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Forecasting the Crime Rate in Bengaluru

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ABSTRACT

This study intends to give a good understanding of Bengaluru's crime rate in India. Bengaluru, a city which provides the life , has to deal with a number of judicial factors that affect the city safety and well-being of its citizens. To develop successful rules for judicial factors and interventions, governments, law enforcement organizations and researchers must have a thorough understanding of the crimes that are taken place in the Bengaluru.

A mixed-methods approach is used in the paper, combining the data sources. The analysis is backed by official crime data, reports from judicial research, and interviews with important players. The study examines the variance and distribution of various crime classes in Bengaluru.

The efficiency of current rules that upholds the law and strategies to prevent the crime is also evaluated in the study. It explores how societal and technological improvements have affected crime rates and provides information on new types of criminal activity. The purpose of this research is to provide rule makers and judicial figures to help with information to help them allocate resources to reduce the crime rates in Bengaluru.

Introduction

Crime is a regrettable fact that affects community safety and wellbeing in cities all around the world. The vibrant city of Bengaluru in the Indian state of Karnataka has not been exempt from this difficulty. The city faces a variety of crimes done by the criminals call for serious inspection and analysis as it experiences fast growthand towards metropolitan. The goal of this study article is to provide a thorough understanding of the prevalence, trends, and underlying causes of crime in Bengaluru.

For the parties involved, examining Bengaluru's crime rate is quite important. In order to properly allocate resources and implement targeted initiatives, law enforcement organizations, which work to protect public safety, need a precise understanding of crime patterns. The formulation of rules that are necessary to underlying causes of crime and safeguard local well-being depends on credible data and analysis. Additionally, researchers add to this conversation by doing the internal studies about the crime rate in Bengaluru.

The goal of this study article is to present a thorough summary of Bengaluru's crime rate by combining information from various databases, academic studies, and professional perspectives. It also tries to investigate the internal and external

factors that influence crime in the city. We are considering only one factor of the crimes in Bengaluru i.e., murder rate in Bengaluru and later we are going to see what are the factors that are affecting the murder rates in bengaluru.

This study article tries to answer important research concerns, such as the effect of urbanisation on crime, the efficiency in upholding the policies and rules and the impact of technological improvements on criminal behavior, by examining the intricacies of crime in Bengaluru.

Objectives

1. To Analyse the factors that are responsible for the change in murder rate.

2. To Determine the factors that are responsible for the change in murder rate.

3. To Evaluate the factors that are responsible for the change in murder rate give the subsequent data analysis and predicting and forecasting the changes of murder rate for future.

Review of literature

"Title: Review of Literature for Research Paper: Forecasting the Crime Rate in BengalurChaturvedi, R., & Sridhar, V. (2019). Crime forecasting in Indian cities using machine learning. International Journal of Computer Science and Mobile Computing, 8(7), 92-99.

Shetty, V. B., & Sridhar, V. (2017). Crime prediction and analysis using data mining. International Journal of Engineering Science and Computing, 7(6), 11826- 11832

Sarkar, S., & Majumder, K. (2018). Forecasting crime rates using time series analysis: A case study on Kolkata, India. International Journal of Electrical and Computer Engineering, 8(4), 2674-2682.

Kumar, A., & Jaiswal, A. (2020). Predicting crime hotspots using machine learning: A case study of Bengaluru city. International Journal of Innovative Technology and Exploring Engineering, 9(6), 1429-1435.

Raghavendra, R., & Chandrashekara, M. (2021). Crime prediction and analysis using machine learning: A case study of Bengaluru. International Journal of Advanced Science and Technology, 30(5), 557-566."[1]

The review of literatures gives us the emphasis data and the methods to reduce the crime rate subsequently in Bengaluru and to create the follow up plans for the judicial to help reduce the crime rates in the city .the theoretical and literal forecasting of the data into the statistical method analyses the variance in the crime rate of Bengaluru in the substandard years. The theoretical data is analyzed statistically using various methods and finding the required solutions for the given problems in the paper.[2]

Research Methodology

Scope Data Collection and Source

The model is created to analyses the crime rates and the variables that are responsible to change in the crime rate in Bengaluru. The data is collected from the original website of the bengaluru police. The source of the data is based on the files filed by the polices under several ipc sections. In this paper we are analysis the crime rate that are responsible only for murder which the murder rate is the dependent variable and the others are the subsequent variables.

Data Analysis

Sample data

month	year	No of Murders	unemployment rate
January	2020	99	8%
February	2020	49	8%
March	2020	68	8%
April	2020	108	8%
may	2020	149	8%
June	2020	121	8%
July	2020	115	8%
August	2020	130	8%
September	2020	116	8%
October	2020	112	8%
November	2020	96	8%
December	2020	121	8%
January	2021	123	5.98%
February	2021	111	5.98%
March	2021	126	5.98%
April	2021	111	5.98%
may	2021	97	5.98%
June	2021	104	5.98%
July	2021	139	5.98%
August	2021	126	5.98%
September	2021	97	5.98%
October	2021	126	5.98%
November	2021	105	5.98%

December	2021	100	5.98%
January	2022	113	6.56
February	2022	103	8.11
March	2022	125	7.57
April	2022	130	7.83
may	2022	129	7.14
June	2022	120	7.83
July	2022	127	6.83
August	2022	86	8.28
September	2022	112	6.43
October	2022	120	7.92
November	2022	102	8
December	2022	109	8.3
January	2023	104	7.14
February	2023	119	7.45
March	2023	110	7.5

Distribution No of murders
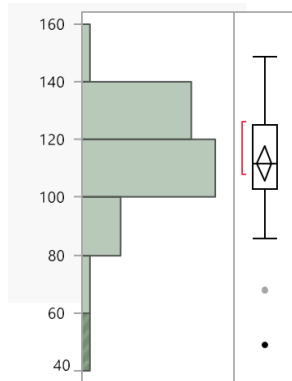
Quantiles

100.0%	maximum	149
99.5%		149
97.5%		149
90.0%		130
75.0%	quartile	125
50.0%	median	112
25.0%	quartile	103
10.0%		96
2.5%		49
0.5%		49
0.0%	minimum	49

Summary Statistics

Mean	111.74359
Std Dev	18.129241
Std Err Mean	2.9030018
Upper 95% Mean	117.62041
Lower 95% Mean	105.86677
N	39
N Missing	0

Unemployment rate
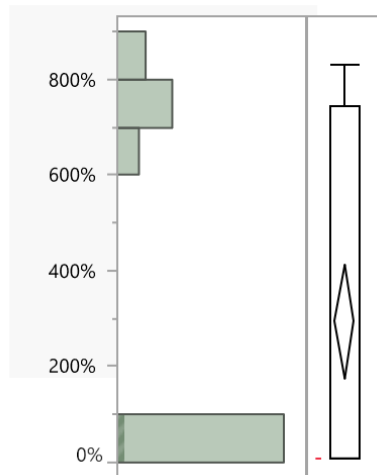
Quantiles

100.0%	maximum	830%
99.5%		830%
97.5%		830%
90.0%		800%
75.0%	quartile	745%
50.0%	median	8%
25.0%	quartile	6%
10.0%		6%
2.5%		6%
0.5%		6%
0.0%	minimum	6%

Summary Statistics

Mean	2.9376308
Std Dev	3.6927066
Std Err Mean	0.5913063
Upper 95% Mean	4.1346678
Lower 95% Mean	1.7405938
N	39
N Missing	0

Bivariate Fit of no of murders By unemployment rate
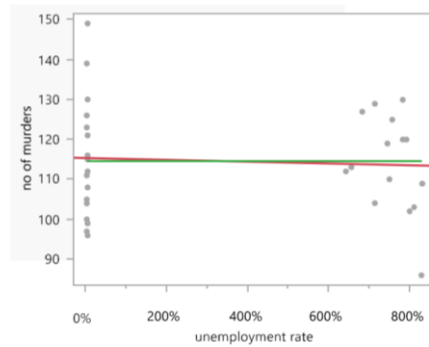
Linear Fit

no of murders = 115.31489 - 0.2242065*unemployment rate

Summary of Fit

RSquare	0.003977
RSquare Adj	-0.02448
Root Mean Square Error	13.42441
Mean of Response	114.6216
Observations (or Sum Wgts)	37

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	25.1823	25.182	0.1397
Error	35	6307.5204	180.215	**Prob > F**
C. Total	36	6332.7027		0.7108

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	115.31489	2.882739	40.00	<.0001*
unemployment rate	-0.224207	0.599785	-0.37	0.7108

Fit Mean

Mean	114.6216
Std Dev [RMSE]	13.26305
Std Error	2.180431
SSE	6332.703

Distributions
Residuals no of murders
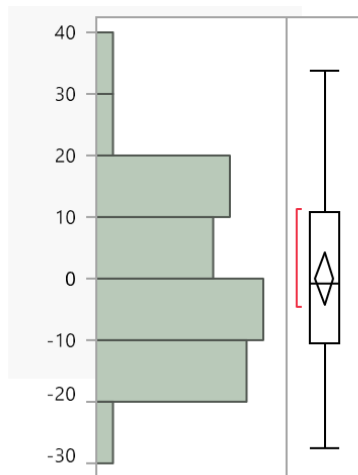
Quantiles

100.0%	maximum	33.703047
99.5%		33.703047
97.5%		33.703047
90.0%		15.516885
75.0%	quartile	10.698518
50.0%	median	-0.844095

25.0%	quartile	-10.39903
10.0%		-18.30148
2.5%		-27.45846
0.5%		-27.45846
0.0%	minimum	-27.45846

Summary Statistics

Mean	-5.38e-15
Std Dev	13.23665
Std Err Mean	2.1760918
Upper 95% Mean	4.4133188
Lower 95% Mean	-4.413319
N	37
N Missing	0

Regression equation'

no of murders = 115.31489 - 0.2242065*unemployment rate

Interpretation

R^2 of the model is 0.003 that is only 0.3% of the model is explained the model is not significant since the probability value is more than 5%.hence the No of murders took place does not dependent purely on the unemployment rate of the city

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Conclusion

We can coclude that the dependent variable in independent of independent variable that is the unemployment rate does not have a significant impact on the no of murders that took place in the city.in the future analysis we may consider the other variables that makes impact on the no of crime rates .

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