ACCIDENT LOCATION ON INDIAN ROADS

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ABSTRACT-India's rapid population expansion, urbanization, and motorization have resulted in a major increase in road accidents, resulting in numerous fatalities and injuries. Understanding the geographic distribution and characteristics of accident-prone areas is critical for successful road safety management and the creation of targeted remedies. Using geospatial tools and data, this project seeks to give a complete analysis of accident locations on Indian roadways.Geographic Information System (GIS) tools were used to geographically visualize and analyze the accident data, allowing patterns and trends to be identified.This work contributes to a better understanding of the complex dynamics of road accidents in India by combining geospatial analysis with accident data. It emphasizes the necessity of addressing road safety concerns with a spatially aware strategy and establishes the groundwork for future study in this area. Finally, the findings of this study have the potential to help reduce accident rates, save lives, and improve the general safety of Indians.

Keywords : urbanization , road accidents , geospatial tools, geographic information system(GIS), road safety, save lives.

INTRODUCTION:

National highways in India play a critical role in connecting major cities, facilitating trade, and supporting the overall economic development of the country. However, the increasing number of road accidents on these highways has raised concerns regarding public safety and the need for effective road safety measures. Understanding the spatial distribution and characteristics of accident locations on national highways in India is essential for developing targeted interventions to reduce accidents and improve road safety.

OBJECTIVE:

The objective of this project aims to identify accident hotspots, investigate contributing causes, and provide measures for improved road safety by analyzing accident sites in India.The project identifies the accident location so that we can take the necessary precautions to prevent accidents and save lives. In such specific cities, more traffic regulations are put into place. This project's major goal is to save lives.

OUTCOME:

The project's outcome includes initially compiling a database of incident locations together with their latitude and longitude, after which we may use geographic information systems (GIS) to integrate the data into specific areas on maps while highlighting the incident zone as a black spot

1. **Identification of high risk area:**

   On Indian roads, including highways and urban areas, accident-prone spots have been

successfully identified through studies. These locations, often known as "black spots" or "accident hotspots," prioritize intervention techniques for enhancing road safety.

2. **Road safety intervention:**
   In the long run, more precise accident location detection can help improve traffic safety measures. Authorities can identify accident-prone regions and address safety concerns by examining the data gathered by accident detection devices. This may entail putting in place better signs, traffic-calming techniques, fixing roads, or even redesigning specific road segments to lower the risk of accidents.

3. **Increased public awareness:**The use of accident site detecting technologies helps raise public awareness of the importance of driving safely. Real-time accident data can be used by media outlets, social networks, and mobile applications to warn commuters and drivers about potential dangers, alternate routes, and safe driving techniques. This greater knowledge may encourage cautious driving and help create a safer driving environment.

Challenges:

Creating an Indian Roads Real-Time Accident Location System.

- Limited or inaccurate data:

Access to dependable and current data is a requirement for accurate accident site detection. The information available, nevertheless, is either incomplete or erroneous. As an illustration, GPS data can occasionally be inaccurate, particularly in metropolitan locations with tall structures or in rural areas with weak satellite service. Accident location estimations may be off based on inaccurate data.

- False positives and false negatives:

Systems for detecting accidents must balance the need to prevent false alarms with the necessity to detect accidents properly. When a system mistakenly classifies a non-accident occurrence as an accident, unnecessary response attempts are made. When an accident actually happens but is not noticed, false negatives happen. It can be difficult to strike a balance between these two criteria, thus optimizing the algorithms is essential to minimizing false positives and false negatives.

- Data integration and compatibility:

Integrating data from numerous sources, such as sensor networks, traffic cameras, and GPS devices, is frequently necessary for accident site detection. Data integration is complicated because these data sources may use several formats, protocols, or

standards. It can be difficult to ensure compatibility and smooth data flow among several systems.

Architecture:

- Data collection
- Mapping the data

Data collection:

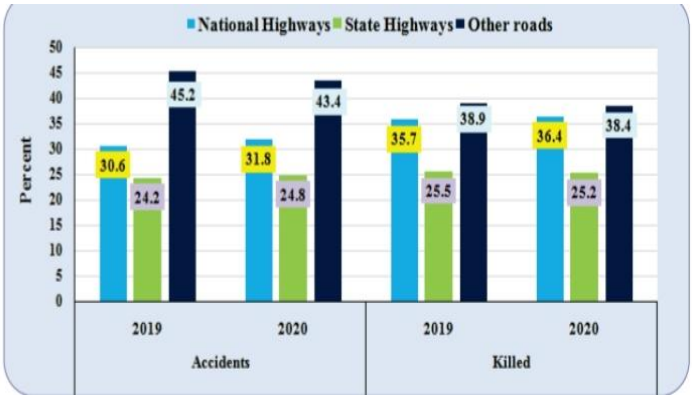
We are going to use primary as well as secondary data sources to compile in-depth statistics on traffic collisions. While secondary data will consist of demographic data, road network data, traffic volume statistics, and other pertinent variables, the main record will include accident records received from police departments and road safety departments.

	Name of black sp	Lattitude	Longitude
2	Siddhi Ashram	23.7993489	91.2733629
3	Chesrimari to Pu	41.1171432	16.8718715
4	Bridhinagar	12.9235108	80.1558976
5	S.k para Area	23.975826	91.96928
6	Keralapuram	8.9405615	76.6585978
7	Karuvatta-vazhiya	9.3195143	76.4257935
8	Eramalloor	9.8234702	76.3111052
9	chandiroor	9.8433362	76.3088759
10	Ramapurama	13.010621	80.1932384
11	Nandikandi outsk	17.6116958	77.9917086
12	Aushapur village	17.4620347	78.7355759
13	Muthangi(v) limits	17.5425548	78.2267425
14	Mellacheruvu fly o	16.8192144	79.9290642
15	katsar village	25.3337351	83.3482146
16	Muslmanwadi pa	19.0920423	77.2333412
17	Nagzari fata	20.1986856	76.5184122
18	Shahapur	19.4520777	73.3279586
19	Nachlana	33.3613594	75.1722108
20	Chamalwas	33.385502	75.2099821
21	Barnoti Morh	32.4301639	75.4355652
22	Pusaro Bridge	24.2907271	87.2328042
23	Asanthar	24.3708132	87.1210889
24	Basukinath bus s	24.3863547	87.0799077
25	Devalapur cross	15.7837783	74.8229316
26	Mayaganahalli	12.7685803	77.3354429
27	Ethakota center	16.7197294	81.8347317
28	Gopalapuam cen	13.0489376	80.2586162
29	Kotapoluru cross	13.7287717	80.0167816
30	Sawmill Area	35.1009893	-106.6663912
31	Mithun Gate	27.1028136	93.6331499
32	Bank Tinali	28.0383824	95.5911369
33	Daldhova	23.3452948	83.3468379
34	Badheri Chowk	30.7317011	76.7347343
35	Anmod Ghat	15.43643	74.3103546
36	Dabolim	15.390198	73.8547036
37	Pipodara	21.3602405	72.9599129

Analysis of data:

As India has one of the highest rates of traffic accidents worldwide, there has been a great deal of concern about road accidents there for a long time. It is necessary to take into account a number of variables while analyzing the road accident situation in India, including the causes, contributing factors, statistics, and efforts to remedy the issue. Here is a Analysis of Indian traffic accidents

Category of roads	Accident in 2019	Accident in 2020	% change in 2020 over 2019
National highway	1,37,191	1,16,496	-15.1
State highway	1,08,976	90,755	-16.7
Other roads	2,02,835	1,58,887	-21.7
All india	4,49,002	3,66,138	-18.5



Mapping the area :

The created database is delivered to the GIS, or geographic information system. Techniques from the Geographic Information System (GIS) will be used to map and evaluate the accident data.

Software model :

The accident data on India will be mapped and analyzed using Geographic Information System (GIS) methods. GIS makes it possible to combine different data layers, making it easier to discover accident hotspots and patterns.

- ArcGIS:

The widely used GIS software suite ArcGIS, created by Esri, has many features for accident location analysis. Users can examine accident data based on location, qualities, and spatial correlations thanks to its spatial analysis features. Real-time data sources can be integrated with ArcGIS, allowing for the viewing of accident locations on dynamic maps.

- GeoDa:

Free and simple Geographic Information Systems (GIS) program called GeoDa is created primarily for spatial analysis. It provides numerous analytical methods, such as spatial autocorrelation, cluster analysis, and kernel density estimation, for accident location analysis. Users of GeoDa can investigate and see spatial patterns of accidents, find hotspots, and evaluate the importance of spatial grouping.

Conclusion:

In conclusion, a project that focuses on the locations of accidents on Indian roads can have a big impact on raising traffic safety and emergency response. The project can accomplish the following goals by utilizing cutting-edge technology including GIS software models, GPS systems, and intelligent transportation systems.

- Making decisions based on data: The initiative may offer insightful accident data for study, allowing officials to spot accident trends, high-risk regions, and contributing variables. Improvements to the infrastructure and specific road safety actions can be made using this information.

- Reduced response time: The initiative can cut down on emergency service response times by promptly locating accident sites, ensuring prompt on-site help.

- Public involvement and education: By utilizing real-time accident data, the initiative may educate the general public about traffic safety issues and promote safe driving practices. Commuters can make educated judgments and avoid accident-prone locations by sharing accident information through social media platforms and smartphone applications.