApp, or in-app messaging.

To assist users in traveling safely, the app offers Safe Route Suggestions based on Google Maps API. It offers directions considering real-time traffic, accidents, and road conditions along with giving priority to well-lit and crowded roads. Color-coded routes also provide a sense of safety levels, and users can see police stations and emergency centers on the route. Real-time navigation is offered through Google Maps and Apple Maps, and live location updates can be sent to emergency contacts. Another prominent feature is Hidden Camera Detection, which helps users detect hidden cameras using magnetometer sensors and infrared scanning. It also provides stepby-step instructions with images and videos for manually searching hotel rooms, public toilets, or any sensitive places.

New users will be able to learn about an interactive app tour, which introduces them to such features as SOS activation and management of contacts. Finally, the About Us section includes information on the app mission, developer credentials, and customer support, as well as an option to provide feedback or report bugs from the app itself. Safe Path aims to empower and safeguard users, and they will always have a safe means to move around and receive assistance whenever they need it.



Emergency contacts Emails



FIG-2

SOS BUTTON (when user click the SOS button Immediately emergency message sent to emergency emails along with user state stored in the system)

| | gowtham196644@gmail.c . Sixt 22 Feb. 07.42 (1 day ago) to me • | * | 0 | h | 1 |
|--|---|---|---|---|---|
| | Emergency Alert | | | | |
| | Sandhya | | | | |
| | sandtvapajala047.dtymail.com | | | | |
| | I am in danger# | | | | |
| | Location Details: | | | | |
| | Latitude 16 497095 Longitude 00 6057498 Antibude 10 6057498 Soved 0 Soved 0 Bearing 0 | | | | |

FIG-3

Alert message Notification to Emergency contact emails



FIG-4

Hidden spy camara detection

The Safe Route Suggestion feature of the React Native app employs the Google Maps Directions API to examine real-time traffic patterns and provide multiple route suggestions. It is safe because it ranks the routes by traffic density, with higher traffic areas graded as safer. The feature utilizes react-native-maps for navigation interactivity, dynamically coloring polylines by route safety. The feature efficiently manages location permissions by @reactnativecommunity/geolocation, real-time updates location, and supports navigation using Google or Apple Maps. With user-friendly feedback and optimization, it provides a safe and seamless user experience.



FIG-5



FIG-6

Safe Path empowers women in the sense that they will now carry greater control over their safety. AIbased routing, real-time location monitoring, automatic emergency feature, and protecting privacy

in all aspects accord utmost safety to the user, irrespective of being alone or in a potentially unsafe environment. Empowerment is a vital aspect of the purpose of the app, which helps women feel more secure and self-confident in their everyday lives.

Safe path technology fusion provides route routing with real-time location detection, plus a hidden camera detection mechanism, thus presenting a multifaceted solution to address the women's safety issues. The app thus makes a thicker and multidimensional blanket security for women through these technologies. It empowers the users with ability that makes them masters of their safety and good decisionmakers regarding their paths and surroundings. This fusion takes a large leap toward increasing security for women within a technologically dominated world.

However, the application is not all good. The privacy of user data is compromised, especially given that realtime tracking is one of its main features. Strong encryption and safe data retention should be necessary for creating trust in users and keeping sensitive information safe. In addition, it is necessary for crime data to be accurate for the application to work, so, in some places, it is difficult to find up-to-date and accurate crime data. This might affect the quality of the suggested safe routes. The second issue concerns the consumption of battery and data through the application, because continuous monitoring of location, video recording, and posting in real-time consumes all the battery and data. There is a need for optimization along this aspect to consume the least time in battery and data so the user may not be interrupted by the service.

SYSTEM ARCHITECTURE:





Its design is beautifully constructed on top of three fundamental layers: the Frontend (constructed on Android and Java), the Backend (driven by Node.js and Express), and a set of Third-Party Services complementing its functionalities.

Frontend (Android - Java): The Android application is supplemented with a friendly and inviting interface for simple management with some required safety features like:

User Interface (UI) – The pre-designed UI offers the benefit of easy and trouble-free navigation from users. Location & Maps Integration – It includes live location sharing and navigation maps to guide the user in the correct direction.

Emergency Features – The app also includes the emergency features of SOS alert, alarm activation, and stealth camera activation for the sole intent of enhancing user safety.

Backend (Node.js + Express)

Basically, backend is accountable for business logic implementation without impeding interaction with third-party services and mobile app via REST APIs.

Main components are:

RESTful API – It is an important communication method between frontend and backend.

Push Notifications & Alerts – It handles important notifications in a way that offers real-time delivery of emergency alerts when needed the most. It plays a critical role of not only storing but also processing crucial information on user locations, profiles, and emergency situations.

Database (MongoDB): This amazing database solution is utilized for securely storing the precious data sets we require. User Profiles, for example, store all the personal information required for seamless authentication processes.

Live Location Data – Here, current location coordinates are being kept for proper tracking.

Emergency Contacts & Logs – The numbers for alerting and contact logs are stored in this database. Third-Party Services Besides making it even more useful, Safe Path makes use of a number of third-party services:

Google Maps API – It gives very accurate route suggestions from readings of locations at the time. Twilio (Call Alerts & SMS Alerts) – It provides emergency call alerts and SMS alerts to the respective contacts in real-time.

Firebase Cloud Messaging (Push Notifications) – It provides push notifications in real-time for any type of emergencies that can be faced.

5. RESULT AND DISCUSSION

Thus creating quite a great deal safety and security for women, Safe Path Mobile Application has various particular benefits because of the routing features that clearly ensure that a trip is undertaken in an enhanced travel safety through making sure that the safest possible routes are suggested as per live data, which in turn reduces susceptibility to dangerous areas traveling. The location tracking makes it easy to keep users alert while having the capability of sharing exact locations in emergencies, improving quick emergency response executions and locating the user.

An emergency support feature in real-time is extremely crucial, especially since it has the SOS button, which notifies the emergency contacts as fast as possible about the user's emergency. Besides realtime tracking, it initiates rapid action and help. The alarm siren is another added function, which serves both as a discouragement to unwanted intruders and call for help and is the extra level of protection. Under this, women are made aware of the existing hidden cameras near them, a feature seen as the acquisition of privacy by women, especially within the public domain.

6. CONCLUSION

Improved Women's Safety: Allowed users to have capabilities to actively monitor and reduce any safety risks. Enabled users to respond with multiple SOS features in emergencies. Awareness coupled with tools allows a culture of safety and empowerment to flourish.

Empowered Users: Instilled a sense of control over their safety by empowering users. Provided information to increase personal safety awareness and resource availability. Built users' confidence by giving them the tools and knowledge to maneuver safely in their environment.

User-Centric Application Established: The designers built and developed easy-to-use interfaces that feature

simple navigation and accessibility. Prioritise privacy and data security for end users during development. User feedback is continually obtained and design and functionality are refined in accordance with user needs.

7. FUTURE ENHANCEMENT

Upgraded Features: AI-Powered Threat Prediction: Explore applying AI and machine learning to predict potential threats based on user location, history, and live data. Community-Based Safety Networks: Build community capacity by facilitating peer support, facilitating local safety groups, and creating a greater sense of community among users. Enhanced Integration with Emergency Services: Explore enhanced integration with the host emergency services for automated response time and alert in case of an emergency. Continuous Improvement: Regular Support and Updates: Give regular updates on regular periods to fix issues, improve performance, and roll out new features as per the feedback given and evolving safety needs.User Feedback and Iteration: Regularly collect user feedback from reviews in the app store, in-app surveys, and other sources. Use user feedback to determine areas of improvement and schedule subsequent development priorities.

conclusion/Summary: The Safe Path project illustrates the potential of technology to solve pressing social issues and empower people. By combining cuttingedge technology, user-centric design, and a focus on user safety and privacy, Safe Path can have a profound positive effect on the lives of women globally.

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