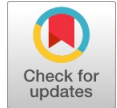# Conspectus Articulate on Violent Victimization of Indian-Foreigners in Homicide Crime

Abhishek Pandey, Sanjay B. Sonar

Abstract: In this study, the vulnerability of foreigners to crime in India is examined, with a particular emphasis on the article, which offers an account of a research project that looks at the many crimes committed against Indian expats and investigates their root reasons. The t-test is used to identify significant variations in instances over two years, and the ANOVA statistical tool is used to identify significant overall changes in the victimization rate. The National Crime Records Bureau of India's official website (https://ncrb.gov.in/en/crime-india) served as the study's data source. The data show that the most common crimes committed against Indian foreigners are theft, robbery, and assault. Most of these incidents take place in well-known tourist locations and big cities. The survey also underlines the difficulties foreigners encounter when reporting crimes to the Indian police, such as language hurdles and a lack of legal knowledge.

This study intends to contribute to the development of effective solutions to reduce victimization risks and improve the overall experience of foreign tourists in India by addressing the causes and effects of crimes against Indian foreigners.

Keywords: Crime, Statistical Tools, Anova, Machine Learning

I. INTRODUCTION

India is a nation that draws a sizable number of foreign tourists each year because of its diverse and rich cultural heritage. However, with frequent reports of theft, robbery, assault, and even rape, India's high crime rate has made crimes against foreigners a growing concern. Even though the Indian government is working to increase security and safety, crimes against foreigners are still a problem. The purpose of this research paper is to examine how vulnerable foreigners are to crime in India by examining the types and frequency of crimes against them as well as the causes of these crimes. The study also examines changing scenarios from 2017 to 2021 with foreigners. The acquired data is analyzed and interpreted using data science techniques, such as statistical analysis, data visualization and to see the number of most frequently occurring cases as well as the changes in the number of instances in India by gathering secondary data from the government website "National Crime Records Bureau". The most liable group is tourists, followed by students and foreigners.

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Theft, robbery, and assault are the most common crimes committed against tourists. The study uses data science methods, such as statistical analysis, Data visualization, and natural language processing, to examine and explain the data gathered.

II. SCOPE OF THE STUDY

The proposed work is pertinent because it can help create laws and regulations that improve foreign visitors' safety and security in India, enhancing the nation's image as a friendly and secure tourist destination.

III. REVIEW OF LITERATURE

Various studies and research papers have been written on the subject in recent years due to the growing concern regarding how vulnerable and victimized foreigners are to crime in India. The following is a summary of the pertinent research on this subject:

(Viswanath, Raghavi. 2021, [1]) India has seen a sharp rise in violence against Muslims and Dalits since the Bharatiya Janata Party (BJP) took office in 2014. The BJP or Hindu groups are linked to almost 85% of the offenders. Law enforcement has been unfriendly to victims, and Indian law does not adequately comprehend hate crimes. This article investigates the applicability of crimes against humanity, specifically murder and persecution, to current occurrences in India.

India has a high rate of crimes against women, including sexual and domestic abuse. However, little research has been done on how international women travelers perceive safety in India, particularly when traveling alone. (Gunjal, Gayatri, and R. K. Upadhyay, 2023, [2]) The study examined the blogs of 21 international women travelers who travel alone. It makes the case that these hazardous settings are only one of many that women encounter in their daily lives, both as tourists and as regular citizens.

To determine its strengths and limitations, the study by (Chaudhary, and Manjula, 2000, [3]) used a gap analysis to examine how international visitors view India as a travel destination. The enjoyment of tourists is adversely affected by problems such as deception, begging, and unsanitary circumstances, even though India is praised for its art and cultural legacy.

(Parida, Yashobanta et.al, 2018, [4]) Examined how violence, tourism infrastructure, and economic growth affected both domestic and foreign tourists in 25 Indian states between 1995 and 2011 [5]. The findings indicate that while crime has a detrimental impact on short-term visitor arrivals, economic growth, world heritage sites, and accommodation availability boost visitor

inflows [6]. Estimates from the IV-Tobit model indicate higher tourism revenue [7].

When tourist towns and non-tourist control towns are compared, (Jackson, Mervyn, et al., 2011,) found that the former have more public areas and arterial highways, both of which are indicators of criminal activity [8]. The design of tourist crime victimization via environmental design and crime prevention through environmental design should be the main topics of future study [9].

The attitudes of international women visitors to India are examined in this study by (Chugh Sushma, 2015,) emphasizing security and safety [10]. A random selection of one hundred foreign female travelers was made. The poll revealed that, despite some security and safety concerns, women travelers thought India was worth returning to, even though it had a detrimental effect on their reputation [11].

IV. MATERIAL AND METHOD

To analyze the crime against foreign tourists in India,
- T-test for significant changes yearly
- ANOVA to study the significant difference in crime activities for the period 2017-2021

- Graphical representation of the t-test and ANOVA result.
- Secondary data was collected from the government portal https://ncrb.gov.in/en/crime-india in the years of 2017, 2018, 2019, 2020, and 2021.
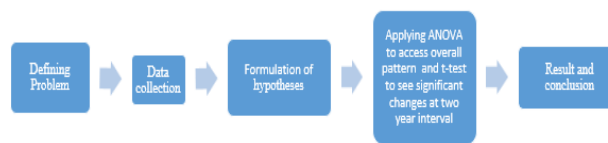
The differences in the crime rate against foreigners and whether it dropped or increased during the period of study, it is necessary to test the difference in the number of crime cases yearly and as a whole, so ANOVA is used to look at the mean difference in the crime cases across the groups and t-test to test the difference in the crime cases yearly. The graphical tool is used.

Data Analysis is carried out using two popular tools, namely the t-test and the ANOVA one-way analysis. Hypotheses for the one-way ANOVA

H0: Mean crime rates are the same during the period of study against

H1: The mean crime rate differs significantly during the period of study

Table 1: Represents the Summary Statistics of the Data and Table 2 Represents the ANOVA

Groups	Count	Sum	Average	Variance
Murder	5	51	10.2	5.2
Culpable _Homicide _not_ amounting _to_ Murder	5	6	1.2	1.2
Attempt_ to_ Commit_ Murder/Culpable_ Homicide	5	20	4	5.5
Simple Hurt	5	89	17.8	63.2
Grievous _Hurt	5	9	1.8	5.7
Assault on Women with Intent to Outrage Her Modesty	5	155	31	453.5
Kidnapping and Abduction	5	27	5.4	6.3
Human Trafficking	5	47	9.4	20.8
Rape	5	116	23.2	60.7
Theft	5	827	165.4	13841.3
Extortion	5	1	0.2	0.2
Robbery	5	46	9.2	45.2
Dacoit	5	5	1	0.5
Cheating	5	101	20.2	42.7
Forgery	5	36	7.2	37.7
Insult to the Modesty of Women	5	7	1.4	2.3
Other IPC Crimes	5	136	27.2	194.7
Immoral Traffic (Prevention) Act	5	50	10	10.5
Other SLL Crimes	5	138	27.6	50.3

H01: There is no significant difference in crime in the two years against

H11: The mean crime rate has declined significantly

V. EXPERIMENTAL RESULT

The ANOVA suggests that the F-critical is smaller than the F-value, smaller than 5 percent indicating a major difference in the mean crime rates for the period.

Source of Variation	SS	df	MS	F	P-Value	F-Critical
Between Groups	121132	18	6730	8.612	5.35E-12	1.74119
Within Groups	59390	76	781.4			
Total	180522	94				

Now I perform the t-test to see the difference every year.

The difference in the years 2017 and 2018 (considering the year 2017 as a base year and after taking the base years 2018, 2019, and 2020)

The hypothesis for the study for comparison between two years will be assumed to be the same.

Table 3: Represents the T-Test Assuming the two Samples with Unequal Variances

Test Result	2017	2018
Mean	25.89474	27.21053
Variance	2717.766	3350.175
Observations	19	19
Hypothesized Mean Difference	0	
df	36	
t Stat	-0.07363	
P(T<=t) one-tail	0.470857	
t Critical one-tail	1.688298	
P(T<=t) two-tail	0.941714	
t Critical two-tail	2.028094	

As it can be seen that the t-value is smaller than the t-critical and the p-value is

greater than 5%, the Null hypothesis is accepted, signifying that there is no significant difference in the crime rate in the year 2017 to 2018. Now the comparison of crime activity years of 2017 and 2019 is tested using the t-test, assuming unequal variances for the two groups. Table 4 shows the results, and difference in crime rates in the base year between 2017 and 2019.

Table 4: The T-Test (Difference of Crime Rate in the Base Year 2017 and Year 2019)

Test Result	2017	2019
Mean	25.89474	27.21053
Variance	2717.766	3350.175
Observations	19	19
Hypothesized Mean Difference	0	
df	36	
t Stat	-0.07363	
P(T<=t) one-tail	0.470857	
t Critical one-tail	1.688298	
P(T<=t) two-tail	0.941714	
t Critical two-tail	2.028094	

The test suggests a significant difference in the two years as the p-value is greater than 5% significance. The table below denotes the difference in the crime rate in the base years 2017 and 2020.

Table 5: The T-Test (Difference of Crime Rate in the Base Year 2017 and Year 2020)

Test Result	2017	2020
Mean	25.89474	20.45455
Variance	2717.766	1467.879
Observations	19	22
Hypothesized Mean Difference	0	
df	33	
t Stat	0.375622	
P(T<=t) one-tail	0.354801	
t Critical one-tail	1.69236	
P(T<=t) two-tail	0.709602	
t Critical two-tail	2.034515	

The table shows that the t-value is smaller than the critical value. It can be accepted that there is no difference in the mean crime rate between 2017 and 2020.

Table 6: T-Test for the Mean Difference in the Crime Rate Between 2017 and 2021

Test Result	2017	2021
Mean	25.89474	7.444444
Variance	2717.766	46.73203
Observations	19	18
Hypothesized Mean Difference	0	
df	19	
t Stat	1.528861	
P(T<=t) one-tail	0.071388	
t Critical one-tail	1.729133	
P(T<=t) two-tail	0.142777	
t Critical two-tail	2.093024	

In this case, we can also see that the mean difference in crime rate in the years 2017 and 2021 has not changed during the study, next, it is required to test if there is a significant difference between the two years. Table 7 shows that the p-value is> 5%, so we cannot reject H07. Hence, there is no significant difference between the year 2018 and the year 2019. Table 7 shows the difference in the not significant difference in the mean crime rate between 2018 and 2019.

Table 7: The T-Test (There is no Significant Difference Between the Year 2018 and Year 2019)

Test Result	2018	2019
Mean	27.21053	27.21053
Variance	3350.175	3350.175
Observations	19	19
Hypothesized Mean Difference	0	
df	36	
t Stat	0	
P(T<=t) one-tail	0.5	
t Critical one-tail	1.688298	
P(T<=t) two-tail	1	
t Critical two-tail	2.028094	

Table 8: T-Test (There is no Significant Difference Between the Year 2018 and Year 2020)

Test Result	Variable 2018	Variable 2020
Mean	27.21053	10.05263
Variance	3350.175	157.9415
Observations	19	19
Hypothesized Mean Difference	0	
df	20	
t Stat	1.26271	
P(T<=t) one-tail	0.110609	
t Critical one-tail	1.724718	
P(T<=t) two-tail	0.221218	
t Critical two-tail	2.085963	

Here Year between 2018 and 2020. The significant difference in the crime rate. In Table 9, the difference in the crime rate with the t-test is below.

Table 9: The T-Test (Difference in the Crime Rate Between 2018 and 2020)

Test Result	2018	2021
Mean	27.21053	7.894737
Variance	3350.175	47.9883
Observations	19	19
Hypothesized Mean Difference	0	
df	19	
t Stat	1.444332	
P(T<=t) one-tail	0.082467	
t Critical one-tail	1.729133	
P(T<=t) two-tail	0.164935	
t Critical two-tail	2.093024	

There is no significant difference in crime activity between 2018 and 2021 since the p-value is greater than the 5% level.

The difference in the crime rate between 2019 and 2020 is shown in Table 10.

Table 10: T-Test (Crime Rate in the Year 2019 and the Year 2020)

Test Result	2019	2020
Mean	27.21053	10.05263
Variance	3350.175	157.9415
Observations	19	19
Hypothesized Mean Difference	0	
df	20	
t Stat	1.26271	
P(T<=t) one-tail	0.110609	
t Critical one-tail	1.724718	
P(T<=t) two-tail	0.221218	
t Critical two-tail	2.085963	

Again, it is seen that in the above table, the p-value is smaller than 5%, hence there is no significant decline or increment in the crime rate during the year between 2019 and 2020.

Table 11: T-Test (The Difference in the Crime Rate in the Years 2019-2021)

Test Result	Variable 2019	Variable 2020
Mean	27.21053	7.894737
Variance	3350.175	47.9883
Observations	19	19
Hypothesized Mean Difference	0	
df	19	
t Stat	1.444332	
P(T<=t) one-tail	0.082467	
t Critical one-tail	1.729133	
P(T<=t) two-tail	0.164935	
t Critical two-tail	2.093024	

Here it is observed that there is no significant difference in the crime rate, so, it is required to test the difference between the other possible duration

Table 12: T-Test (T-Testing the Difference in the Crime Rate in the Years 2019-2020)

Test Result	2019	2020
Mean	27.21053	7.894737
Variance	3350.175	47.9883
Observations	19	19
Hypothesized Mean Difference	0	
df	19	
t Stat	1.444332	
P(T<=t) one-tail	0.082467	
t Critical one-tail	1.729133	
P(T<=t) two-tail	0.164935	
t Critical two-tail	2.093024	

The difference in the crime rate in Table 12 is also not found as the p-value is greater than 5%.

Table 13: T-Test (Crime Rate is not found as the P-Value is Greater than the 5%)

Test Result	2020	2021
Mean	10.05263	7.894737
Variance	157.9415	47.9883
Observations	19	19
Hypothesized Mean Difference	0	
df	28	
t Stat	0.655462	
P(T<=t) one-tail	0.25876	
t Critical one-tail	1.701131	
P(T<=t) two-tail	0.51752	
t Critical two-tail	2.048407	

For the years 2020 and 2021, the difference in the crime rate is not important as the p-value is greater 5% level of significance.

### A. Graphical Comparison

Figure 1 denotes a comparison of the different recorded cases that occurred between 2017 and 2021.
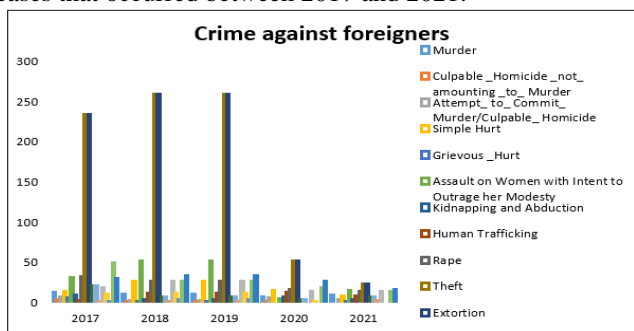

[Fig.1: Crime Records Yearly Comparison]

From the figure, it can be visualized that the maximum number of cases recorded for "theft" declined in the year 2021. Assault on Woman with Intent to Outrage her Modesty is another crime that increased from the year 2017 to the year 2020 and then declined in 2021. Rape is an instance which declined slowly from the year 2017 to 2021. It can be observed that the "Cheating" cases increased from the year 2017 to 2019, and a slight downfall was recorded (19 to 27, then reduced to 14). Murder cases dropped from "13" in 2017 to 9 in 2021. Kidnapping instances remain fluctuating. Attempts to commit murder show a fluctuating trend. Figures (a), (b), (c), (d), and (e) Show the pie chart of the crime records.
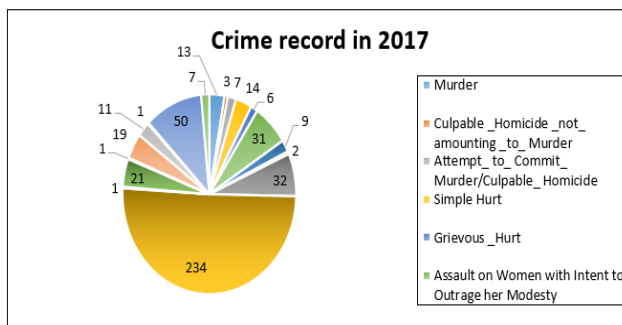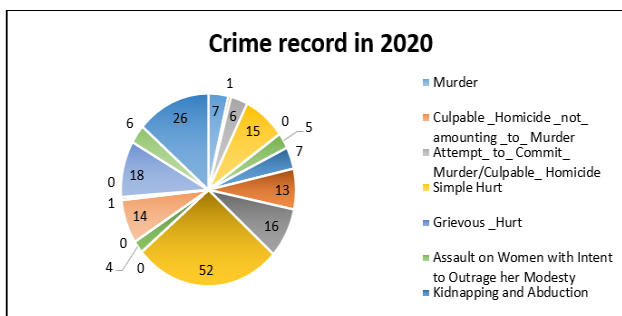

[Fig.2 (a): Pie Chart of the Crime Records of the Year 2017]
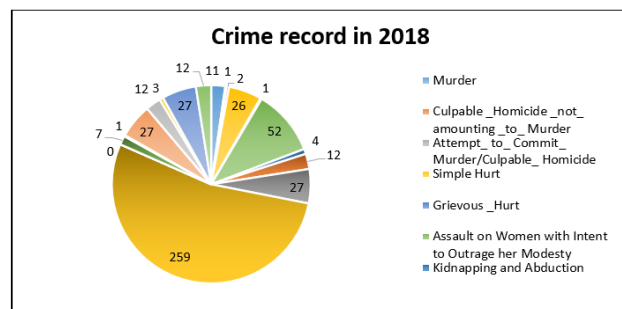
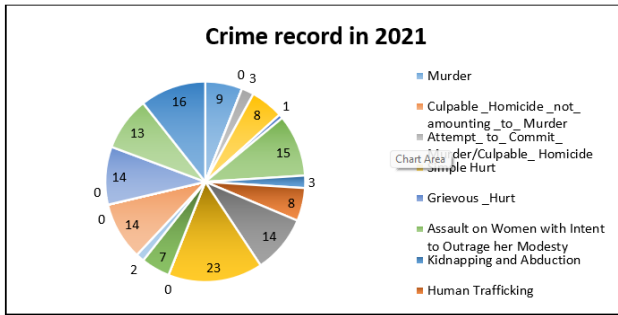**[Fig.2 (b): Pie Chart of the Crime Records of the Year 2018]**
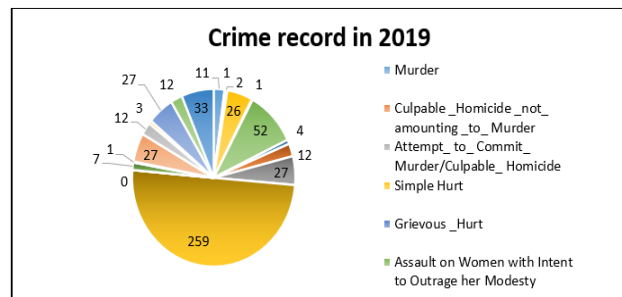
[Fig.2 (c): Pie Chart of the Crime Records of the Year 2019]

[Fig.2 (d): Pie Chart of the Crime Records of the Year 2020]

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[Fig.2 (e): Pie Chart of the Crime Records of the Year 2021]

VI. DISCUSSION

The analysis of variance (ANOVA) indicated a statistically significant difference in the mean crime rates observed during the study period. This conclusion was supported by the F-value surpassing the F-critical value and the p-value falling below the predetermined significance level of 5%. Further investigating specific yearly differences, t-tests were conducted. However, the results of these tests did not reveal any significant differences between the compared years. The t-values obtained were smaller than the corresponding t-critical values, and the p-values exceeded the 5% threshold.

Moreover, graphical comparisons and pie charts were employed to visually depict the trends and distribution of various crime categories across the study years. The findings from these visual representations suggest relatively stable patterns in the crime rates throughout the examined period. The "Theft" category exhibited the highest number of recorded cases, showing a decline in 2021. Additionally, there was an increase in the incidences of "Assault on Women with Intent to Outrage her Modesty" from 2017 to 2020, followed by a decline in 2021. The occurrence of "Rape" cases showed a gradual decrease over the study period. "Cheating" cases increased until 2019. "Murder" cases decreased from 13 in 2017 to 9 in 2021. "Kidnapping" instances displayed fluctuating trends, while "Attempt to do murder" showed varying patterns.

In summary, the statistical analysis, including ANOVA and t-tests, along with the graphical representations, provide evidence of limited variations in crime rates over the study period. These findings contribute to a better understanding of the overall crime landscape and can inform future research and policy decisions in the field of criminology.

VII. CONCLUSION

The study suggests using data science methods to examine crime statistics and spot trends that could enhance foreigners' safety and security in India. The results indicate that to increase foreigners' safety and security in India, stronger police protection and the use of technology like CCTV cameras and GPS monitoring devices are needed. The study also suggests launching awareness efforts to promote safety and security and giving foreigners who want to report crimes to the police access to language and legal assistance.

DECLARATION STATEMENT

After aggregating input from all authors, I must verify the accuracy of the following information as the article's author.

REFERENCES

1. Viswanath, Raghavi. "Hate crimes against minorities in India: Locating the value of an international criminal law discourse?" Journal of International Criminal Justice 19.3 (2021): 611-642. https://doi.org/10.1093/jicj/mqab051
2. Gunjal, Gayatri, and R. K. Upadhyay. "Travel Warning and Safety Index: Moulding India's Image." Issue 2 Int'l JL Mgmt. & Human. 6 (2023): 2213. https://doi.org/10.1080/02508281.2018.1494872
3. Chaudhary, Manjula. "India's image as a tourist destination—a perspective of foreign tourists." Tourism Management 21.3 (2000): 293-297. https://doi.org/10.1016/S0261-5177(99)00053-9
4. Parida, Yashobanta, Parul Bhardwaj, and Joyita Roy Chowdhury. "Effects of economic development and crime on tourism in India." Anatolia 29.1 (2018): 63-73. https://doi.org/10.1080/13032917.2017.1384742
5. Jackson, Mervyn, et al. "City design and its relationship with tourism crimes: a behavior analysis of the urban environment." International Journal of Tourism Anthropology 1.3-4 (2011): 195-207. https://doi.org/10.1504/IJTA.2011.043705
6. Chugh, Sushma. "Risk perceptions of international female tourists in India." International Tourism and Hospitality in the Digital Age. IGI Global, 2015. 220-233. DOI: https://doi.org/10.4018/978-1-4666-8268-9.ch014
7. R.A Rahmanbaeva, Problems of Innovative Economic Development. (2019). In International Journal of Recent Technology and Engineering (Vol. 8, Issue 2S11, pp. 4120–4123). https://doi.org/10.35940/ijrte.b1524.0982s1119
8. Usmanova, A. A., & Usmanov, S. A. (2019). Key Role of Education in the Framework of Achieving the Goals of Sustainable Economic Development. In International Journal of Management and Humanities (Vol. 4, Issue 3, pp. 43–45). https://doi.org/10.35940/ijmh.a0439.114319
9. Sahu, Dr. S. K. (2019). Occupational Mobility and Economic Development in the Dhobis of Dibrugarh and Duliajan Towns of Assam. In International Journal of Innovative Technology and Exploring Engineering (Vol. 9, Issue 1, pp. 617–623). https://doi.org/10.35940/ijitee.a4497.119119
10. Mishra, P. (2019). Modeling Investment Decision Through Perceived Risk. In International Journal of Engineering and Advanced Technology (Vol. 8, Issue 6s3, pp. 1638–1643). https://doi.org/10.35940/ijeat.f1306.0986s319
11. Rao, Dr. D. V. M., Kalgi, Dr. N., & Choudhary, Dr. N. (2021). Consumers Perception on Quick Service Restaurants. In International Journal of Management and Humanities (Vol. 5, Issue 7, pp. 66–70). https://doi.org/10.35940/ijmh.g1268.035721

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Retrieval Number:100.1/ijssl.G96030612723
DOI: 10.54105/ijssl.G9603.04021224
Journal Website: www.ijssl.latticescipub.com

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