TRAFFIC ANALYSIS AND ROAD ACCIDENTS: A CASE STUDY OF NASHIK CITY USING QGIS

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Abstract – Nashik, a city situated in the northern part of Maharashtra .The District has great mythological background. It has been declared one of the fastest developing city of India. Due to this many people are migrating towards Nashik . This ultimately affects the population density of the city. People are in search of better life style and hence increase the population of the city. The roads were constructed for lesser population, which has now be- come an issue. This leads to congestion in traffic, especially during the peak hours. In this project we shall select few major spot for traffic study survey. This will fetch us with the data of traffic at each spot. Now by using the software Q-GIS we can easily prepare the maps showing the intensities of traffic at selected spots. These maps can be further used for studying the traffic patterns and also finding out solution over the same.
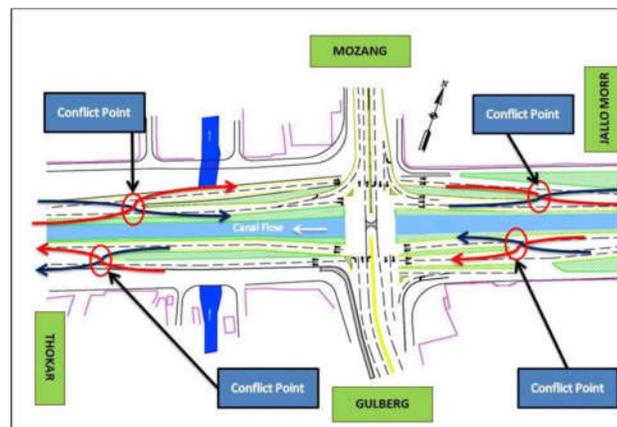
Fig. No. 1. Traffic flow pattern sample

Key words : Congestion, traffic spots, population, major spots, accidents.

1. INTRODUCTION

The process of rapid and unplanned urbanization has resulted in an unprecedented revolution in the growth of motor vehicles world-wide. The alarming increase in morbidity and mortality owing to road traffic incidents over the past few decades rank ninth in order to decrease burden and are projected to be ranked third in the year 2020. In India , more than 70,000 people get killed due to RTI every year, and this

needs to be recognized as an important public health issue. Very few studies have attempted to understand the epidemiology of risk factor associated with RTI in Indian cities. The present study aims to examine the magnitude of this multi- faceted problem in developing cities like Nashik and analyze the causative factors. Nasik, the city of pilgrimage, has been under the process of urbanization for around more than 50 years now. It is one of the fastest developing cities in the country. People living in the nearby Talukas have been migrating towards the Nashik city in seek of work opportunities and better career prospects. Being a student studying in such a city it wouldn't be a better opportunity for us to select this location for our project and research work. By taking into consideration, all the above discussed problem, it could be concluded that traffic congestion has affected the people of the city. To resolve this problem the following study were made.

1.1 OBJECTIVE OF STUDY

1. To carry out the Traffic   Survey of various spots around Nashik city.

2. To identify and analyse the risk factor and causes of accidents due to traffic congestion.

3. To prepare a comparative map of traffic intensities and thus identify the traffic hotspots.
4. To determine the solution over the increasing traffic problem in the city.

2. METHODOLOGY

2.1 SITE SELECTION :

By considering factors such as population and nature of noise pollution, critical spots in residential, com- mercial, industrial and social importance were selected. The boundary of Nashik city and the core areas of city were select- ed as the study area. To develop the map for predicting the traffic congestion, the first task was site selection. So, by considering factors such as traffic, population and nature of noise problem, critical spots in residential, commercial, industrial and social importance were selected. The boundary of nashik city and the core areas of city were selected as the study area. NH-3 en-routes along the boundary of city and carries maximum traffic causing pollution of noise. The region near Bombay Naka accommodates many hospitals, which shall not be much affected by the disturbing noise or traffic. The Satpur MIDC region is affected not only by the traffic noise but also by the noise caused by industrial activities. The old city area has huge market area, this leads to traffic.

2.2 LOCATING CO-ORDINATES:

The co-ordinates of all the selected points were located using the GARMIN GPS instrument. These co-ordinates were further used in Q-GIs for pre- paring the maps.
Steps of Determination of GPS Coordinates:

1. Switch On the GPS receiving instrument at the location of recording the noise level.

2. Wait till the receiver gets signal from the satellites.

3. When the instrument has reached the accuracy of less than 10 meter then the coordinates are recorded.

2.3 TRAFFIC SURVEY:

The traffic survey is to be conducted at different time i.e. morning and evening. The data is to be filled using following format:

Area(Location)	2 Wheelers	3 Wheelers	4 Wheelers	Heavy duty ve-hicles
A	23	12	15	2
B	102	53	34	4

2.4 PREPARING MAPS :

The software of Q-GIS (Quantum Geographical Information System) is to be used fro this purpose. The data shall be input in the software to get the maps showing intensities with different colors. **QGIS** (previously known as **Quantum GIS**) is a free and open-source cross platform desktop geographic information system (GIS) application that supports viewing, editing, and analysis of geospatial data. QGIS functions as geographic information system (GIS) software, allowing users to analyze and edit spatial information, in addition to composing and exporting graphical maps. QGIS supports both raster and vector layers; vector data is stored as either point, line, or polygon features. Multiple formats of raster images are supported, and the software can geo-reference images.

3.ANALYSIS

All the data collected by conducting the traffic survey is first entered into and excel sheet. This sheet is then imported in the software of Q-GIS. The vector layers are added from the tool box option. Later on the plug ins are installed. The plug in used for our study was the interpolation plug in. The software will now interpolate the values given as input of the traffic survey. The map will get displayed showing the intensities using different colors. The colors used for displaying can be changed in the legends. But we generally use is as Red for higher intensities and Blue for lower intensities of traffic. The following are the steps to work in Q-GIS:

3.1 Data compilation: Initially all the data of various locations under study along with their respective sound levels measured were compiled in tabular form. This was done using MS-Excel.

3.2 Addition of vector layer: For this, the tool of layer in the tool box was being used. The procedure was layer >add layer>add delimited layer.

3.3 Installation of plug-ins : For this purpose, the plug in named 'interpolation' was installed. It is a plug in for interpolation based on vertices of a vector layer. The procedure was plug ins>manage/install plug in>interpolation plug in> install. Now interpolate all the values.

3.4 Generation of maps : After giving the input, the values of sound levels get interpolated. This generates a map showing variation in the traffic congestion at different locations under consideration.

4.RESULTS

- The areas in red indicate high intensity of traffic.

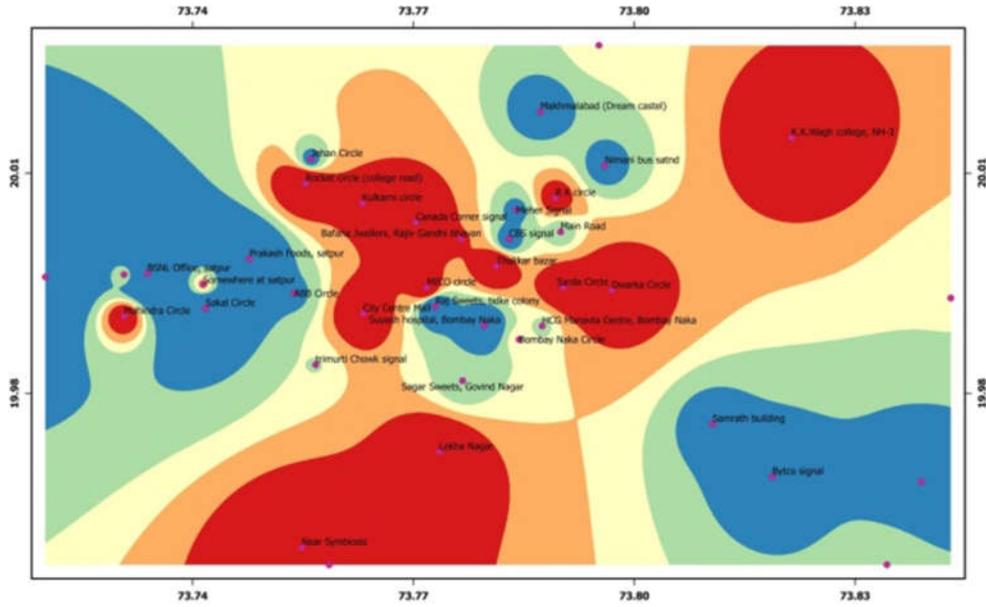- The areas in blue indicate low intensity of traffic
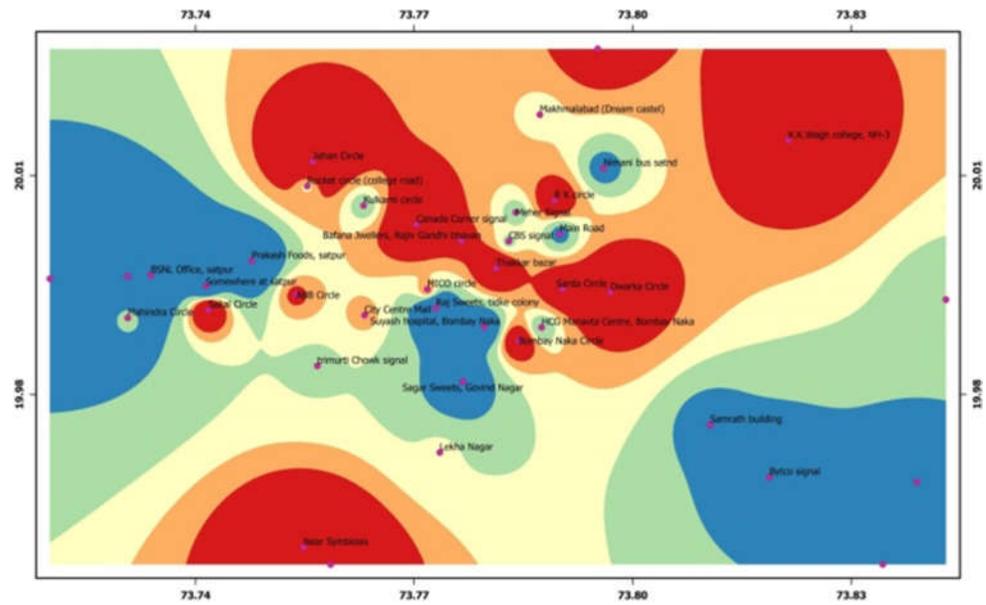

Fig. No.2. Traffic Intensity Map for Morning

Fig. No.3. Traffic Intensity Map for Evening

5.CONCLUSION

From the map it could be easily observed that, during the morning time areas such as Lekha nagar, Mahindra circle and the area near City center mall, Untawadi are always suffering from high level noise intensity, regardless of the time of day.   At the City centre mall signal heavy and dense traffic is observed during morning hours than the evening hours, as people move to work, and since one of the 4 roads at the signal has been put to place very recently, and people find it an efficient road to commute, contributing to early morning traffic .The Satpur areas are always mostly seen in the blue patch as per our observations. Both on weekdays and weekends; there's hardly traffic observed .The Sakal Circle On Trimbak road which is pretty wide, traffic moves quite smoothly during the morning hours.

The remedies over this could be that the road at places with high intensities can be widened and regulatory circles or junctions can be provided where required. Some places need to have a traffic signal too.

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