A
Project Report
on

Creating a Safe Environment for Women:

A Location-based Review Platform

Submitted to

Sant Gadge Baba Amravati University, Amravati

Submitted in partial fulfilment of
the requirements for the Degree of
Bachelor of Engineering in
Computer Science and Engineering

Submitted by

Pratibha Yadav
(PRN: 203120382)

Vaishnavi Zadokar
(PRN: 203120326)

Shreya Patil
(PRN: 203120171)

Laxmi Hargunani
(PRN: 203120381)

Under the Guidance of
Dr. Jaikumar M. Patil
Asst. Professor, CSE Dept.

Department of Computer Science and Engineering
Shri Sant Gajanan Maharaj College of Engineering,
Shegaon – 444 203 (M.S.)

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SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING,

SHEGAON – 444 203 (M.S.)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that **Ms. Pratibha Yadav, Ms. Vaishnavi Zadokar, Ms. Laxmi Hargunani** and **Ms. Shreya Patil** students of final year Bachelor of Engineering in the academic year 2023-24 of Computer Science and Engineering Department of this institute have completed the project work entitled "**CREATING A SAFE ENVIRONMENT FOR WOMEN: A LOCATION-BASED REVIEW PLATFORM**" and submitted a satisfactory work in this report. Hence recommended for the partial fulfilment of degree of Bachelor of Engineering in Computer Science and Engineering.

Dr. Jaikumar M. Patil
Project Guide

Dr. Jaikumar M. Patil
Head of Department

Dr. S. B. Somani
Principal
SSGMCE, Shegaon

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Internal Examiner

Dr. J. M. Patil

Name and Signature

Date: 10/5/24

External Examiner

Dr. A. J. Agrawal

Name and Signature

Date: 10/5/2024.

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– Projectees
Pratibha Yadav
Vaishnavi Zadokar
Laxmi Hargunani
Shreya Patil

ABSTRACT

In our modern digital era, ensuring safety, especially for women in unfamiliar environments, is paramount. SafeHer, our dedicated digital platform, addresses this need by leveraging technology and collaboration. By bridging the gap between user-generated content and reliable safety resources, SafeHer empowers women to navigate confidently. Our initiative, **"Creating a Safe Environment for Women: A Location-Based Review Platform,"** responds to the challenges faced by women globally. It fosters a culture of empowerment and inclusivity, envisioning a future where women can move freely and securely. Through transparency, accountability, and user empowerment, our project aims to serve as a beacon of hope, creating safer environments for women worldwide. Our initiative represents a proactive approach to addressing safety challenges, fostering supportive networks, and empowering women to confidently engage with their surroundings. Through collaborative efforts and innovative solutions, SafeHer seeks to catalyse positive change and contribute to creating safer and more inclusive environments for women globally.

Keywords *- Safety-index, location-based data, security, crowdsourcing*

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1. INTRODUCTION

1.1 Overview:

In the modern digital age, characterized by seamless global interconnectedness facilitated by ubiquitous online platforms, the imperative of ensuring safety and reliability, particularly in unfamiliar environments, holds profound significance, especially for women. Women often confront a myriad of unique challenges and vulnerabilities during their journeys, necessitating a heightened focus on their safety needs. Our platform, named SafeHer, embodies this ethos by providing a dedicated digital space expressly designed to enhance women's safety. SafeHer seeks to address the existing gap between user-generated content and the demand for trustworthy safety resources by leveraging innovative technology and fostering collaborative efforts.

As technology continues to evolve, so do the methods by which individuals navigate their surroundings. Location-based reviews and safety indices have emerged as indispensable tools for informed decision-making in an era characterized by information overload. However, lingering doubts persist regarding the reliability and relevance of user-generated content, particularly in addressing the nuanced safety concerns of women. Our initiative, "Creating a Safe Environment for Women: A Location-Based Review Platform," is a response to the recognition of these pressing challenges. Informed by a collective acknowledgment of the unique safety hurdles faced by women globally, our endeavour seeks to carve out a digital space dedicated explicitly to enhancing women's safety. Through a multidisciplinary approach that combines technological innovation, community engagement, and data-driven insights, our initiative aims to bridge the existing chasm between user-generated content and the demand for trustworthy safety resources.

At its core, our initiative embodies a vision of empowerment and inclusivity, envisioning a future where women can navigate their environments with confidence and agency. Beyond serving as a repository of safety information, our platform strives to cultivate a dynamic ecosystem wherein women can freely share their experiences, connect with one another, and access vital resources tailored to their needs.

By harnessing the power of technology and collaboration, our initiative aims to create a positive feedback loop of empowerment, wherein women are not merely passive recipients of safety information but active participants in shaping their communities' safety landscape. Through the democratization of safety knowledge and the amplification of marginalized voices, our initiative seeks to foster a culture of collective responsibility and solidarity, wherein every woman's safety concerns are heard, valued, and addressed.

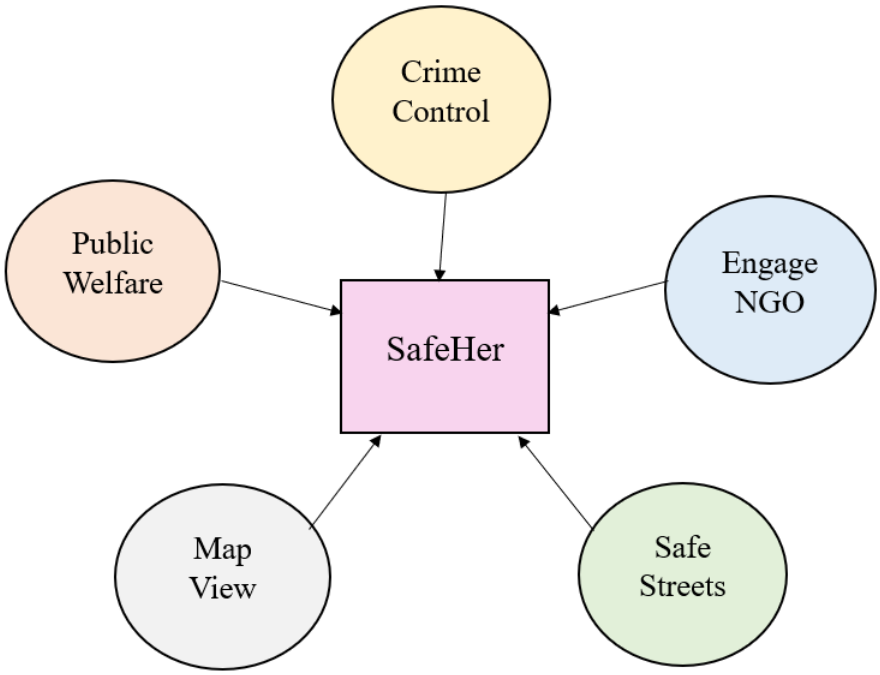

Figure 1.1.1 SafeHer Conceptual Elements

As our initiative continues to evolve and expand, it remains committed to its founding principles of transparency, accountability, and user empowerment. By prioritizing user privacy and data security, our endeavour seeks to build trust and credibility among its user base, ensuring that every woman feels safe and supported in her journey toward empowerment. Through its innovative approach and unwavering commitment to women's safety, our initiative aims to serve as a beacon of hope and inspiration for women around the world, demonstrating that through collective action and solidarity, we can create a future where every woman can live, work, and thrive free from fear and constraint.

1.2 Background and significance of problem:

The background and significance of the problem are rooted in the urgent need to address safety concerns, particularly for women, across various settings, including travel and exploration. Women often encounter unique challenges related to personal safety, access to reliable information, and navigating unfamiliar environments. Incidents of harassment, assault, and other forms of gender-based violence underscore the necessity for proactive interventions to ensure women's safety.

Addressing women's safety extends beyond individual experiences to broader societal implications. Women's ability to move freely and confidently in public spaces is essential for their participation in economic, social, and cultural activities.

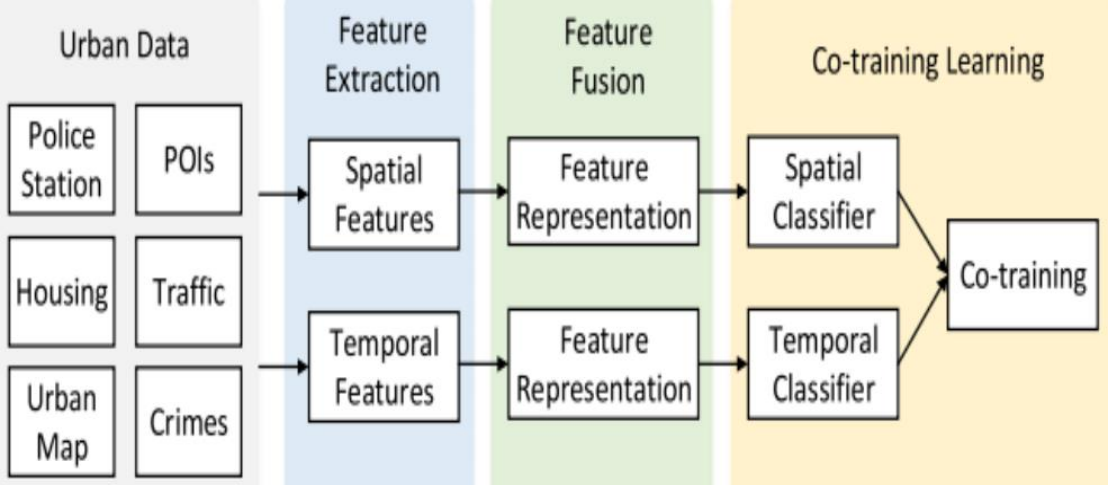

Figure 1.2.1 Featural Classification of Location Data

Permanent factors are enduring characteristics of an area that influence its safety profile over an extended period. In the context of Shegaon city in Buldhana, Maharashtra, these factors play a fundamental role in categorizing areas as risky, dangerous, safe, or moderate. Infrastructure forms a cornerstone of permanent factors, encompassing the quality and accessibility of roads, bridges, and buildings. Well-maintained infrastructure contributes to safer transportation and accessibility for residents and visitors alike.

Lighting infrastructure, including streetlights and public lighting, enhances visibility and deters criminal activities, particularly during nighttime. The presence of public

transportation systems, such as buses or trains, facilitates mobility and connectivity, contributing to the overall safety and accessibility of the city.

Proximity to safe spaces, such as parks, community centres, and police stations, provides residents with refuge and resources in times of need. Additionally, the quality of public amenities such as restrooms and recreational facilities reflects the city's commitment to enhancing the well-being and safety of its inhabitants.

Temporary factors are dynamic elements that influence the safety dynamics of an area on a short-term basis. In Shegaon city, temporary factors interact with permanent factors to shape the overall safety profile of different locales. Traffic patterns, influenced by daily routines and events, impact congestion levels and pedestrian safety, particularly at intersections and busy thoroughfares.

The presence of suspicious individuals, transient populations, or loitering groups can create temporary pockets of insecurity, necessitating heightened vigilance from residents and law enforcement. Crowd density, influenced by social events, festivals, or public gatherings, can strain existing infrastructure and security resources, potentially leading to safety concerns. Weather conditions, such as heavy rain or extreme temperatures, pose temporary hazards to pedestrians and drivers, affecting visibility and road conditions.

Street lighting fluctuations due to maintenance or electrical issues can create temporary blind spots, compromising safety, especially during nighttime. Furthermore, the presence of stray animals, construction sites, and temporary accommodations introduces additional variables that require proactive management and mitigation strategies to uphold safety standards within the city.

By prioritizing women's safety, we not only safeguard their fundamental rights but also contribute to building more inclusive and equitable communities. The development of a comprehensive digital platform dedicated to enhancing women's safety signifies a proactive approach to addressing these challenges.

By providing accessible avenues to vital safety information and fostering supportive networks, the project aims to empower women to navigate the world confidently and securely, free from fear and constraint. Through collaborative efforts and innovative

solutions, the project seeks to catalyse positive change and contribute to creating safer and more inclusive environments for women globally.

As college students situated in Shegaon town, District Buldhana, Maharashtra, our firsthand experiences underscore the pressing challenges concerning safety, particularly when venturing to areas near our campus. Within the vicinity of our college, female students encounter recurrent uncertainties regarding the safety of certain locales. Navigating through these environments whether urban or rural presents a formidable task, as concerns over personal safety loom large and access to reliable information remains scarce. Instances of harassment, theft, or assault in and around Shegaon town serve as stark reminders of the urgent need for proactive measures to mitigate safety risks.

Female students, in particular, often grapple with a palpable sense of unease when traversing unfamiliar terrains. This unease significantly impedes their mobility and undermines their sense of security. The lack of adequate lighting in certain areas exacerbates these concerns, casting shadows of doubt on the safety of pathways and thoroughfares, especially after dusk. Moreover, the presence of suspicious individuals further heightens apprehensions, rendering solo commutes a source of anxiety rather than a routine undertaking.

The dearth of accessible emergency services compounds the challenges faced by female students, leaving them feeling vulnerable and exposed in times of distress. The absence of readily available resources and support mechanisms underscores the urgency of implementing comprehensive safety initiatives tailored to the needs of the student populace. As we navigate our academic pursuits, the imperative for safer environments becomes increasingly pronounced. It is not merely a matter of personal comfort or convenience but rather a fundamental prerequisite for our well-being and academic success. Without adequate safety measures in place, fear and apprehension overshadow the learning experience, hindering the development of a vibrant and inclusive academic community. By fostering a culture of safety and accountability, we can create an environment where every student feels empowered to thrive and succeed, ensuring that our academic pursuits are not hindered by concerns over personal safety.

Our firsthand experiences navigating through the streets and public spaces of Shegaon and its surroundings have underscored the urgency of finding practical solutions to enhance women's safety. By addressing these challenges, we aim to create a safer environment that promotes freedom of movement and empowers female students to explore and engage with their surroundings confidently.

1.3 Aim of research work study:

The aim of our research work study is to enhance safety, particularly focusing on improving the safety of public spaces for women. This will be achieved by establishing a platform where members of the public can report locations and share reviews regarding safety concerns. Through this platform, inclusive participation from diverse individuals and communities will be encouraged, fostering a collective effort towards enhancing safety in public spaces. The primary objective is to leverage digital tools to create a platform that enables individuals to contribute to the improvement of safety measures in their communities. By allowing for the reporting of safety-related incidents and sharing safety reviews, valuable insights into the safety challenges faced by women and other marginalized groups in public spaces will be gathered. Central to this aim is the principle of upholding privacy and fairness. Robust privacy measures will be implemented to protect the anonymity of users and uphold their right to privacy throughout the reporting and review process.

1.4 Objectives and scope of the work:

In our pursuit of the overarching goals of our project, we have outlined four interconnected objectives. These objectives serve as the cornerstone of our efforts, guiding the development towards a robust solution that meets user needs while striving for excellence in usability, functionality, and community engagement, we outline four key objectives:

1. To develop a user-friendly web-based platform that allows users to report unsafe locations.
2. To visualize unsafe locations on a map to help users identify areas of concerns

3. To enable public access to reviews and assess the safety of locations directly from maps.
4. To foster collaboration among users by allowing them to comment on reports.

Scope of the work:

This project entails the development of a sophisticated web-based platform, aiming to provide users with seamless access to vital safety information. The platform's features include:

1. User-Friendly Reporting System: A streamlined interface will empower users to effortlessly report unsafe locations. They can share detailed descriptions of safety concerns and relevant contextual information, ensuring a comprehensive understanding of incidents.
2. Interactive Mapping Functionality: Central to the platform is its dynamic mapping feature, allowing users to visualize reported unsafe locations on an interactive map. This intuitive tool enables users to identify areas of concern within their vicinity and plan routes accordingly, enhancing their situational awareness.
3. Public Access to Reviews: The platform will offer public access to reviews and safety assessments directly from the map interface. Users can delve into detailed information about reported incidents and safety ratings for specific locations, facilitating informed decision-making regarding their movements.
4. Collaborative Commenting System: Promoting community engagement, the platform will feature a collaborative commenting system. This functionality empowers users to provide feedback on reported incidents, share additional information, extend support to those affected, and contribute to constructive safety discussions.

In essence, the project involves the design, development, and implementation of a user-centric web-based platform focused on enhancing safety awareness and community involvement. By facilitating the reporting of unsafe locations, visualizing safety data, and fostering collaborative engagement among users, the platform aims to promote safety in public spaces and empower individuals to make informed decisions.

2. LITERATURE REVIEW

2.1 Introduction:

The literature review serves as a critical foundation for understanding the existing body of knowledge and research relevant to the topic of women's safety during travel. It provides insights into the methodologies, findings, and gaps in the literature, guiding the development and implementation of our research project. Our motivation arises from understanding the concerns women face when traveling to unknown areas, compelling us to prioritize their safety and well-being. We initiated the study of research papers to glean insights that could guide us in realizing our idea and working towards creating solutions to address the safety concerns faced by women during travel.

We embarked on a study of crowdsourcing to gain a comprehensive understanding of its mechanisms and functionality, through the review papers [1]. As we delved deeper into the study of crowdsourcing, we recognized the intertwined relationship between crowdsourced data and location-based information. Exploring the nuances of location-based data allowed us to grasp its significance in leveraging collective intelligence for various applications and decision-making processes. We did it from our second reference paper [2]. During our exploration of location-based data, we categorized into two distinct categories, namely permanent and temporary factors. This classification system provided us with a structured framework to analyse and understand the dynamic nature of location-based information [2]. In our pursuit of mapping unsafe locations, we delved into safety index calculations [5]. This exploration equipped us with a systematic approach to assess and quantify safety levels, allowing for the identification and visualization of unsafe locations on maps based on safety indices [2]. For mapping unsafe locations, we utilized Google Maps and its corresponding requirements. This platform provided us with the necessary tools and infrastructure to accurately pinpoint and visualize unsafe areas, enabling effective safety mapping initiatives [3]. Therefore, in our endeavour to collect location-based data and women's safety information, we employed various methods and platforms, including Google Maps, to gather pertinent data and insights [6][4]. Thus, to implement our idea of ensuring women's safety, we integrated the collection of location-based data

[2], engaged crowdsourcing initiatives [1], and developed a conceptual framework as a web platform [4]. This platform not only empowers women to review locations and access location-based reviews but also serves as a collaborative space where users can share insights and contribute to community-driven safety measures, fostering a safer environment for them to navigate and empowering them with information to make informed decisions about their surroundings.

2.2 Conclusion drawn from literature review:

The literature review provides a comprehensive understanding of the challenges women face regarding safety, especially during travel and exploration. It sheds light on prevalent issues like harassment and assault, emphasizing the urgent need to prioritize women's safety across various environments.

Through our comprehensive analysis of various research papers, we have acquired invaluable insights into three key areas: crowdsourcing mechanisms, location-based data analysis, and safety index calculations. Crowdsourcing stands out as a potent instrument for real-time data collection, harnessing the collective knowledge of individuals to inform decision-making and empower communities. This approach not only facilitates the gathering of vital safety information but also fosters a sense of ownership and collaboration among users, leading to more effective safety measures.

Delving deeper into location-based data analysis, we have uncovered the dynamic nature of safety information, which can be categorized into permanent and temporary factors. This classification framework provides a structured lens through which to assess safety levels, offering nuanced perspectives on safety dynamics in various contexts. Moreover, our exploration of safety index calculations has equipped us with systematic methodologies for quantifying safety levels, enabling stakeholders to identify and visualize unsafe locations with precision. Armed with these insights, we are better equipped to develop targeted interventions and strategic initiatives aimed at enhancing safety and security in public spaces.

In summarizing our investigation, the literature review underscores the importance of leveraging innovative approaches such as crowdsourcing and location-based data analysis to address women's safety concerns effectively.

2.3 Scope of this research work:

The scope of this research encompasses a multifaceted approach aimed at developing a robust digital platform tailored to enhance safety in public spaces, with a specific emphasis on addressing the safety concerns encountered by women during their journeys and explorations. This entails the intricate integration of various components, including the design and implementation of a user-friendly web interface that facilitates the reporting of unsafe locations.

Through the utilization of crowdsourcing mechanisms, the platform aims to harness the collective wisdom and experiences of individuals, enabling real-time data collection on safety issues. Moreover, the research endeavours to delve into the realm of location-based data analysis, exploring the dynamic nature of safety information categorized into permanent and temporary factors. By leveraging sophisticated analytical tools, the platform seeks to provide users with nuanced insights into safety dynamics, empowering them to make informed decisions about their surroundings.

Additionally, the research involves the development of safety index calculations, which serve as systematic methodologies for quantifying safety levels and identifying areas of concern with precision. Furthermore, the scope extends to the creation of interactive maps that visualize unsafe locations, thereby facilitating spatial awareness and informed navigation. Through the integration of public reviews and assessments, users can access comprehensive information about the safety status of different areas directly from the maps.

The research also emphasizes fostering collaboration and community engagement within the platform, providing users with avenues to share insights, exchange information, and contribute to collective safety efforts. Overall, the scope of this research transcends the mere development of a digital platform; it aspires to create a comprehensive ecosystem that empowers individuals to actively participate in improving safety and fostering more inclusive environments for all, particularly women.

3. METHODOLOGY

The methodology for this project report aims to describe how SafeHer collects and analyses crowdsourced, anonymous reports of sexual violence, identifies patterns and key insights, and facilitates data-driven decision-making to improve public safety. The section will outline the approach used to gather, process, and analyse the data, the technological infrastructure supporting the platform, the steps taken to ensure data security and user anonymity, and the ways in which the insights generated are utilized to inform policy and community actions.

Key objectives of the methodology are to provide a robust and reliable framework for data collection, ensure the accuracy and validity of the information, and promote ethical handling of sensitive data. The methodology is critical to demonstrating the effectiveness and reliability of SafeHer's technology stack and the credibility of its insights. Furthermore, it explains how the platform fosters collaboration among citizens, community organizations, police, and city governments to achieve its goals of increased awareness, transparency, and public accountability.

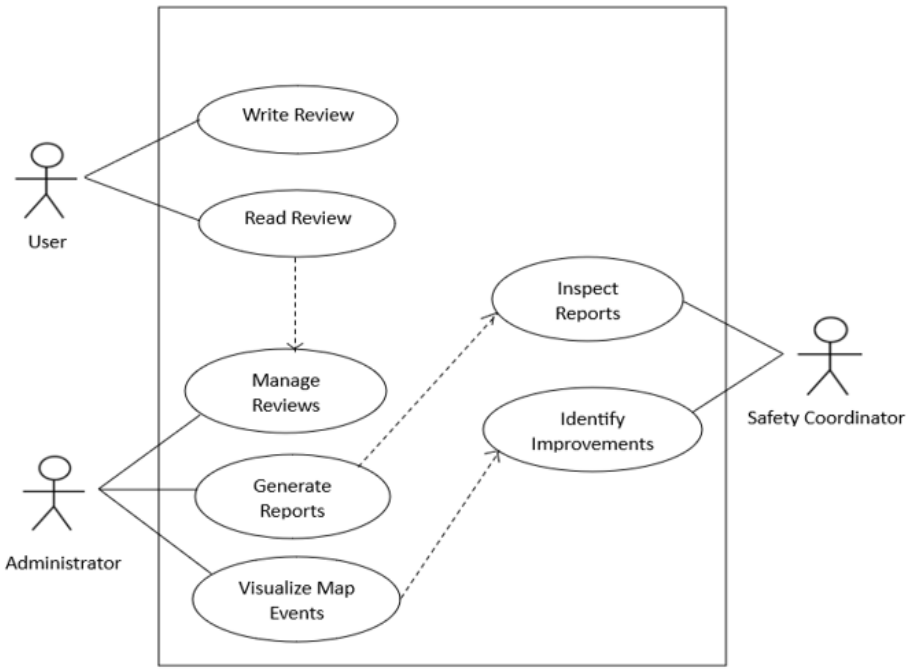

Figure 3.1 Usecase diagram

Users can write and read reviews, sharing experiences and making informed decisions. Administrators manage accounts, generate reports, and visualize data. Safety coordinators review locations and suggest improvements, enhancing safety measures. This ensures user engagement, efficient administration, and prioritized safety.

3.1 Survey design

This project aimed to identify and address safety concerns for women in public spaces surrounding our college, SSGMCE. Given the increasing awareness of safety issues for women in urban and rural environments, our objective was to create a database of safety-related problems that could inform future infrastructure improvements and safety policies. Here's a detailed overview of our research methodology, including survey design, data collection, and analysis. The project used a survey-based research design to gather quantitative and qualitative data on safety issues experienced by female students in the college community.

We designed a Google Form survey that included a series of questions to identify common safety issues and gather specific feedback on public spaces around our college. The survey questions focused on infrastructure, environment, and crime-related factors. Respondents could select multiple options and provide additional comments if needed. The main question categories were:

a. Infrastructure and Environmental Issues:
    - Lack of street lighting
    - Presence of stray animals
    - Poorly maintained paths
    - Absence of safe public restrooms
    - Lack of public transportation
    - Lack of safe meeting spaces
b. Crime and Safety Risks:
    - Presence of suspicious individuals
    - History of crime incidents
    - Chain snatching or robbery
    - Domestic violence

- Physical assault
- Stalking

c. Security and Public Safety Measures:
    - Absence of security measures
    - Limited community policing
    - Unmonitored drinking and smoking establishments
    - Limited access to emergency services

Respondents could choose options or pinpoint specific unsafe locations, enabling us to map safety concerns geographically. The survey was distributed electronically to female students in college hostels and other channels, running for two weeks, promoted via social media, campus events, and word-of-mouth.

After collecting the survey responses, we analysed the data to identify trends and patterns. The analysis process involved several steps:

a. Categorization: We grouped responses by safety issue to determine the most common concerns. This involved tallying the frequency of each option selected in the survey.
b. Geographical Mapping: We used the location data provided by respondents to create a map of safety concerns around the college. This allowed us to visualize areas with high concentrations of reported issues.
c. Cross-Referencing with Crime Data: Where available, we cross-referenced our survey data with public crime reports and other safety-related datasets to validate our findings and gain additional insights.
d. Qualitative Analysis: We reviewed additional comments and feedback provided by respondents to gain a deeper understanding of the specific safety concerns and their context.

To ensure data accuracy and ethical compliance, we took several measures:

a. Data Anonymity: The survey was designed to be anonymous to protect respondents' privacy and encourage honest feedback.
b. Ethical Review: The methodology was reviewed by the college's ethics committee to ensure compliance with ethical standards.

c. Quality Checks: We conducted consistency checks and cross-validation to ensure the reliability of the data.

The results from our data analysis provided valuable insights into safety issues for women in public spaces around our college. These findings are detailed in the subsequent sections of this report. The data-driven insights will inform our recommendations to college authorities, local governments, and other stakeholders to address safety concerns and improve public spaces for women.

3.2 Materials and Tools

This project utilized a combination of tools and technologies to gather data, develop the frontend interface, manage the database, and implement the backend functionalities. Below is a detailed overview of the materials and tools employed:

a. Data Collection:

Google Forms: We utilized Google Forms as the primary tool for data collection. Its user-friendly interface allowed us to design and distribute the survey easily, enabling respondents to provide feedback on safety concerns and experiences.

b. Frontend Development:

HTML, CSS, JavaScript: For the frontend development of our project, we relied on standard web technologies such as HTML, CSS, and JavaScript. These languages were used to create the user interface for the platform, allowing users to interact with the system and submit reports seamlessly.

Leaflet.js: Library To integrate interactive maps into our frontend interface, we leveraged the Leaflet.js library. This library provided us with the necessary functionality to visualize geographical data and display safety concerns on an interactive map.

c. Database Management:

MySQL Workbench: As our chosen relational database management system (RDBMS), MySQL Workbench facilitated the design, development, and maintenance of our database.

d. Backend Development:

Node.js: Our project's backend was implemented using Node.js, a server-side JavaScript runtime environment. Node.js allowed us to build scalable and efficient server applications, handling data processing, user authentication, and communication between the frontend and the database.

Express.js: We utilized Express.js, a minimalist web framework for Node.js, to streamline the development of our backend server. Express.js provided us with a robust set of features for routing, middleware integration, and HTTP request handling, enabling us to build RESTful APIs efficiently.

3.3 Flow Chart

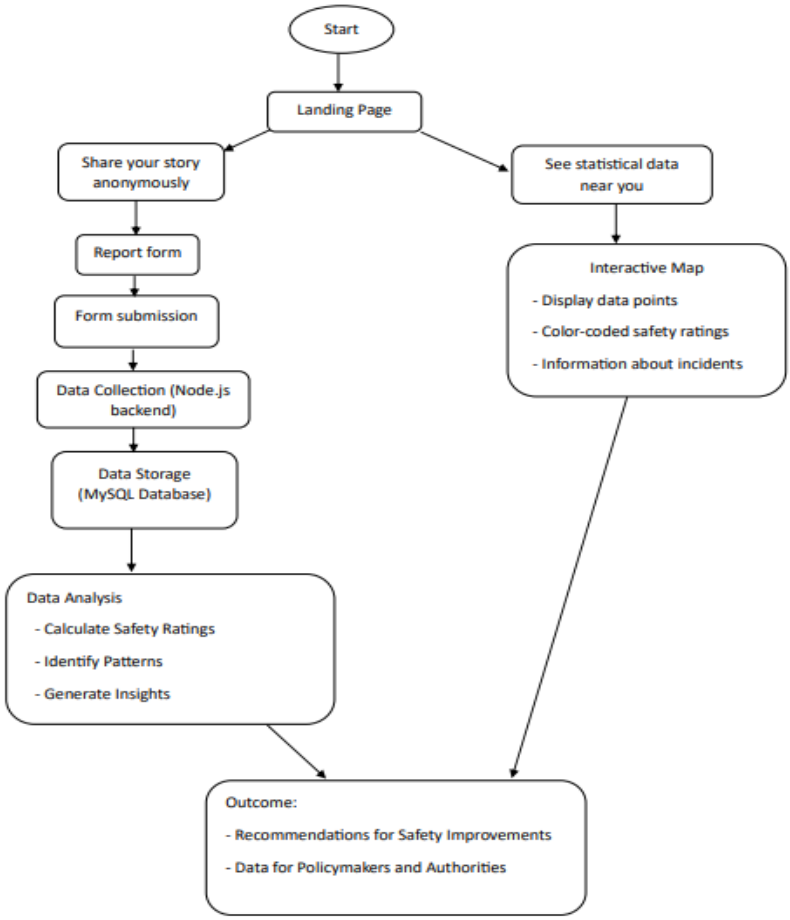

Figure 3.3.1 Flowchart for methodology

- The starting point is the landing page, where users can choose between "Share Your Story Anonymously" or "See Statistical Data Near You."
- The "Share Your Story Anonymously" option leads to a report from where users can submit their safety-related experiences anonymously.
- The "See Statistical Data Near You" option opens an interactive map that displays safety data and provides safety ratings for various locations.
- After form submission, the data is collected by the backend (Node.js) and stored in a database (MySQL).
- The data analysis stage processes the collected data to calculate safety ratings, identify patterns, and generate insights.
- The outcome includes recommendations for safety improvements and data-driven insights for policymakers and civic authorities.

This representation should help visualize the methodology's flow and the relationship between different components of the project. To implement the SafeHer platform, we employed a multi-stage process that began with a user-friendly landing page and culminated in an anonymous story-sharing feature. The methodology encompasses the structure and functionality of our platform, including the integration of user feedback, data-driven statistical analysis, and a seamless user experience. Below are the key components of our methodology:

Landing Page: The initial point of interaction with the SafeHer platform is our landing page. This page serves as the primary entry point for users, providing information about our platform's mission, objectives, and services. The landing page offers two main options:

- Share Your Story Anonymously: This option redirects users to a page where they can submit anonymous reports about safety incidents, share personal experiences, and describe safety concerns.
- See Statistical Data Near You: This option leads to a map that displays safety-related data based on user-generated reports, along with safety ratings for various locations.

Statistical Data Visualization: When users choose to view statistical data, they are taken to an interactive map built with Leaflet.js.

The map uses a color-coded system to indicate safety levels:

- Green: Safety rating of 7 or above, indicating a generally safe area.
- Yellow: Safety rating between 4 and 6, suggesting moderate safety concerns.
- Red: Safety rating below 4, indicating high safety risks.

Table 3.3.1 Color Code descriptor

Rating	Values Level of Safety Concern	Color
0-3	**Dangerous (D)**	**Red**
4-6	**Risky (R)**	**Yellow**
7-10	**Safe (S)**	**Green**

Anonymous Story Sharing: Users who wish to share their safety-related experiences can do so by clicking the "Share Your Story Anonymously" button on the map page. This redirects them to a secure form where they can provide detailed information about their experiences while maintaining their privacy. The form collects the following data:

- City and Country: To identify the location of the incident.
- Gender: For demographic analysis and to understand the gender distribution among respondents.
- Experience Description: A text area where users can describe their safety-related experiences.
- Date and Time: To capture when the incident occurred.
- Type of Problem Faced: A dropdown list containing various safety-related issues, such as lack of street lights, presence of stray animals, limited access to emergency services, and others.
- Factors Leading to the Problem: A dropdown list that allows users to select potential causes for the safety issue, including harassment, discrimination, lack of community resources, etc.
- User Location: A field that can automatically retrieve the user's location to help map safety concerns accurately.

The form's data is submitted to a backend endpoint written in Node.js, where it is processed and stored in a MySQL database. This ensures the information is securely collected and used for generating statistical insights.

Privacy and Security Measures: Given the sensitive nature of the data, we implemented strict privacy and security measures:

- Anonymity: The form does not collect personal identifiers, ensuring user anonymity.
- Data Encryption: All data transmissions are encrypted to protect user information.
- Secure Backend: The Node.js backend follows secure coding practices to prevent unauthorized access or data breaches.

Data Analysis and Rating System: Once the data is collected, it undergoes analysis to identify patterns and determine safety ratings for various locations. Our analysis process includes:

- Statistical Analysis: Using the collected data, we calculate safety ratings for different locations and identify common safety issues.
- Safety Rating Calculation: Safety ratings are calculated based on the frequency and severity of reported incidents. The color-coded system on the map reflects these ratings.
- Data-Driven Insights: The collected data provides insights into common safety issues, helping us understand the challenges faced by women in public and private spaces.

These insights guide our efforts to advocate for infrastructural changes, improved safety policies, and community engagement to create safer spaces for women. Additionally, this data serves as a resource for civic authorities, police, and policymakers to make informed decisions regarding public safety.

4. COMPUTER SIMULATION

A computer simulation is used to understand the complex factors influencing safety and to test various interventions. This theoretical framework outlines the simulation setup, model, scenarios, and expected results for a growing town called Shegaon in District Buldhana of State Maharashtra, India. This is quite famous for great culture, religious and spiritual place as well.

4.1 Objective and Setup

The simulation aims to model the public safety landscape in Shegaon and evaluate how different factors contribute to safety risks and improvements. The objective is to identify effective interventions, such as infrastructure enhancements, community policing, and public awareness campaigns, to improve safety for women in public spaces.

The simulation setup establishes the context and environment for the simulation in Shegaon. This includes defining the scope, identifying key variables, and setting initial conditions.

a. Geographical Scope: The simulation models Shegaon, divided into a grid of neighbourhoods. Each neighbourhood has unique characteristics related to safety, infrastructure, and community engagement.
b. Infrastructure Quality: The presence and condition of street lighting, public transportation, walkways, and public restrooms.
c. Crime Rate: The frequency and types of reported crimes, including harassment, assault, and robbery.
d. Community Engagement: Levels of community policing, neighbourhood watch programs, and public safety campaigns.
e. Environmental Factors: The presence of stray animals, abandoned buildings, and poorly maintained public spaces

4.2 Model and Scenarios

The simulation model represents Shegaon as a grid-based structure. Each neighbourhood in the grid has a set of attributes that define its safety profile. The model allows for dynamic changes based on events and interventions.

a. Crime Rate: A measure of reported crime frequency, derived from real-world data collected in Shegaon through SafeHer and local police reports.
b. Infrastructure Quality: A score representing the condition of street lighting, public transportation, walkways, and public restrooms.
c. Community Engagement: A score reflecting the level of community-based safety programs, such as neighbourhood watch or community policing in Shegaon.

Simulation scenarios allow exploration of various situations to understand their impact on public safety in Shegaon. The simulation includes the following scenarios:

a. Infrastructure Improvement Scenario: This scenario tests the impact of infrastructure improvements, such as adding street lighting, improving public transportation, and maintaining walkways in Shegaon.
b. Community Policing Scenario: This scenario simulates the effect of increased community policing and neighbourhood watch programs on public safety in Shegaon.

4.3 Running the Simulation

The process involves setting up the grid-based model, defining events and transitions, and running the simulation multiple times to obtain statistically significant results.

a. Initialization: The simulation starts with an initial configuration based on real-world data from Shegaon. Each neighbourhood in the grid has initial values for safety rating, crime rate, infrastructure quality, and community engagement.
b. Events and Transitions: Events simulate various changes in the environment, such as crime incidents, infrastructure improvements, or community policing

c. activities. Transitions represent changes in neighbourhood attributes in response to these events.
d. Interventions: Specific interventions are implemented to test their impact on public safety. For example, adding street lighting, increasing community policing, or improving public transportation.

4.4 Analysis and Visualization

After running the simulation, the results are analysed to identify key insights and potential policy recommendations. The analysis focuses on evaluating safety improvements, identifying risk factors, and determining the effectiveness of various interventions.

a. Risk Factors: By analysing the simulation results, key risk factors contributing to safety concerns in Shegaon can be identified, such as high crime rates, poor infrastructure quality, or low community engagement.
b. Effective Interventions: The simulation helps evaluate the effectiveness of various interventions, allowing policymakers to focus on those that have the most significant impact on safety in Shegaon.

Visualization is crucial for understanding the simulation results and communicating findings to stakeholders. The following visualizations are used to represent the simulation outcomes:

a. Heatmaps: Heatmaps visually represent safety ratings and crime rates across Shegaon, allowing for easy identification of high-risk areas and safety hotspots.
b. Graphs and Trends: Graphs illustrate trends over time, such as changes in infrastructure quality, crime rates, and community engagement in Shegaon. These trends provide insights into long-term patterns and potential risks.
c. Scenario Comparisons: By comparing different simulation scenarios, you can determine the most effective strategies for improving public safety in Shegaon. This approach enables data-driven policy recommendations.

5. EXPERIMENTAL INVESTIGATION

At the heart of our research initiative is an experimental investigation, employing a multipronged approach that combines rigorous methodology, ethical integrity, and scientific inquiry. This investigation aims to explore, understand, and address safety concerns through systematic observation, measurement, and analysis. Central to this effort is the development and implementation of a web-based platform serving as a safe and inclusive space for individuals to anonymously share their safety experiences and perceptions.

The experimental design is meticulously crafted to ensure validity, reliability, and ethical integrity. Informed by existing literature, stakeholder consultations, and user feedback, we developed a robust conceptual framework outlining key variables, constructs, and relationships. This framework guided decisions related to data collection, measurement, and analysis. Robust encryption protocols and data protection measures are implemented to safeguard user privacy and confidentiality. Standardized data collection procedures ensure consistency and reliability across submissions. Our approach emphasizes a user-centric design, prioritizing accessibility, usability, and inclusivity. The submission form, the primary interface for user interaction, is designed to capture various aspects of safety events comprehensively. User feedback and iterative testing refine the form design to meet diverse user needs. Ethical guidelines ensure voluntary and coercion-free participation.

Data collection is foundational to our investigation, designed to be intuitive, user-friendly, and inclusive. By providing users with the option for anonymous sharing, we prioritize privacy and confidentiality. Standardized protocols ensure data consistency and reliability across submissions. Moving from data collection to analysis, we employ a variety of quantitative and qualitative techniques. Integration of both approaches enhances validity and enables a comprehensive understanding of safety concerns.

The design process begins with a clear articulation of the research objectives and hypotheses, which serve as guiding principles throughout the project. Drawing on insights from existing literature, stakeholder consultations, and user feedback, we develop a conceptual framework that outlines the key variables, constructs, and

relationships under investigation. This conceptual framework serves as the blueprint for the design of the platform, informing decisions related to data collection, measurement, and analysis.

Central to the experimental design is the development of the submission form, which serves as the primary interface through which users interact with the platform. The design of the submission form is informed by principles of usability, accessibility, and inclusivity, ensuring that users can easily navigate the form and provide comprehensive feedback. Key considerations in the design of the form include the inclusion of multiple input fields for capturing various aspects of the reported event (such as location, date, time, and safety rating), as well as the option for users to provide additional context or comments in their own words.

In addition to the design of the submission form, the experimental design encompasses decisions related to data collection protocols, procedures, and ethical considerations. Robust encryption protocols and data protection measures are implemented to safeguard user privacy and confidentiality, while standardized data collection procedures ensure consistency and reliability across submissions. Moreover, ethical guidelines and principles of informed consent are upheld throughout the data collection process, ensuring that users have the opportunity to participate voluntarily and without coercion.

Qualitative analysis techniques complement quantitative analysis by providing depth, context, and richness to our understanding of safety concerns. Thematic coding, content analysis, and narrative inquiry are commonly used qualitative techniques that involve the systematic categorization and interpretation of textual data. Through qualitative analysis, we aim to uncover nuanced insights, identify emerging themes and patterns, and capture the lived experiences and perspectives of individuals. Qualitative analysis adds a humanistic dimension to our understanding of safety concerns, allowing us to appreciate the complexities and nuances of real-world experiences. Through careful planning, execution, and analysis, we generate actionable insights empowering stakeholders to improve safety and well-being.

6. RESULT AND DISCUSSION

The successful implementation of the "**Creating a Safe Environment for Women: A Location-based Review Platform**" project marks a significant milestone in addressing women's safety concerns within urban environments. Through collaborative efforts and leveraging cutting-edge technology, the platform has emerged as a pivotal tool, empowering women with crucial safety information. By enabling user-generated reviews and intuitive map visualizations, women can navigate public spaces with enhanced confidence and awareness, equipped with real-time insights into the safety dynamics of various locales. This user-centric approach, guided by iterative refinements informed by extensive user feedback, underscores the project's commitment to addressing the evolving needs of its target audience and fostering a culture of community engagement and collective responsibility in tackling women's safety issues.

6.1 Result

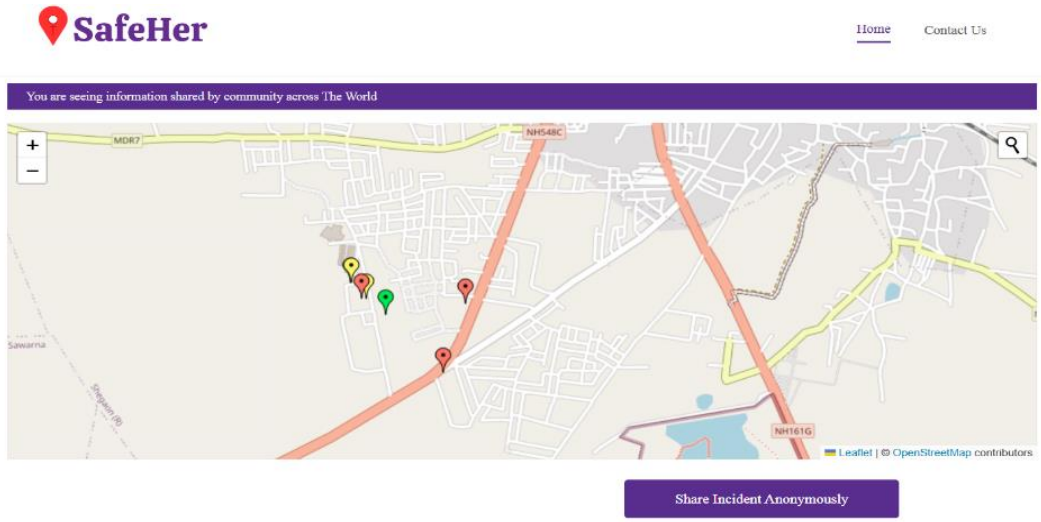

Figure 6.1.1 Visualization of Locations on Map

Red markings denote areas identified as unsafe, serving as cautionary indicators for users to exercise heightened vigilance. Conversely, Green markings signify safe spaces, offering reassurance to women navigating public environments. Yellow markings highlight areas with potential risks, prompting users to proceed with caution. As the project advances, ongoing improvements will enhance accessibility and refine the

platform, solidifying its position as a transformative tool for fostering safer, inclusive urban environments where women can flourish with confidence and dignity.

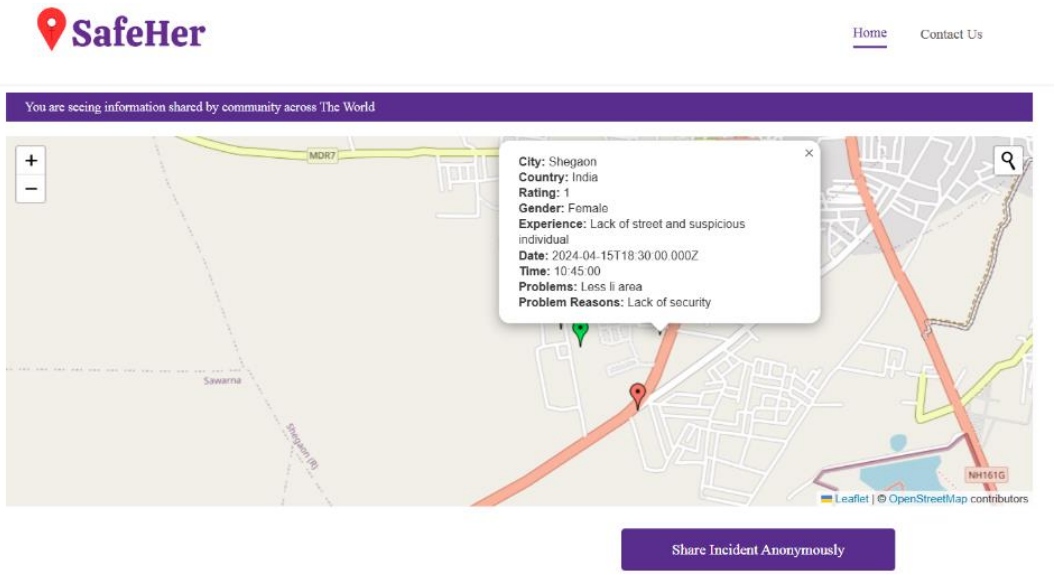

Figure 6.1.2 Visualization of Reviews on Map

The visualization of reviews on a map is an innovative feature enhancing user engagement and offering insights into safety dynamics. Clicking on marked locations reveals detailed reviews and ratings, empowering women with firsthand accounts to make informed decisions. By incorporating user-generated content, the platform fosters community engagement and safety discourse. Continuous enhancements ensure seamless accessibility, solidifying its role as a transformative resource for creating safer urban environments where women can navigate confidently.

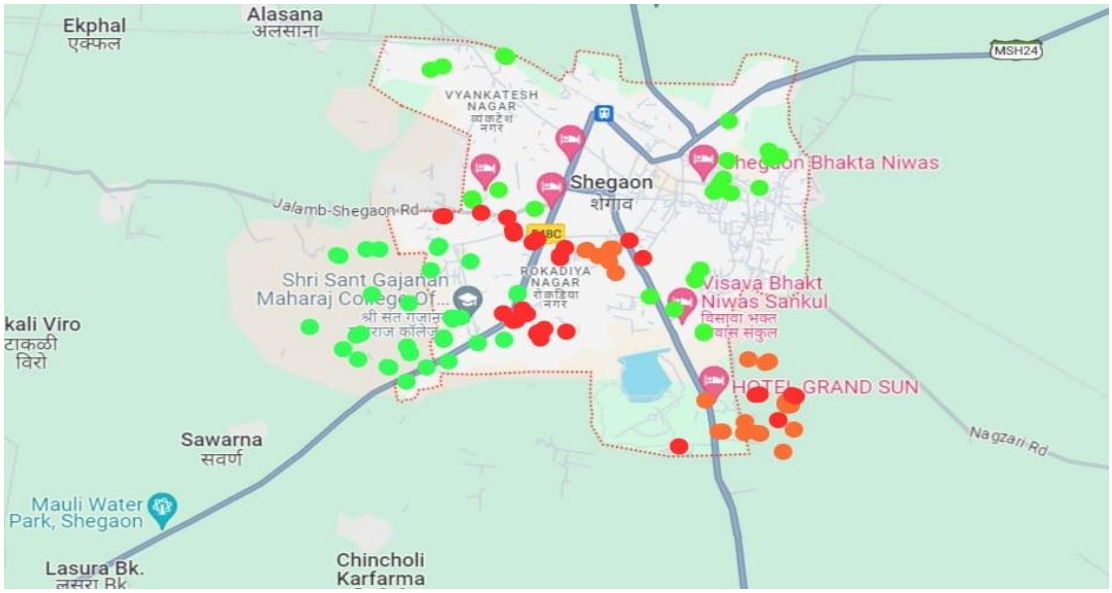

Figure 6.1.3 Computer Simulation of Shegaon

In our exhaustive examination of women's safety concerns in Shegaon city, we've meticulously mapped pivotal locations, revealing potential vulnerabilities. Through collaborative efforts, we aim to enhance safety infrastructure and empower women to navigate public spaces confidently. Over seven months, we've pinpointed safety levels using a color-coded system, considering both temporary and permanent factors. Our holistic approach enables effective prioritization of interventions and resource allocation. Through ongoing analysis and stakeholder engagement, we strive to implement targeted solutions, fostering a resilient and inclusive community prioritizing safety.

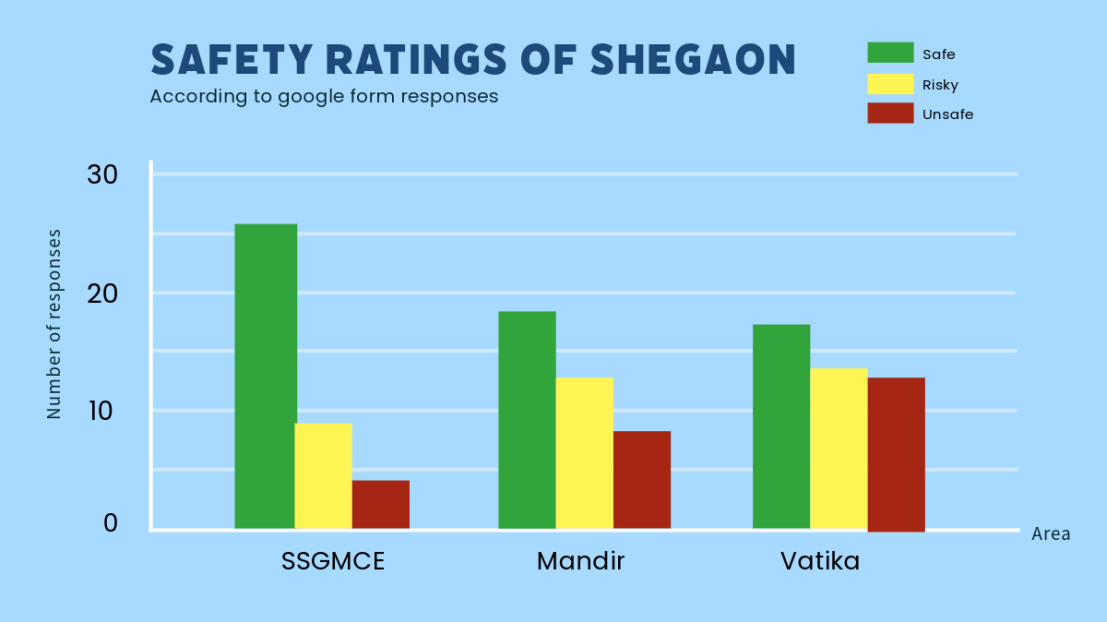

Figure 6.1.4 Safety Ratings Distribution in Shegaon

In this study, we gathered responses from a sample group comprising 100 individuals, all sharing their perceptions of safety within the Shegaon area. Through surveys or questionnaires, respondents expressed their views on whether specific locations in Shegaon were considered safe, unsafe, or fell into a category of risk.

After meticulously categorizing these responses, we proceeded with data analysis. This involved tallying the number of responses in each category. For instance, our findings revealed that 55 % respondents perceived Shegaon as safe, while a certain number

regarded it as unsafe, and another portion identified it as risky. By quantifying these perceptions, we gained valuable insights into the prevailing attitudes towards safety within Shegaon, shedding light on areas of consensus and potential concerns.

In summary, the process of categorizing responses into safe, unsafe, and risky unveiled diverse perceptions of safety within the Shegaon area among the surveyed individuals. The analysis depicted a spectrum of viewpoints, with a notable portion of respondents deeming Shegaon as safe, while others identified certain areas as unsafe or bearing potential risks. These insights underscore the importance of addressing safety concerns and implementing measures to enhance overall safety and well-being. By acknowledging and responding to these perceptions, local authorities and stakeholders can collaborate to create a safer and more secure environment for residents and visitors alike.

6.2 Discussion

The discussion section of the result report highlights the transformative impact of the "Creating a Safe Environment for Women: A Location-based Review Platform" project in addressing women's safety concerns within urban environments. The integration of user-generated reviews and intuitive map visualizations has significantly empowered women with real-time insights into the safety dynamics of various locales. By employing a color-coded system to denote safety statuses, the platform enhances users' confidence and awareness while fostering a culture of informed decision-making and heightened safety consciousness.

The implementation of the "Creating a Safe Environment for Women: A Location-based Review Platform" project is a significant step in addressing urban women's safety concerns. Through user-generated reviews and intuitive map visualizations, it provides real-time insights, fostering informed decision-making. The incorporation of a color-coded system and a user-friendly reporting form encourages community engagement, promoting safety awareness and empowerment among women in urban settings. Ongoing enhancements ensure broader accessibility, making the platform a dynamic resource for creating safer environments, guided by iterative refinements based on extensive feedback.

7. CONCLUSION

This chapter includes the conclusion, contribution and scope for future work of "Creating a Safe Environment for Women: A Location-based Review Platform" has revolutionized efforts to address women's safety in urban areas. Through its sophisticated web-based platform, the project empowers women with real-time safety insights and fosters community engagement. Its contributions include a comprehensive safety database, user-friendly features, and the promotion of solidarity among users. Looking ahead, opportunities for expansion include integrating advanced technologies and broadening collaborations. Ultimately, the project holds immense potential to create safer, more inclusive environments for women worldwide.

Looking forward, the project is poised to capitalize on its success and explore avenues for further expansion and refinement. Opportunities for future work include the integration of advanced technologies, such as machine learning and artificial intelligence, to enhance the platform's capabilities in predicting and mitigating safety risks. Furthermore, broadening collaborations with stakeholders, including government agencies, NGOs, and community-based organizations, will enrich the platform's resources and outreach.

7.1 Conclusion

In conclusion, the **“Creating a Safe Environment for Women: A Location-based Review Platform”** project represents a significant advancement in addressing women’s safety in urban areas. Through its innovative web platform, women gain access to real-time safety information, empowering them to navigate public spaces with confidence. By facilitating location-specific safety reviews, the platform fosters informed decision-making and a sense of solidarity among users. Looking ahead, the project aims to expand and refine its capabilities through advanced technologies and broader collaborations, striving to promote women’s safety worldwide. The project remains committed to championing women's rights and envisioning a future where safety is a universal human right.

7.2 Contribution

The project "Creating a Safe Environment for Women: A Location-based Review Platform" has made significant contributions to the field of women's safety and community empowerment. By developing a sophisticated web-based platform, the project has empowered women to actively participate in enhancing safety awareness and promoting informed decision-making while navigating public spaces. The core contribution of the platform lies in its ability to harness user-generated data to create a comprehensive database of safety information. Through the submission of location-based safety reviews, women can contribute their insights and observations, thereby enriching the platform with valuable data. This collective database serves as a vital resource for users seeking to assess the safety status of various locations and make informed choices about their travel routes.

Moreover, the platform's inclusion of features such as safety ratings and detailed reviews has further amplified its utility and effectiveness. By providing users with access to comprehensive information about safety levels and incidents reported by fellow users, the platform empowers individuals to make well-informed decisions about their safety. Additionally, the platform fosters community engagement by enabling users to interact with and learn from each other's experiences, thereby fostering a culture of solidarity and collective responsibility. Through these contributions, the project has not only raised awareness about women's safety but has also empowered women to actively participate in shaping their own safety narratives.

In addition to its significant contributions to women's safety and community empowerment, it's important to highlight that while existing emergency help platforms primarily focus on immediate response and crisis intervention, "Creating a Safe Environment for Women: A Location-based Review Platform" serves as a complementary tool that addresses safety-related infrastructural challenges and provides proactive solutions. Unlike emergency help platforms that primarily respond to incidents as they occur, this platform aims to prevent such incidents by identifying safety concerns in advance and providing users with the necessary information to make informed decisions about their surroundings.

7.3 Scope for Future work

Integrating additional features like user registration and profile management offers promising avenues for the project's future development. By enabling users to create accounts, the platform fosters a sense of ownership and belonging, encouraging stronger engagement. User registration streamlines the reporting process for unsafe locations, facilitating quicker responses from authorities and enhancing overall effectiveness in addressing safety issues. Moreover, personalized features and services tailored to user preferences can enhance the user experience, promoting continued engagement. Collaborating with NGOs specializing in women's safety provides access to expertise and resources, enabling the platform to offer comprehensive support services and targeted interventions. Additionally, integrating advanced technologies like AI and ML can enhance the platform's capabilities, providing valuable insights for stakeholders and informing effective interventions to address safety concerns. These strategic approaches pave the way for the project to expand its reach, impact, and effectiveness in creating safer environments for women.

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LIST OF DELIVERABLES ON PRESENT WORK

a. A comprehensive report documenting the project's objectives, methodology, findings, outcomes, and proposals for improving women's safety in public spaces.
b. A Google Forms-based survey or similar tool used to collect crowdsourced data from users, capturing safety-related incidents and experiences anonymously.
c. A MySQL database used to store collected data, including safety ratings, reported incidents, geographic locations, and other relevant information.
d. An intuitive web interface developed using HTML, CSS, JavaScript and Leaflet.js library. The interface allows users to access safety-related information, share their stories anonymously, and visualize safety ratings on a map.
e. A Node.js-based backend infrastructure that supports data processing and interactions between the front-end and the database. It handles form submissions and retrieves data for display on the web application.
f. A map-based visualization integrated into the web application that displays safety ratings and incident reports across Shegaon. The map provides a visual representation of safety trends and allows users to explore safety in different locations.
g. A set of statistical reports generated from the collected data. These reports include safety ratings, infrastructure quality and community engagement levels. They serve as a basis for identifying and informing stakeholders.
h. A set of recommendations based on the project's findings. These might include suggestions for improving infrastructure, increasing community policing, and implementing public awareness campaigns.

PLAGIARISM REPORT

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ORIGINALITY REPORT

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PROJECT MEMBERS

Pratibha Nandlal Yadav
4th Year CSE
SSGMCE, Shegaon
pratibha2002yadav@gmail.com

Vaishnavi Ramkrushna Zadokar
4th Year CSE
SSGMCE, Shegaon
vaishnavizadokar18@gmail.com

Laxmi Sunil Hargunani
4th Year CSE
SSGMCE, Shegaon
laxmihargunani@gmail.com

Shreya Nitin Patil
4th Year CSE
SSGMCE, Shegaon
shreyapatil120702@gmail.com