

Vol III Issue I July 2013

Impact Factor : 1. 2018

ISSN No :2231-5063

# Monthly Multidisciplinary Research Journal

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**RNI MAHMUL/2011/38595**

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## CRIME ANALYSIS USING GEOINFORMATICS TECHNIQUE AND HOTSPOT DETECTION FOR AKOLA CITY, MAHARASHTRA STATE, INDIA

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**Abstract:** The need of effective utilization geoinformatics technique has been providing city safety kind with tools to analyze and interpret such relations through GIS software. Recently, there has been increase in crimes of various types in Akola city. To prepare Maps offer crime analysis and graphic representations of crime-related issues. An understanding of where crimes occur can improve attempts to fight crime. The present study identified various crime patterns in Akola city and covers aspect of robbery, vehicle theft, and house theft safety for Akola city on a GIS platform and integrated with crime reason causes and effects. The system supports crime mapping and to minimize the crime conditions in Akola city.

**Keyword:** Crime Analysis, GIS, Hot Spot Detection, Network Analysis, Topology.

### INTRODUCTION

The traditional and age-old process of intelligence and criminal record data has failed to the present crime condition. Every year, nearly 36,000 vehicles, which amount to Rs.115 core, are stolen in India out of these only about 14,500 are traced, often in un-roadworthy conditions, with many components missing. Geographic Information system (GIS) uses geographic and computer generated maps as an interface for integrating and accessing massive amounts of location-based information and display spatial and non-spatial data. Internet capability enables an agency to serve various information to police stations, police control room to serve maps regionally to other agencies. The police should use the current technologies such GIS, GPS and vehicles tracking system. GIS allows police personnel to plan effectively for emergency response, determine mitigation priorities, analyze historical events, and predict future events. GIS helps crime officers determine potential crime location by examining complex seemingly unrelated criteria and displaying them all in a graphical layered, spatial Interface or map. It is a most important component of crime analysis, hot spot detections and the policing planning. The present study utilizes the various crime records integrated with ancillary data to crime hotspots that have been identified over several months can be displayed at the same time in Akola city. The present study was carried out such as following aim and objectives.

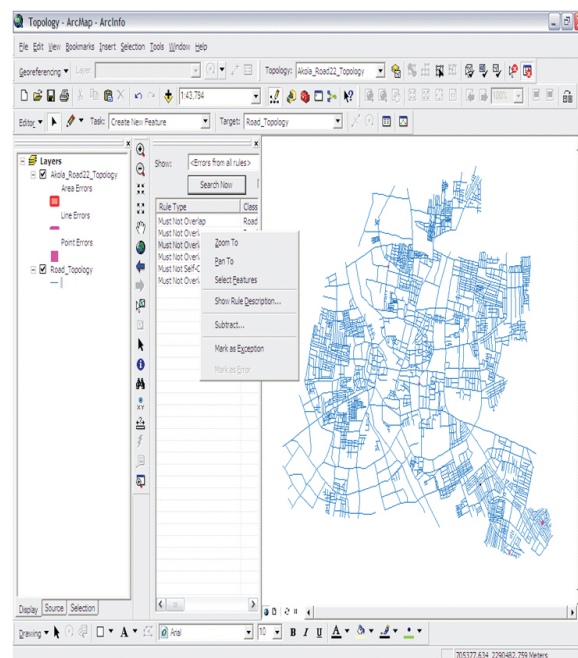
The basic aim of this research investigation is to prepare the effective hot spot detections and crime analysis for Akola city using geoinformatics technique.

Understanding the service of police department, police service network mapping and various crime analysis in Akola city.

Identifying and highlighting Crime incidents and hot spots

### detectionMethodology

A geographical information system translates physical feature in satellite image and municipal map (roads, rivers, ward map, municipal boundary) into forms that can be show integrated, manipulated and analyzed data. Using ESRI's software. like ArcGIS 9.3.1 software was used for the removing the error and the created topology. The road, hot spot location, police station location, and ward layer to attach attribute data for the crime analysis using ArcGIS 9.3.1 software.



**Fig. 1 Topology Building and Error Remove**

The present study for Crime analysis in the year 2009-10 is carried out with help of municipal ward map and the details of crime committed in the year 2009-10 were collected for the crime analysis. The whole Akola city was categorized into different Ward based on the crime analysis and to prepare total crime map in the year 2009-10 using geoinformatics technique. To prepare service road network map can also be effective used to get critical information understanding road to any incident to assist in tactical planning in Akola city. The present study was selected as major theme. This theme was overlaid with union operation as result of the police department development plan has been Prepared. Digital maps are the quickest means of visualizing the entire crime scenario. Using Arc GIS 9.3.1 version software was used to achieve the aim and objective.

found that vehicle theft, theft and fraud was the most reported crime in the railway station, bus station, main branch SBI, bank, bus stand, main hospital, and collector office during the two year, accounting for approximately 50% of all reported offenses. (Fig.No.3).

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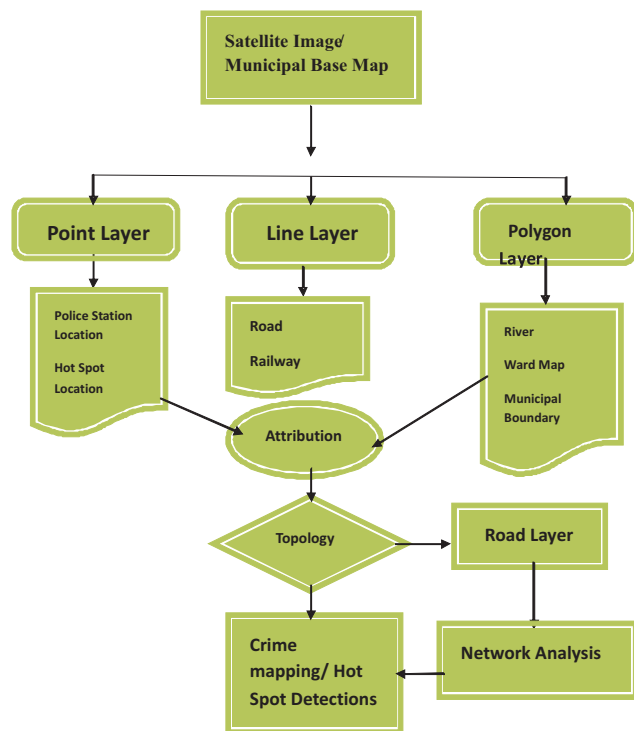


Fig. 2 Flowchart indicating GIS data analysis process

**RESULTS AND DISCUSSIONS:-**

The present study showing the locations of crime hot spots location, police stations, and service network map were created and the corresponding municipal area were delineated for each police station in Akola city. The attribute details including ward wise crime data in the year 2009-10 and ward wise Population details were collected to make the shape file for hot spots location and crime mapping in Akola city. Thematic maps showing hot spot detections and ward wise crime analysis. To prepare service network map is based upon the time using network analysis, suppose any crime incidents by road from which police stations are nearest and how much time police reach to incident location and the showing total crime map in the year 2009-10 and the comparison of total crime in the year 2009 and 2010. It is highest total crime in the year 2009. The present study was

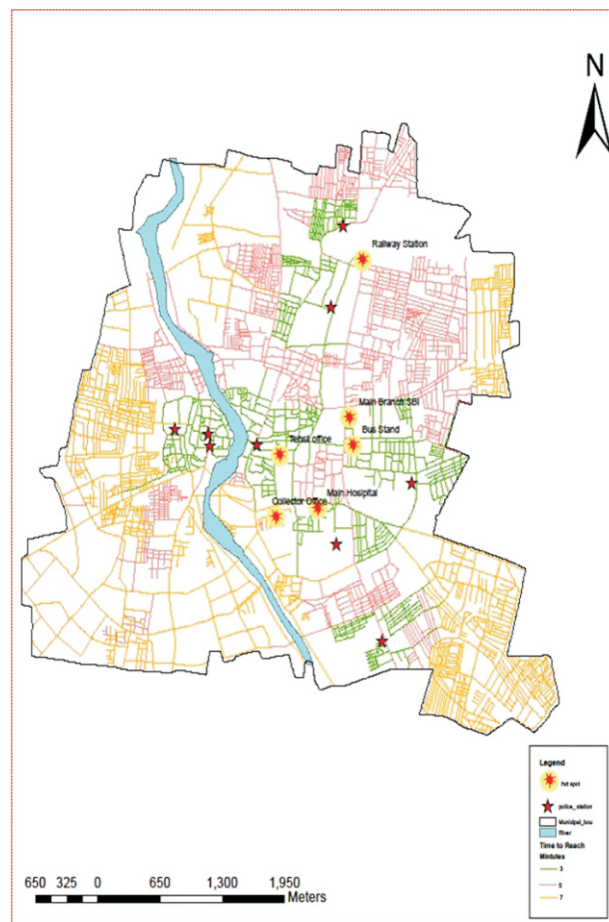


Fig. 3 Crime Hot Spots Map In Akola City

Police also plays an important role in Crime analysis. They provide important help in vehicle theft, house theft, robbery or disaster. Police stations that provide Emergency response support to any incident or rescue situations. There are six police stations in Akola city such as City kotwall, ramdaspath, civil line, old-city, akotfile, Khadan. (Fig. 4)



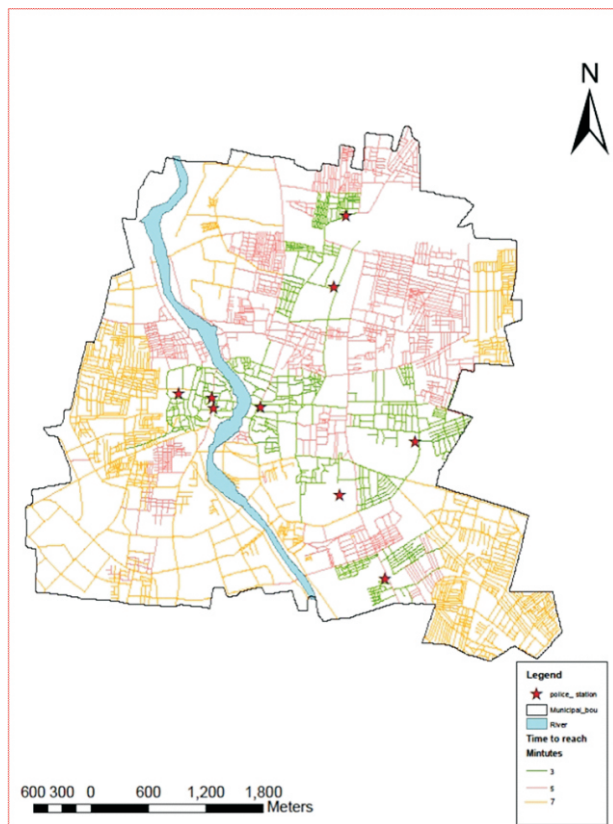


Fig. 4 Police Service Network Map of Akola City

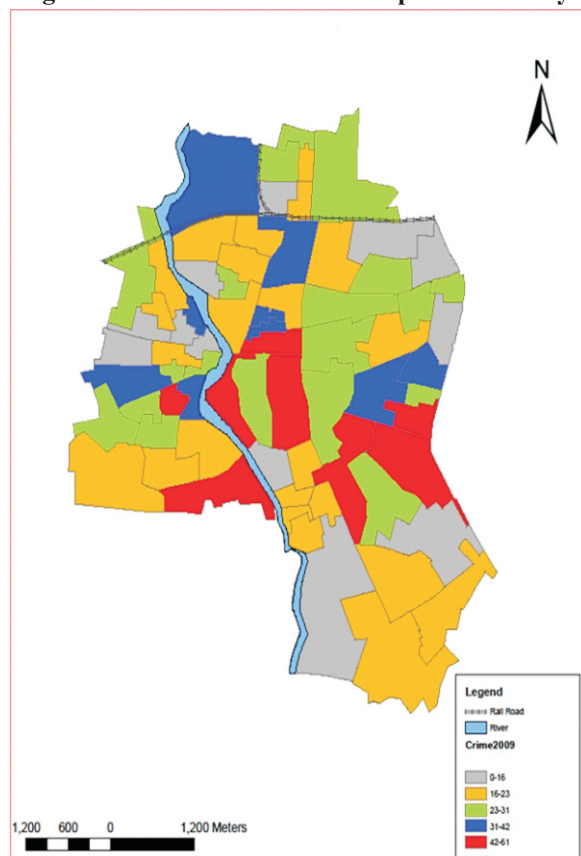


Fig. 5 Total Crime Map (2009) In Akola City

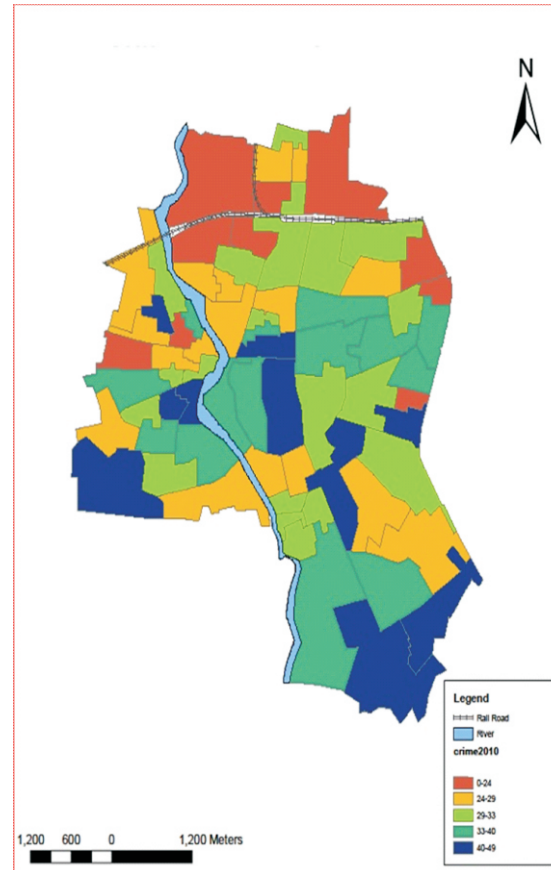


Fig. 6 Total Crime Map (2010) In Akola City  
CityConclusions

The use of geoinformatics techniques for crime analysis and hot spot detections mapping is primarily due to the automatization of certain operations thereby working time and the working personnel are reduced. The database that is “behind” each layer can anytime be updated. In addition the use of GIS facilitates the rapid visualization of some elements in the map through selecting them from the attribute table. It leads to the highlights of hot spots location of different types of crime on a GIS platform. To prepare Crime mapping can help police protect citizens more effectively and simple maps that display the locations where crimes or concentrations of crimes have occurred can be used to help direct patrols to places they are most needed. By using this technology we are assured that the information will be used in a consistent, efficient and flexible manner.

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