

ACCIDENT LOCATION ON INDIAN ROADS

KABILAN S

ELECTRONICS AND COMMUNICATION ENGINEERING

RAJALAKSHMI INSTITUTE OF TECHNOLOGY

GMAIL: kabilan.s.ece.2021@ritchennai.edu.in

ABSTRACT:

A significant rise in road accidents, together with rising urbanization and motorization in India, have led to a high number of fatalities and injuries. For effective road safety management and prevention, it is essential to comprehend the geographic distribution and features of accident-prone locations.

the development of specialized treatments. This project aims to provide a thorough examination of accident locations on Indian roads using geospatial techniques and data. The accident data was regionally visualized and analyzed using Geographic Information System (GIS) techniques, allowing patterns and trends to be found. By merging many perspectives, this study advances understanding of the intricate dynamics of road accidents in India.

accident data analysis using geography. It underlines the significance of using a spatially aware approach to address issues related to road safety and lays the foundation for further research in this field. Finally, the results of this study may contribute to lowering accident rates, saving lives, and enhancing Indians' general safety.

Keywords: Road accidents, urbanization, geospatial tools, geographic information systems (GIS), and saving lives.

INTRODUCTION:

In India, national highways are essential for enabling trade, connecting important cities, and the country's general economic growth. On the other hand, the rising incidence of accidents on these routes has prompted worries about public safety and the requirement for efficient road safety measures. To create targeted interventions to reduce accidents and enhance road safety, it is crucial to comprehend the spatial distribution and features of accident locations on national roads in India.

SURVEY:

Medury, Y., and Reddy, V. K. Indian National Highway Accident Hotspots Analysis.

Journal of Traffic and Transportation Engineering, English Edition, 5(1), 76–85.

The study's main objective is to identify and evaluate accident hotspots on India's national highways.

S. Jain and R. Sharma (2019). Find accident-prone regions on Indian roadways using GIS. 8(3), 120–128. Journal of Traffic & Transportation Engineering International. This study uses geographic information system (GIS) techniques to identify accident-prone regions on Indian roads.

2017; A. Nair, A. Menon, et al. Journal of Urban Planning and Development, 143(2), 04016025; Analysis of Accident Locations on Indian Urban Roads.

This study analyzes a variety of factors, such as pedestrian safety, traffic laws, and road design, to determine where accidents occur in Indian city streets.

OBJECTIVE:

This project's goal is to analyze accident sites in India in order to find accident hotspots, look into contributing factors, and offer solutions for increased road safety. The initiative pinpoints the site of the disaster so that we can take the appropriate procedures to stop them and save lives. More traffic laws are implemented in such specialized cities. Saving lives is the main objective of this project.

OUTCOME:

As a result of the research, a database of event locations, along with their latitude and longitude, will be created. We can then utilize geographic information systems (GIS) to integrate the data into particular areas on maps, displaying the incident zone as a black spot.

IDENTIFICATION OF HIGH RISK AREA:

Accident-prone zones on Indian roadways, particularly those in urban areas and on highways, have been successfully identified through studies. These areas—often referred to as "black spots" or "accident hotspots"—prioritize the use of intervention strategies to improve traffic safety.

ROAD SAFETY INTERVENTION:

Long-term, more accurate accident location detection can contribute to raising traffic safety standards. By analyzing the information acquired by accident detection devices, authorities may pinpoint areas that are more likely to experience accidents and solve safety issues. To reduce the likelihood of accidents, this may mean installing improved signage, traffic-calming strategies, repairing roads, or even rebuilding particular road portions.

INCREASED PUBLIC AWARENESS:

The use of accident site detection technologies aids in increasing public understanding of the value of safe driving. Media sources, social media platforms, and mobile applications can use real-time accident data to alert commuters and drivers about potential hazards, detours, and

safe driving practices. This increased understanding might promote defensive driving and contribute to a safer driving environment.

CHALLENGES:

Creating an Indian Road Real - Time Accident Location System

LIMITED OR INACCURATE DATA:

Accurate accident site detection depends on having access to reliable and recent data. However, the information that is currently available is either inaccurate or incomplete. In urban regions with tall structures or in rural areas with poor satellite service, for instance, GPS data can occasionally be erroneous. Estimates of the location of the accident may be incorrect due to erroneous data.

FALSE POSITIVES AND FALSE NEGATIVES:

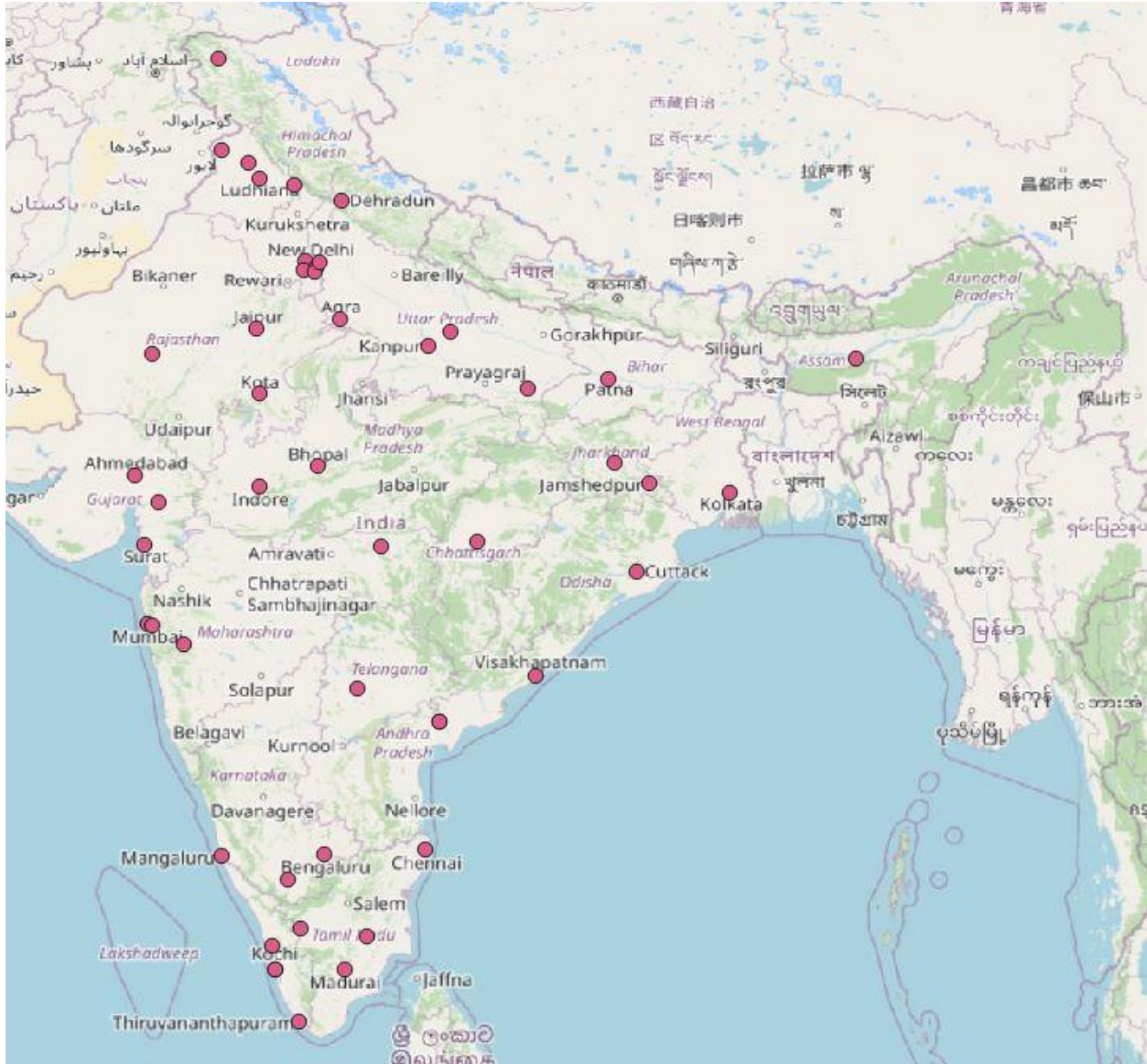
Systems for detecting accidents must strike a compromise between the requirement to eliminate false alarms and the requirement to effectively detect accidents. Unnecessary response attempts are produced when a system incorrectly labels a non-accident incident as an accident. False negatives occur when an accident truly occurs but is not observed. The algorithms must be optimized to reduce false positives and false negatives because it can be challenging to achieve a compromise between these two criteria.

DATA COLLECTION:

To assemble comprehensive statistics on traffic collisions, we will use both primary and secondary data sources. The primary record will include accident reports obtained from police departments and road safety departments, while supplementary data will include demographic information, information about the road network, statistics on traffic volume, and other relevant variables.

MAPPING THE AREA:

The geographic information system (GIS) receives the produced database. To map and analyze the accident data, methods from the Geographic Information System (GIS) will be applied.



DATA INTEGRATION AND COMPATIBILITY:

For accident site detection, integrating data from several sources, such as sensor networks, traffic cameras, and GPS devices, is typically required. Because different data sources may adhere to various formats, protocols, or standards, data integration is challenging. Assuring compatibility and efficient data flow among numerous systems can be challenging.

ARCHITECTURE:

- Data Collection.
- Mapping the data.

SOFTWARE MODEL:

Geographic Information System (GIS) techniques will be used to map and evaluate the accident data for India. Combining several data layers with GIS enables the identification of accident hotspots and patterns.

- ArcGIS: There are numerous tools for accident location analysis in the widely used GIS software suite ArcGIS, developed by Esri. Due to its geographical analysis capabilities, users can study accident data according to location, characteristics, and spatial correlations. ArcGIS may be used to integrate real-time data sources, making it possible to view accident locations on interactive maps.
- GeoDa: GeoDa is a free and straightforward Geographic Information Systems (GIS) application designed primarily for spatial analysis. For accident location analysis, it offers a wide range of analytical techniques, including spatial autocorrelation, cluster analysis, and kernel density estimation. Users of GeoDa can look into accident patterns in space, identify accident hotspots, and assess the significance of spatial grouping.

CONCLUSION:

In conclusion, a research that examines the sites of collisions on Indian highways can significantly improve traffic safety and emergency response. By utilizing cutting-edge technology, such as GIS software models, GPS systems, and intelligent transportation systems, the project can achieve the following objectives.

- Data-driven decision-making: The program might provide meaningful accident data for analysis, enabling officials to identify accident trends, high-risk areas, and contributing factors. This information can be used to improve the infrastructure and take particular actions to increase road safety.
- Shortened response times: By quickly identifying accident sites, the project can shorten the time it takes emergency services to arrive on the scene.
- Public involvement and education: The program may raise awareness of traffic safety issues among the general public and encourage safe driving habits by employing real-time accident data. By disseminating accident data via social media and mobile applications, commuters may make informed decisions and avoid accident-prone areas.

REFERENCE PAPER:

1. Sharma N, Kumar A. A. Road accidents in India: Dimensions and issues. [online]. Available from: [Road_Accidents_in_India.pdf \(teriin.org\)](#).
2. Road traffic injuries. WHO Available from: [Road safety \(who.int\)](#)

3. Regional report on status of road safety: WHO South-East Asia region. [online] [Last accessed on 2018 Dec 28]. Available from: [World Health Organization South-East Asia | World Health Organization \(who.int\)](http://www.who.int/south-east-asia/road-safety)