

ROAD SAFETY AUDIT IN FARIDABAD VIA GIS

Suhail¹ Dr. Sonal Saluja² ¹M. Tech Civil (Transportation), Manav Rachna International Institute of Research and Studies ²Assistant Professor, Manav Rachna International Institute of Research and Studies

Abstract

For present paper researcher perform analysis related to road accident, as partial database in corpora ting all the desired Information be created. First of all, the existing road network was extracted from guide map. The updating of road network was carried out with the help of Satellite data from Google earth. All this information was registered on to a single layer and verified through satellite. Small discrepancies in road discontinuities were resolved by edge matching and proper editing in order to achieve a seamless digital database. The non-spatial data related to accident records available from police records were attached to the spatial data layers. A proper integration of the spatial and non-spatial was carried out by using Arc Map (GIS) version 10.4 Software as taken to ensure that the database remained dynamic, so that any change in attribute database was reflected in the GIS spatial layers using the Arc Map (GIS) version 10.4 Software as the base, customized query for analysis of road accident data were defined.

Keywords: Road safety, Faridabad, GIS, vehicle, accident.

Introduction

In India, NHs are the major roads of the country supporting economic activity apart from providing mobility and accessibility to the masses. They traverse the length and breadth of the country, connecting the state capitals and major cities. NHS are vital in providing medium and long-distance intercity passenger and freight traffic across the country. As per MORTH (2020), NHS accounted for 36% of the total number of persons killed, whereas they constituted only2.03% of the entire road network in India in 2019.

Study area

Are a under Old Faridabad and Sector 31 Faridabad Police station in Faridabad district of Haryana in northern India which is 03 kilometres from the national capital New Delhi has been chosen as study area for accident data analysis and its representation. The area is lying between two major parallel roads NH-44 (Old NH-2) and Faridabad Bypass passes through these areas. Section from Sarai Khawaja to old Faridabad of new NH-44

© 2023 JJNRD | Volume 8, Issue 6 June 2023 | ISSN: 2456-4184 | JJNRD.ORG (OLD NH-2) which is major connecting route for important cities Gurgaon, Ballabhgarh, Noida and Delhi) passes through study area. Beside all these features study area is mainly famous for road side Malls, Suraj kund mela etc. which attract a lot of traffic from nearby areas.

Vehicle accident has been collected from Haryana police station web site as well as from Old Faridabad and Sector-31 Faridabad police station for 2015 to 2018. Base map is taken from Arc GIS and satellite imagery is taken from Google earth.

The location map of Study Area is shown in Figure 2



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1. Location Map of Study Area

IDENTIFICATIONOFBLACKSPOT

Study Area

The study area for Identification of black spot is Area under Old Faridabad and Sector-31 Faridabad police station. The area is lying between two major parallel roads NH-44 (Old NH-2) and Faridabad Bypass passes through these areas. Section from Sarai Khawaja to old Faridabad of new NH-44 (OLD NH-2).

Methodology

The methodology has been subdivided into the following steps

- Collection of accidents data with Spatial coordinates a teach location of study area
- Use Google Earth Map
- ▶ Load vehicle crash data and aggregate the data a teach location.
- Compute as severity index a teach location
- > Create a vehicle accidents black spot map with Kernel Density Estimation.
- Computes severity in dice sand rank of unsafe black spot
- > ArcGIS software with the spatial statistic tool box issued for mapping and spatial analysis.
- Collection of accidents data: Vehicle accidents data of each location of study area has been section collected from Haryana Police website.

Computease verity index at each location.

These verity index is computed by the following equation:

Severity Index SI = 6.0 xX1+ 3 xX2+0.8xX3+0.2xX4

Where X1 = total number of fatal injury accidents X2-total number of serious injury accidents

X3-totalnumberofminorinjuryaccidents

X4 =total number of property damage only accidents The severity index is used as the criteria for spatial analysis in this study. The Severity Index of the individual accident evaluated according as collected accident data for the Kernel Density Estimation.

Create a vehicle accidents black spot map with Kernel Density Estimation

The locations of black spots have been basis of the Kernel density. The spatial coordinate of black spot's location has worked out with the help of prepared Kernel Density map. Kernel Density Estimation with Google map and Google Satellite map is shown in figure.

The ranking of black spots also has been assigned based on the Kernel Density.





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1. Kernel Density Estimation with Google map and Google Satellite map

Severity indices and rank of Black spot

By using ArcGIS Kernel Density Estimate has been done. With the help of density map frame radius 20022 and cell radius value of 50 the ranking of black spot on study area has been identified based on kernel density severity indices. Identified spot locations with ranking are shown in table 1.

Table Error! No text of specified style in document. I Severity indices and rank of Black spot

SI. NO.	Location	Spatial Location	Ranking
1	Old Faridabad Chowk, Mathura Road	28.41 <mark>5736°,77.310</mark> 794°	9
2	Badhkal Chowk	28.42 <mark>343</mark> 6°,77.309986°	1
3	Sector-28 Metro Station	28.438947°,77.308837°	4
4	Mewla Maharajpur, Faridabad,	28.442478°,77.308236°	2
5	Sahni Chowk, Faridabad	28.450703°,77.307775°	6
6	NHPC Metro station, Faridabad	28.458756°,77.307159°	3
7	NHPC Chok Mathura Road	28.436267°,77.309047°	3
8	Sharmik Vihar, Bypass Road	28.4395120.77.323947°	5
9	Police Line, Sector-30, Faridabad	28.443664°,77.322667°	8
10	Sector-29, Bypass Road	28.428792°,77.326903°	10

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Area under Old Faridabad and Sector-31 Faridabad Police station in Faridabad district of Haryana in northern India which is 03 kilometres from the national capital New Delhi has been chosen as study area for accident data analysis and its representation. The area is lying between two major parallel roads NH-44 (Old NH-2) and Faridabad Bypass passes through these areas. Section from Sarai Khawaja to old Faridabad of new NH-44 (OLD NH-2) which is major connecting route for important cities Gurgaon, Ballabhgarh, Noida and Delhi) passes through study area.

Fatal Accidents

The number of fatal accidents is shown figure 4 in study area from Year 2015 to Year 2018.



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1:Fatal accidents in study area

Percentage of Fatal Accidents

The percentage of fatal accidents are shown in figure 5 industry area from Year 2015to Year 2018.



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Overall Percentage of fatal accident from 2015to 2018 is 40% which is quite high and directly indicates that Road safety condition is very poor. From year 2015 to 2018, month wise distribution of accidents in Study area is as under:

Month wise accidents details from 2015 to 2018

The month wise number of accidents are shown in figure 6 in study area from Year 2015 to Year 2018.



Vehicle wise accidents data distribution

The vehicle wise accidents are shown in figure 7 in study area from Year 2015 to Year 2018.



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4. Vehicle wise accidents data distribution from 2015 to 2018

Times lot wise data distribution

The time slot wise accidents distribution is shown figure 8 in study area from Year 2015 to Year 2018.



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5: Day/Night accidents data distribution from 2015 to 2018

Distribution of Pedestrian Accidents

The distribution of numbers of pedestrian accidents are shown in figure 9 and in study area from Year 2015 to Year 2018.



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6: Number of Pedestrian Accidents

The percentage share of pedestrian accidents is shown in figure 10 from Year 2015 to Year 2018.



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Conclusions

Road accidents attributable to various types of traffic rules violations reveals that over speeding constitutes the main violation associated with accidents.

From the present study the following conclusions has been drawn:

- From traffic data analysis it is evident that Cars are involved in more than 55% of accidents. In this
 period, three number so flyover have constructed at location Old Faridabad chowk, Badkhal Chowk and
 NHPC Chowk simultaneously and one number of underpass has constructed Mewla Maharajpur
 Chowk.
- In the study area there is no facility for pedestrian due to this reason involvement of pedestrians in accident is quite high. Accident analysis shows that pedestrian is involved in 35 % of accidents. During Year 2018, foot over bridge has constructed near Mewla Maharajpur chowk and Old Faridabad on NH-44.

Kernel density analysis shows that there are 11 black spots in study area on NH-44 including Faridabad Bypass section having 5kmlengthon NH-44. All these locations are junctions: Old Faridabad Chowk, Badhkal Chowk, Sector-28 Metro Station, Mewla Maharajpur Chowk, Sahni Chowk, NHPC Metro Station, NHPC Chowk, Sharmik Vihar, Bypass Road, Police Line, Sector-30-Bypass Road, Sector-29, Bypass Road, Kheri Pul, Bypass Road.

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