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|  | | Accident Locations on Indian Roads | | | | |  | |
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|  | | | | Sonakshi Badlani |  | | | |
|  | | | | 10-June 2023 to 15-July-2023—Data Collection and analysis—Intel Unnati |  | | | |
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|  | Abstract | | | | | | |  |
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|  |  |  | This technical report presents a geospatial analysis of accident locations on Indian roads using QGIS (Quantum Geographic Information System). The study aims to provide a comprehensive understanding of the spatial distribution of accidents, identify high-risk areas, and visualize the patterns and trends associated with road accidents across various regions in India.  The study utilizes a dataset comprising accident records collected over a specified period from different sources, including geospatial coordinates which were found out using a geocoder. This dataset is integrated with road network data and other relevant spatial to provide a comprehensive context for the analysis.  QGIS, a powerful open-source GIS software, is employed to process and analyze the accident data. Spatial clustering techniques and hotspot analysis tools are utilized to identify significant concentrations of accidents and delineate high-risk zones. Furthermore, the study explores the correlation between accident occurrence and various spatial factors, such as road type, intersections, speed limits, and presence of pedestrian facilities. | | |  |  |  |
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|  |  | Introduction Geospatial analysis, utilizing advanced tools such as QGIS (Quantum Geographic Information System), offers a powerful approach to mapping accident locations and uncovering spatial patterns and trends.  In summary, the introduction sets the foundation for the technical report on mapping accident locations on Indian roads using QGIS. It establishes the importance of geospatial analysis in understanding accident patterns, highlights the capabilities of QGIS as a powerful tool for this study, and underscores the relevance of the research in the Indian context. Motivation The marking of accident blackspots in India plays a crucial role in enhancing road safety and reducing the occurrence of accidents. An accident blackspot refers to a location on the road network where a significantly higher number of accidents have taken place compared to surrounding areas. By identifying and marking these blackspots, authorities can focus their resources and implement targeted interventions to mitigate the risks associated with these hazardous areas.  Visible markers at these locations serve as a constant reminder of the need for caution and heightened awareness, encouraging drivers to adopt safer behaviors and adhere to traffic regulations. Additionally, marked blackspots facilitate data-driven decision-making by providing a tangible representation of the areas requiring urgent attention and resource allocation | | | | |  |  |  |

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|  | | THE PROCESS | | | | |  | |
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|  | The approach The data relating to accidents in various states can be extracted from various government sites and can be used to conclude various things about the accidents occurring. One such database is put up by the government of each state with the locations of the accident blackspots in the state.  I started working with the state of Karnataka and found a word document with the blackspot locations given, using excel’s geocoder I obtained the full address of the location. The same geocoder was used to find the accident blackspot location’s latitude and longitude.  To enable the geocoder in excel, I downloaded an extension which could convert different addresses to their full address and their latitude- longitude and was downloadable as a csv file.  On multiple trials, I found out other ways to geocode the addresses namely mmqgis extension on the QGIS tool itself and a code written on python. I chose the excel geocoder as it was the least time consuming and converted the given addresses into their full addresses.  Once the csv file with the latitude, longitude and the full address was found out, the shapefile of the particular state was downloaded( a google maps API could also be used) and both the files(The Shapefile and the csv file ) was uploaded on the QGIS tool. The blackspots were marked for Karnataka.  The above process was carried out for each of the following states- Karnataka, Maharashtra, Tamil Nadu, Bihar, Chhatisgarh, Haryana, Madhya Pradesh, Rajasthan, Gujrat, Himachal Pradesh, Andhra Pradesh and Uttar Pradesh.  I even used the Kepler.gl tool to show the accident blackspots. The csv files obtained after the geocoding, containing the latitude and longitude were simply uploaded on kepler.gl to obtain the following result: | | | | | | |  |
|  | Conclusion | | |  |  | | |  |

In conclusion, the technical report has highlighted the importance and effectiveness of marking accident blackspots in India as a vital strategy for enhancing road safety. By identifying these locations with a high concentration of accidents, authorities can prioritize resources and implement targeted interventions to mitigate risks and reduce accident rates.

The report has underscored that analyzing accident data alone is insufficient without considering the spatial patterns and concentrations of accidents. The identification and marking of blackspots allow policymakers, transportation agencies, and urban planners to gain deeper insights into the contributing factors, such as inadequate road design, signage, or high traffic volume, and take appropriate measures to address them.

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