**APPLICATION OF SCAN STATISTICS IN IMPLEMENTATION AND MODELING OF HOTSPOT OF TOTAL COGNIZATION IPC CRIMES IN INDIA:AN INFERENTIAL PERSPECTIVE**

**ABSTRACT**

Crime analysis plays a pivotal role in law enforcement and policy formulation, particularly in countries like India where understanding spatial and temporal patterns of crime is crucial for effective crime prevention strategies. This study employs scan statistics to analyze hotspots of total cognizable IPC (Indian Penal Code) crimes in India using data from the National Crime Records Bureau (NCRB) spanning from 2014 to 2022. By leveraging NCRB data, which offers comprehensive information on crime incidents across various states and union territories over the specified timeframe, this study aims to identify areas with significantly higher rates of total cognizable IPC crimes compared to their surroundings. The findings of this study contribute to the advancement of evidence-based crime analysis in India, assisting law enforcement agencies in their efforts to combat crime and ensure public safety.In the realm of spatial epidemiology, employing Scan Statistics as an inferential and multivariate analytical tool assists in determining which clusters of alarms warrant further investigation and which are likely random occurrences. Calculations have been performed with SaTScan Version 10.1.2. The research presented in this paper incorporates data from various districts in India from the years 2014-2022. The spatial and temporal analysis facilitated by scan statistics enables the detection of emerging crime trends, the allocation of resources, and the formulation of targeted crime prevention policies

**INTRODUCTION**

Understanding and effectively addressing crime is a critical challenge for societies worldwide, and India is no exception. With its diverse population and complex socio-economic landscape, India grapples with a myriad of criminal activities that pose threats

to public safety and security. To tackle this issue, comprehensive and data-driven approaches are essential. The National Crime Records Bureau (NCRB) serves as a vital source of information, compiling detailed records of crime incidents reported across the country. In this study, we focus on total cognizable crimes, encompassing a broad spectrum of offenses defined under the Indian Penal Code (IPC), spanning from 2014 to 2022. By analyzing this rich dataset, which includes data from each district of India, we aim to uncover spatial and temporal patterns of total cognizable crimes, identify hotspots, and provide insights that can inform evidence-based crime prevention strategies. This study seeks to contribute to the advancement of crime analysis and law enforcement efforts in India, ultimately striving towards ensuring public safety and enhancing the quality of life for all citizens.

**LITERATURE SURVEY**

Some of the research papers on this field:

**1.Study on Crime Rate in India:**

The "Study on Crime Rate in India" offers a comprehensive analysis of the patterns and determinants of crime across different regions of the country. Through an empirical investigation, the authors highlight the prevalence of various types of crime, including but not limited to, property crimes, violent crimes, and white-collar crimes. The study employs statistical methods to identify correlates of crime, such as socio-economic status, urbanization, demographic composition, and law enforcement measures. Moreover, it sheds light on the geographical distribution of crime hotspots and the disparities in crime rates among different states and union territories. By elucidating the complex nature of crime in India, this study provides a valuable foundation for understanding the underlying drivers and formulating effective policy responses.

**2. Does higher educational attainment imply less crime? Evidence from the Indian states:**

The second paper under scrutiny investigates the relationship between educational attainment and crime rates across various states in India. Drawing on extensive data analysis, the authors explore the hypothesis that higher levels of education may serve as a protective factor against criminal behavior. Through regression analyses and empirical modeling, the study reveals intriguing insights into the inverse correlation between education levels and crime rates. It suggests that individuals with higher educational achievements are less likely to engage in criminal activities, attributing this phenomenon to enhanced socio-economic opportunities, improved decision-making skills, and greater social integration. Furthermore, the study underscores the importance of investing in education as a means to deter crime and foster inclusive development. By corroborating empirical evidence with theoretical frameworks, this research contributes significantly to the discourse on crime prevention strategies and human capital development in India.

**METHODOLOGY**

For scan statistics, the geographical data, the estimated population and the no. of cardiovascular cases in each state of India has been collected to locate the hotspots

The dataset from the National Crime Records Bureau (NCRB) spanning from 2014 to 2022 provides a comprehensive repository of crime incidents reported across India, focusing specifically on total cognizable crimes. Each year’s dataset includes detailed information on total cognizable crimes reported in each district of India, encompassing a wide range of criminal activities classified under the Indian Penal Code (IPC). This dataset offers a granular view of crime trends at the district level, capturing variations in crime rates and patterns across different geographical regions. By considering total cognizable crimes over the specified timeframe, this dataset allows for a comprehensive analysis of overall crime trends, facilitating the identification of hotspots and emerging patterns of criminal activity. We have gathered the data of Total IPC Crimes in every districts in India and then is converted into excel form for further processing .

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