

Critical Review on: Identify Hazardous Road Location & Interpret by ArcGIS

Mital Damani¹, Prashant Lakkad², Bindiya Patel³, Darshan Joshi⁴
^{1,2,3,4} Civil engineering Department, Atmiya Institute of Technology & Science

Abstract- India's share of road accidents in the world is an area of serious concern. Road traffic accidents have been recognized as one of those adverse elements which contribute to the suffocation of economic growth in the developing countries, due to the heavy loss related to them, hence causing social and economic concern. Traffic safety is an important key and plays an integral role in sustainable transportation development areas. Now days, the main negative impact of modern road transportation systems are loss of property injuries and deaths in road accidents. The success of traffic safety and highway improvement programs hinges on the analysis of accurate and reliable traffic accident data. Thesis applied the combination of geo-information technology and spatial-statistical analysis to bring-out the influence of spatial factors in their formation. With advancement in technology, new and sophisticated models of vehicle are available and their numbers are increasing day by day. Development of a model for traffic accident density estimation explained by GIS data can enable the determination of dangerous areas objectively and easily, indicating where area-wide traffic calming can be implemented preferentially. A traffic accident has multi-facet characteristics associated with it. For proper traffic accident analysis use of GIS technique has become an inevitable tool. This Study examined the relations between traffic accidents and city characteristics, such as population, road factors, and spatial factors. A model was developed to estimate traffic accident density. Kernel density estimation (KDE) techniques were used to assess the relations efficiently. In general, the location of traffic accidents is described as an address with text, so they are difficult to display on the map. Thesis concern with how to utilize the GIS to work-out on Spatial Analyst to record the traffic accidents. Thesis workout in presenting the method which takes the potential of reducing accidents as an index to extract the black spots

Index Keyword: - ArcGIS, Kernel Density Analysis, Hotspot, Traffic Accident Severity.

I. INTRODUCTION

India is the seventh biggest nation by range. India is the second most crowded nation on the planet, with more than 2.5 billion individuals. Transportation offices are the main necessity of any country for the foundation advancement.

India has a street system of more than 5,472,144 kilometers as on 31 March 2015, the second biggest

street organize in the world. It is a moment biggest street arrange on the planet. Balanced for its vast populace, India has under 3.8 kilometers of streets for every 1000 individuals, including all its cleared and unpaved streets. As far as quality, all season, at least 4 path parkways, India has under 0.07 kilometers of roadways per 1000 individuals, starting at 2010. These are some of the lowest road and highway densities in the world.

Road protection is a primary subject inside the present scenario. It has been anticipated that nearly 1.2 million humans die and 50 million men and women are injured in each single 12 months in street injuries all through the world in step with the World health Organization (WHO). Detailed analysis of worldwide accident information imply that fatality rate in line with licensed automobile in developing international locations are very excessive in comparisons with the industrialized international locations. In developing nations, broadly speaking street visitors accidents came about amongst pedestrians, passengers, bike owner, motorized wheeler and busses. According to the World fitness Organization, road traffic accidents are the sixth main purpose of dying in India among younger people and street accidents have been proven to value round 1% of annual gross countrywide merchandise. Increased space of vehicular movement in all components of the city consisting of neighborhoods, faculty areas and most important arteries have brought about elevated accidents and reduced safety to the pedestrians and bike owner. Pedestrians and bike owner are exposed to chance due to battle with the vehicular, and due to the bad infrastructure facilities. However vulnerable street customers are regularly omitted by means of coverage makers, planner and engineer. Therefore no policy plans for pedestrians in India towns.

Locating of traffic accident black spots in the Rajkot city reveals that maximum numbers of accidents are at between name all roads with higher road accident.

This might be because of absence of geometrics and insufficient flag control framework and

progressing development activities. For person on foot to exacerbate circumstance, there nonappearance of most important passerby offices like foot over scaffold, trails, cycle tracks, Zebra intersection and select walker motion at busiest intersection in the Rajkot and at whatever point they gave, generally are used or underutilized. The city organization is additionally not engaged with the mindfulness battles to show overall population about the principles and directions related with auto collisions wellbeing.

II. LITERATURE REVIEW

A. Identification of Hotspot of Traffic Accidents Using GIS: Anitha Selvasofia.S.D , Prince Arulraj

In countries where economic condition is poor , there is always problem such like social & economic development face trouble same in infrastructure side & over congestion in urban area .This paper represent such situation prevailing in Coimbatore district ,where traffic safety is one of concern point ,thus by finding black spot in prevailing area and carryout analysis with ArcGIS . The success of traffic safety and highway improvement programs hinges on the analysis of accurate and reliable traffic accident data. This study discuss the present state of traffic accident information on NH 47 Gandhipuram to Avinashi and NH-209 from Gandhipuram to Annur, Coimbatore District.At end after critical analysis remedial measure & reducing risk of accident is suggested.

The investigation was attempt to locate most of vulnerable road accident within Coimbatore district with the help of GIS. The Weighted Severity Index Method (WSI) technique was used to rank the mischance areas. In light of the investigation, Ramkrishna Mill, singanallur zone, Thudiyalur zone were distinguished as generally helpless and more number of accident prevailing in such area ,Based on WSI safety ranking they suggest some of remedial measure to improve traffic safety ,it found satisfactory result with help of enough secondary data availability.

B. Traffic Analysis and Road Accidents: A Case Study of Hyderabad using GIS: M. Bhagyaiah, B. Shrinagesh

Globalization has affected developing nations over the world. India is one such nation, which profited the most. The effect is shown in automobile sector, increment in movement and transportation too. The expansion in the vehicles since most recent 10 years

has put part of weight on the current streets and eventually bringing about street most congested. It is assessed that since 2001 there is an expansion of 202 percent of bike and 286 percent of four wheeler vehicles with no street development. Vehicle accident are a typical reason for death, inability and interest for crisis restorative care. There has been expanding pattern in street congestion in Hyderabad over a couple of years. GIS makes a difference in finding the hotspots and furthermore in dissecting the pattern of street congestion in Hyderabad.

At end thesis conclude that police data, newspaper and many other who is only source of gathering fatalities data turns to be insufficient. The restrictions of the police database, which is the legal source of data on fatalities coming about because of street accidents, show a requirement for fortifying the street accident reconnaissance framework with the goal that dependable, exact and satisfactory information on street car accidents and the coming about fatalities and wounds can be gathered. This could then shape the reason for arranging successful intercession procedures to enhance street security in the city. More exertion is needed a far reaching comprehension of the different parts of street activity crashes, and the suggestions made for fortifying observation could fill in as an beginning advance towards lessening fatalities and wounds because of street crashes in the long haul.

C. Estimating Traffic Crash Risk to Users in Urban Areas and its Impact on Mode Choice: Case Study Vadodara City, India: Prajapati Pankaj Shankarlal, Geetam Tiwari

Transportation studies emphasis more development in statistical modelling ,whose contribution is important , which is widely used in application and study pattern of accident.It also used to predict & study outcome of variables predictor variables .In this paper most focus is on pedestrain as it is a main source of starting As well as endin journey . In depth its behaviour is study, Accident spot & such environmental studies gathered in delhi (2001- 2012) , it comes outcome fatalities rate is 45.50% accounted by pedestrain from total fatalities rate.

Results comes out is: Change in infrastructure after & before construction of grade separator & Related to infrastructure type: signalized crosswalk, non-signalized crosswalk, free left turn & foot over bridge.

D. Pedestrian accident analysis in Delhi using GIS: Shalini Rankavat ,Geetam Tiwari

Walking is input of any mode of transport in Indian cities. From 2006-2009, an estimated 8503 fatalities in road traffic crashes occurred in Delhi in which pedestrians contribute almost 51%. The objective of this study was to investigate the potential of utilizing geographic information systems (GIS) in identifying pedestrian accident-prone locations. Crash data were geocoded in ArcGIS over the digitized road map of Delhi. Results highlighted four pedestrian fatal hotspot locations in Delhi. Fatal pedestrian accidents were significantly clustered ($p < 0.05$) over the Ring Road of Delhi at intersections. The analysis showed that the pedestrian fatalities at arterial road intersections involving cars and buses were 27% and 14% of all fatalities involving cars and buses respectively.

It has been outlined how the utilization of GIS can successfully help in the preparing of effective information, and for performing complex spatial examination. GIS helps enormously in the representation of the issue of street mischances.

The geographic conveyance of person on foot casualties features the boundless instability individual's involvement in Delhi when strolling. Deadly crash thickness is higher close ISBT in Delhi, where populace thickness is likewise high. On superimposing GIS delineate documents over Google earth guide of Delhi it was discovered that roundabouts are having less number of mishaps and grouping of mischances is found over the intersections and close foot of flyovers. The outcomes show factually critical and predictable examples of bunches for person on foot crashes over a four-year time span and legitimize the utilization of spatial measurable procedures.

Auto collision investigation would have been more exact, simpler and clear if the car crash reports were more point by point and arranged legitimately. On the off chance that the X and Y facilitate of area utilizing GPS were spared in police database at that point plotting of mischance focuses would have been less demanding and aftereffects of investigation more dependable.

E. Using spatial network analysis to model pedal cycle flows, risk and mode choice: Crispin H.V. Cooper.

This paper exhibits a SpNA display utilizing half breed between, which fits cyclist streams in Cardiff, Wales utilizing separation, rakish separation, engine

vehicle activity and incline as indicators of course decision. SpNA betweenness is too appeared to certainly catch the impact of urban thickness on mode decision. As it handles course discovering choices of drivers and cyclists independently, the model exhibited is additionally appropriate to street security models analyzing the collaboration between the two classes of street client. The model has minimal effort of information gathering and is reproducible utilizing freely accessible system examination programming and open mapping information. Assist roads for demonstrating the impact of foundation on cycling are talked about.

The commitment of this investigation has been to introduce a methodology for fine-scale, city-wide modelling of cyclist streams, by joining SpNA with all the more behaviorally practical establishments. The model depends on negligible information that is for the most part accessible to people in general. It gives sensible connection with measured streams and is delicate to the area and nature of changes to foundation. An auxiliary novel viewpoint is the recreation of connection level engine movement streams to nourish into the reproduction of cyclist streams, in this manner representing the impact of one on the other.

For the models exhibited here to be helpful practically speaking they are improved by apparatuses for dealing with any confound between measured streams, show forecasts and client desires. To this end, the sDNA+ programming incorporates highlights which enable clients to set up why the model predicts that connections are, or are not utilized, when the client considers or then again measured stream information demonstrates something else. To help comprehension of how new foundation may coordinate into the current system, representations can be sifted to show just outings that go through a particular connection, in this way demonstrating anticipated conduct related with new framework.

REFERENCES

- [1] AnithaSelvasofia.S.D,PrinceArulraj.G.,2016 .International Journal of Advanced Engineering Technology. (Sept 2016), E-ISSN:0976-3945
- [2] M. Bhagyaiah, B. Shrinagesh.2014. International Remote Sensing & GIS Conference and Exhibition. DOI:10.1088/1755-1315/20/1/012026

- [3] Prajapati Pankaj Shankarlal, Geetam Tiwari. 2015. Transportation Research & Injuries Preventive Programme (TRIPP) IIT Delhi. (Monsoon 2015).
- [4] Shalini Rankavat ,Geetam Tiwari. 2013. Journal of the Eastern Asia Society for Transportation Studies,
DOI : <https://doi.org/10.11175/easts.10.1446>
- [5] Crispin H.V.Cooper . 2016. Journal of Transport Geography, Science Direct (Jan 2017),
DOI:<https://doi.org/10.1016/j.jtrangeo.2016.12.003>