

**Data Analytics with Power BI**

**PROJECT REPORT**

(Project Semester October-January 2025)

***“Annual Indian Crime Reports by Region Dashboard”***

Submitted by

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Registration No - 12318930

Programme and Section – B. Tech (K23LF)

Course Code – INT374

Under the Guidance of

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## **CERTIFICATE**

This is to certify that Ankit Kumar (student's name) bearing Registration no. 12318930 has completed INT374<Course Code> project titled, "**Annual Indian Crime Reports by Region Dashboard**" under my guidance and supervision. To the best of my knowledge, the present work is the result of his/her original development, effort and study.

**Sandeep Kaur**

**Designation of the Supervisor**

**School of Computer Science and Engineering**

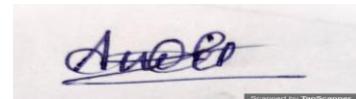
Lovely Professional University

Phagwara, Punjab.

Date: 19-12-2025

## **DECLARATION**

I, Ankit Kumar, student of B.Tech (Program name) under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.



Date: 19-12-2025

Signature

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Name of the student

Ankit Kumar

### **LinkedIn Post :**

<https://www.linkedin.com/feed/update/urn:li:ugcPost:7407787307405148160/>

### **GitHub Repository Link:**

<https://github.com/kumarankit79/Annual-Indian-Crime-Reports-by-Region-Dashboard>

## **Acknowledgement**

I would like to express my sincere gratitude to all those who have supported me throughout the completion of this Data Science Minor Project.

First and foremost, I would like to thank my mentor and project guide, Ms. Sandeep Kaur, Department of Computer Applications, Lovely Professional University, for his/her invaluable guidance, continuous encouragement, and expert advice throughout this project. His/her constant support helped me stay focused and complete my work efficiently.

I would also like to thank the faculty members of the Department of Computer Applications for providing a strong academic foundation and necessary resources to undertake this project successfully.

I am deeply thankful to my family and friends for their constant motivation and emotional support throughout this journey.

Finally, I would like to acknowledge the importance of tools such as Power BI, DAX Function, DATA Modelling, DASHBOARD which have helped me analyse and visualize data effectively and complete this report with a data-driven approach.

**This project has been a tremendous learning experience and a stepping stone toward my career in the field of Data Science.**

**Thank you all.**

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## 1. Introduction

This project builds an interactive Power BI dashboard for the analysis of Annual Indian Crime Reports (2001–2013). Below is a step-by-step, detailed introduction that explains the motivation, goals, scope, dataset, tools, and the overall workflow followed to design and develop the dashboard.

## Motivation

1. Crime data in India is vast and multi-dimensional, covering different crime types, regions, and time periods, but it is often presented in raw tabular formats that are difficult to interpret.
2. Understanding long-term crime trends, regional crime concentration, and sensitive issues such as crimes against women requires structured analysis rather than isolated statistics.
3. The motivation behind this project was to convert raw crime records into an interactive and meaningful analytical dashboard that supports informed understanding and decision-making.
4. This project also served as a practical opportunity to apply end-to-end Business Intelligence skills, including data cleaning, modelling, DAX calculations, and dashboard design using a real-world dataset.

## Objectives

1. Identify long-term crime trends in India from 2001 to 2013.
2. Detect high-risk states and districts by analyzing crime hotspots.
3. Assess the severity and nature of crimes against women across regions and time.
4. Compare violent crimes with property and economic crimes to understand their relative impact.
5. Provide data-driven insights that can support law enforcement planning and policy formulation.

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## Scope

1. Dataset: Year-wise crime statistics reported across Indian States and Districts between 2001 and 2013, covering multiple IPC crime categories.
2. Analysis Levels: National, state, and district-level analysis, depending on the objective being addressed.
3. Nature of Analysis: Descriptive and comparative analysis only; the project does not include predictive modelling or legal interpretation.
4. Deliverable: A multi-page Power BI dashboard with objective-wise pages, KPIs, trends, rankings, and interactive slicers for Year and State.

## Data Overview

1. The dataset includes crime records categorized by State/UT, District, and Year, along with counts for various IPC crime types.
2. Key fields include Year, State/UT, District, Total IPC Crimes, Violent Crimes, Property & Economic Crimes, and specific crime categories such as murder, theft, robbery, and crimes against women.
3. Data quality issues addressed during analysis included inconsistent naming, unnecessary columns, mixed data types, and the need to derive focused tables for specific objectives (e.g., crimes against women).

## Tools & Techniques

1. Primary Tool: Power BI Desktop was used for data cleaning (Power Query), data modelling, DAX calculations, and dashboard visualization.
2. Data Preparation: Power Query was used to clean, rename, filter, and structure the data without modifying the original dataset.
3. Data Modelling: Helper and derived tables were created where required, along with disconnected tables for ranking and dynamic analysis, ensuring a stable and efficient data model.
4. DAX Measures: Custom DAX measures were developed for trend analysis, rankings, Top-N calculations, crime categorization, ratios, and severity-based insights.
5. Visualization & Design: Line charts, bar charts, stacked columns, donut charts, matrices, and KPI cards were used with consistent slicers and conditional formatting to enhance interpretability.
6. Design Approach: A clean and consistent visual layout was maintained across all dashboard pages to ensure clarity, usability, and ease of navigation for non-technical users.

## **2. Source of Dataset**

The dataset used in this project has been obtained from OpenDataBay, a public data platform that provides access to government and open datasets from various domains.

The specific dataset used for analysis is titled “Indian Crime Data (IPC Crimes)” and contains year-wise crime statistics reported across Indian States and Districts.

**Data Source Platform:** OpenDataBay

**Dataset Link:**

<https://www.opendatabay.com/data/government/157f4656-4632-45b3-815e-2046551aabd1>

The dataset includes detailed records of various IPC crime categories such as murder, theft, burglary, robbery, riots, crimes against women, and other offenses, reported annually from 2001 to 2013. The availability of data at both state and district levels makes it suitable for trend analysis, hotspot identification, and comparative crime analysis.

This dataset was selected due to its structured format, comprehensive crime coverage, and relevance for studying long-term crime patterns and regional variations in India.

## **3. Exploratory Data Analysis (EDA)**

Exploratory Data Analysis (EDA) was performed to understand the structure, quality, and characteristics of the crime dataset before building the Power BI dashboards. This step was essential to identify inconsistencies, clean the data, and prepare it for accurate analysis and visualization.

### **Purpose of EDA**

1. To understand the overall structure of the dataset, including the number of records, columns, and crime categories.
2. To examine how crime data is distributed across years, states, and districts.
3. To identify data quality issues such as inconsistent naming, irrelevant columns, and incorrect data types.
4. To ensure the dataset is suitable for building reliable DAX measures and interactive dashboards.

### **Initial Data Exploration**

1. The dataset was first loaded into Power BI Desktop and inspected using the Data View and Power Query Editor.
2. The data consists of year-wise crime records reported across Indian States/UTs and Districts for multiple IPC crime categories.

3. Each row represents crime counts for a specific district in a given year, with multiple columns corresponding to different crime types.
4. The time range of the data spans from 2001 to 2013, making it suitable for long-term trend analysis.

## Data Cleaning and Preparation (Power Query)

The following data cleaning steps were performed using Power Query:

1. Column Selection:

Only relevant columns related to year, state, district, and IPC crime categories were retained. Irrelevant or redundant columns were removed to reduce complexity.

2. Column Renaming:

Column names were standardized for clarity and consistency, making them easier to reference during DAX measure creation.

3. Data Type Validation:

Numerical crime count columns were verified and set to appropriate numeric data types to avoid calculation errors.

4. Handling Inconsistencies:

Minor inconsistencies in naming conventions for states and districts were reviewed and corrected where necessary to ensure uniform filtering.

5. Structuring for Analysis:

The cleaned dataset was structured to support efficient aggregation, filtering, and slicing across multiple dimensions such as year and state.

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## Understanding Crime Distribution

1. Preliminary summaries were created to observe how total IPC crimes vary across years.
2. Initial aggregation showed that crime counts are not evenly distributed across regions, with certain states contributing significantly higher crime volumes.
3. A comparison of different crime categories indicated that property and economic crimes form a major portion of total reported crimes.
4. Early observations also highlighted the importance of analyzing crimes against women separately due to their social significance and distinct patterns.

## Creation of Derived and Helper Tables

1. To support focused analysis, derived tables were created for specific objectives, such as crimes against women.

- Helper and disconnected tables were used for ranking, Top-N analysis, and conditional formatting without altering the original dataset.
- This approach ensured a stable data model while enabling flexible and dynamic calculations using DAX.

## EDA Outcomes

- The EDA process confirmed that the dataset is suitable for multi-level analysis (national, state, and district).
- It helped define meaningful groupings of crime categories, such as violent crimes and property/economic crimes.
- Key patterns identified during EDA guided the design of dashboard objectives and visualizations.
- Overall, EDA played a critical role in ensuring data accuracy, analytical clarity, and reliable insights throughout the project.

Annual Indian Crime Reports by Region Dashboard

**File** Home Transform Add Column View Tools Help

New Recent Enter Data Data source settings Parameters Export query results Refresh Preview Advanced Editor Properties Choose Columns Remove Columns Keep Rows Remove Rows Split Column Group By Data Type: Text Use First Row as Headers Merge Queries Append Queries Combine Files Manage Columns Reduce Rows Sort Replace Values Combine

Queries [1] Crimes\_Data

STATE/UT DISTRICT YEAR MURDER ATTEMPT TO MURDER RAPE KIDNAP

1	ANDHRA PRADESH	ADILABAD	2001	101	60	50
2	ANDHRA PRADESH	ANANTAPUR	2001	151	125	23
3	ANDHRA PRADESH	CHITTOOR	2001	101	57	27
4	ANDHRA PRADESH	CUDDAPAH	2001	80	53	20
5	ANDHRA PRADESH	EAST GODAVARI	2001	82	67	23
6	ANDHRA PRADESH	GUNTUR	2001	182	88	54
7	ANDHRA PRADESH	HYDERABAD CITY	2001	111	113	37
8	ANDHRA PRADESH	KARIMNAGAR	2001	162	85	56
9	ANDHRA PRADESH	KHAMMAM	2001	93	60	47
10	ANDHRA PRADESH	KRISHNA	2001	65	51	37
11	ANDHRA PRADESH	KURNool	2001	133	72	29
12	ANDHRA PRADESH	MAHABOONNAGAR	2001	157	67	59
13	ANDHRA PRADESH	MEDAK	2001	101	56	35
14	ANDHRA PRADESH	NALGONDA	2001	122	60	35
15	ANDHRA PRADESH	NELLORE	2001	89	69	46
16	ANDHRA PRADESH	NIZAMABAD	2001	106	49	21
17	ANDHRA PRADESH	PRAKASHAM	2001	102	82	19
18	ANDHRA PRADESH	RANGA REDDY	2001	214	95	72
19	ANDHRA PRADESH	SRIKAKULAM	2001	38	10	8
20	ANDHRA PRADESH	VIJAYAWADA	2001	53	44	25
21	ANDHRA PRADESH	VISAKHA RURAL	2001	58	29	12
22	ANDHRA PRADESH	VISAKHAPATNAM	2001	22	10	13
23	ANDHRA PRADESH	VIZIANAGARAM	2001	33	14	8
24	ANDHRA PRADESH	WARANGAL	2001	158	79	53
25	ANDHRA PRADESH	WEST GODAVARI	2001	77	58	61
26	ANDHRA PRADESH	YSR NAGAR	2001	**	**	**

22 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 20:19

Cloudy 8 13°C ENG IN 20:19 20-12-2025

## **4. Analysis on Dataset**

### **4.1 Long-Term Crime Trend Analysis (India: 2001–2013)**

#### **i. Introduction**

The objective of this analysis is to examine long-term crime trends in India over a period of thirteen years.

This analysis helps in understanding whether the overall crime rate in the country is increasing, decreasing, or remaining stable over time.

#### **ii. General Description**

The analysis is based on year-wise aggregation of total IPC crimes reported across Indian States and Districts from 2001 to 2013. The Total IPC Crimes metric is used as the primary indicator to study national-level crime trends.

#### **iii. Specific Requirements, Functions and Formulas**

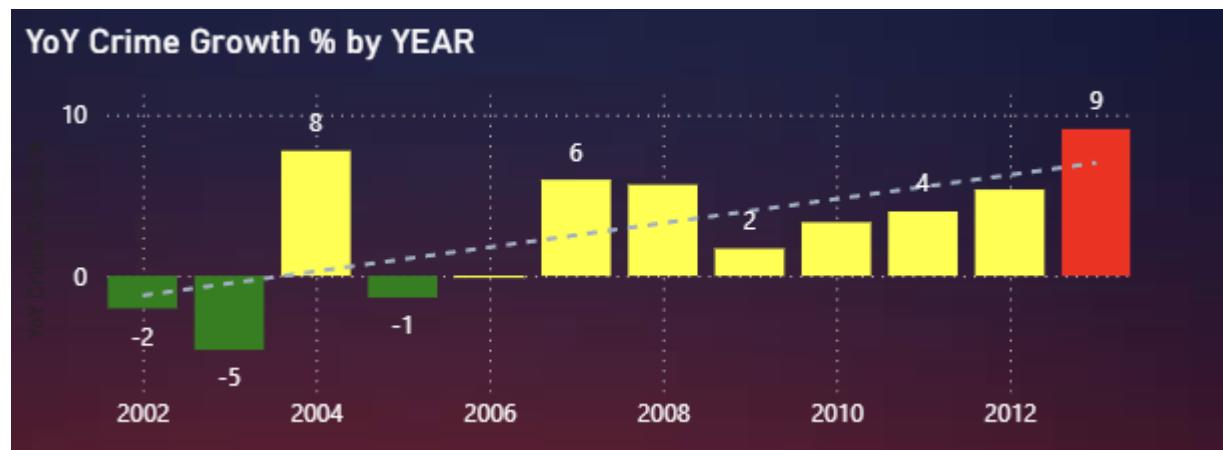
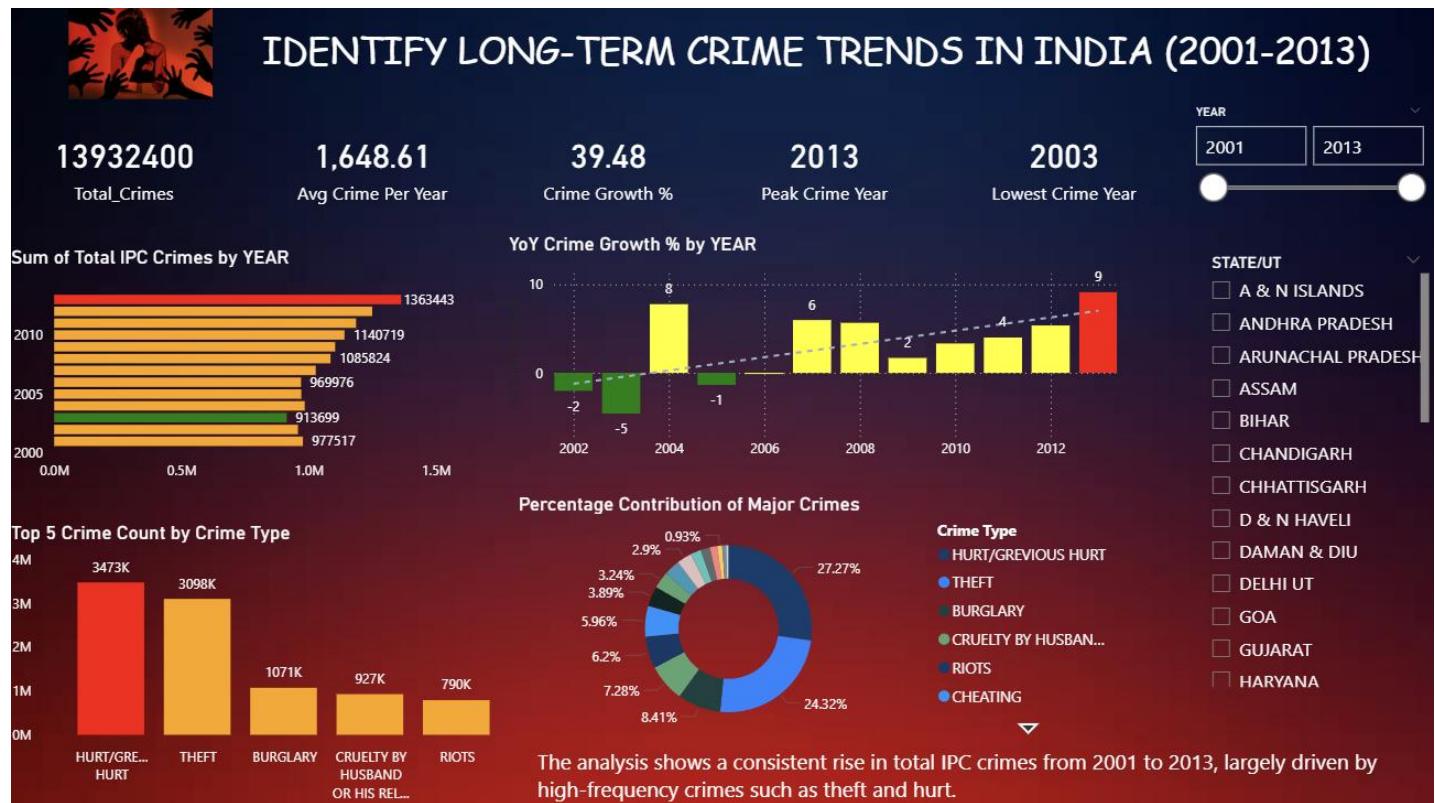
- Fields used: Year, Total IPC Crimes
- Aggregation method: Sum of Total IPC Crimes
- Filters applied: Year slicer, State/UT slicer
- Measures used:
  - Total IPC Crimes
  - Peak Crime Year
  - Lowest Crime Year
  - Year-on-Year (YoY) Change

#### **iv. Analysis Results**

- Time period analysed: 13 years (2001–2013)
- The results indicate a gradual increase in total IPC crimes over the analysed period.
- Certain years record noticeably higher crime volumes, indicating peaks in crime activity.
- Year-on-year analysis shows fluctuations, suggesting that crime growth is not uniform and varies across years.

## v. Visualization

This analysis is supported using a Line Chart for trend analysis, along with KPI Cards displaying total crimes, peak crime year, and lowest crime year.



<b>13932400</b> Total_Crimes	<b>1,648.61</b> Avg Crime Per Year	<b>39.48</b> Crime Growth %	<b>2013</b> Peak Crime Year	<b>2003</b> Lowest Crime Year
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## **4.2 Crime Hotspot Identification (State & District Level)**

### **i. Introduction**

The objective of this analysis is to identify high-risk states and districts with consistently high crime rates. This helps in understanding the geographic concentration of crime and supports targeted law enforcement strategies.

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### **ii. General Description**

Crime data is aggregated at the State/UT and District levels to identify regions contributing significantly to total IPC crimes. Ranking and Top-N analysis is used to highlight crime hotspots.

### **iii. Specific Requirements, Functions and Formulas**

- Fields used: State/UT, District, Total IPC Crimes
- Aggregation method: Sum of Total IPC Crimes
- Filters applied: Year, State/UT
- Measures used:
  - State Rank
  - Top 10 Crime States
  - District-wise Crime Count

### **iv. Analysis Results**

- Crime distribution across regions is highly uneven.
- A limited number of states contribute a large share of total crimes.
- District-level analysis further highlights localized crime concentration within states.

### **v. Visualization**

This analysis is supported using Bar Charts (Top States / Districts) and ranking-based visuals.

 **Image to attach:**



### Top 10 District with Highest no of Crimes

STATE/UT	DISTRICT	Sum of Total IPC Crimes
ANDHRA PRADESH	HYDERABAD CITY	187544
ANDHRA PRADESH	CYBERABAD	134672
WEST BENGAL	KOLKATA	115498
MADHYA PRADESH	INDORE	109770
MAHARASHTRA	MUMBAI	109247
BIHAR	PATNA	86907
RAJASTHAN	ALWAR	85150
TAMIL NADU	CHENNAI	83967
ANDHRA PRADESH	KARIMNAGAR	83222
UTTAR PRADESH	LUCKNOW	81751
<b>Total</b>		<b>1077728</b>

## 4.3 Analysis of Crimes Against Women

### i. Introduction

The objective of this analysis is to assess the severity and nature of crimes against women across regions and time. Crimes against women are analysed separately due to their social significance and policy relevance.

### ii. General Description

This analysis focuses on specific crime categories such as rape, dowry deaths, cruelty by husband or relatives, assault, and insult to modesty. A separate derived table is used to ensure focused and accurate analysis.

### iii. Specific Requirements, Functions and Formulas

- Fields used: Year, State/UT, Women-specific crime categories
- Aggregation method: Sum of crime counts
- Measures used:
  - Total Crimes Against Women
  - Severe Women Crimes
  - Domestic Women Crimes
- Filters applied: Year, State/UT

#### iv. Analysis Results

- Crimes against women show sustained presence across multiple states.
- Severe crimes such as rape and dowry deaths contribute significantly in certain regions.
- Grouping crimes into severe and domestic categories improves interpretability and highlights intensity differences across states.

#### v. Visualization

This analysis is supported using Line Charts, Donut Charts, and a Matrix with conditional formatting to highlight crime severity.



### State-wise Intensity of Crimes Against Women

STATE/UT	Severe Women Crimes	Domestic Women Crimes
WEST BENGAL	27902	175731
UTTARAKHAND	2555	8008
UTTAR PRADESH	48226	149300
TRIPURA	1644	6742
TAMIL NADU	10242	51404
SIKKIM	193	245
RAJASTHAN	24566	151068
PUNJAB	7398	17830
PUDUCHERRY	121	1030
ODISHA	17649	57698
NAGALAND	252	138
MIZORAM	919	962
MEGHALAYA	1220	826
MANIPUR	461	814
MAHARASHTRA	19560	117493
MADHYA PRADESH	50136	142767
LAKSHADWEEP	9	13
KERALA	7744	77138
KARNATAKA	7585	51678
JHARKHAND	13914	15172
JAMMU & KASHMIR	3327	19459
HIMACHAL PRADESH	2108	8212
<b>Total</b>	<b>356149</b>	<b>1549042</b>

## 4.4 Violent vs Property & Economic Crime Comparison

### i. Introduction

The objective of this analysis is to compare violent crimes with property and economic crimes to understand their relative contribution to overall crime levels.

### ii. General Description

Crime categories are grouped into violent and property/economic crimes based on their nature. Aggregated comparison helps identify which category dominates and requires greater policy focus.

### iii. Specific Requirements, Functions and Formulas

- Fields used: Crime category groups
- Measures used:
  - Total Violent Crimes
  - Total Property & Economic Crimes
  - Crime Type Ratio
- Filters applied: Year, State/UT

#### iv. Analysis Results

- Property and economic crimes contribute a larger share of total crimes compared to violent crimes.
- Violent crimes show slower growth relative to property crimes.
- The crime ratio highlights the need for preventive strategies focusing on property-related offenses.

#### v. Visualization

This analysis is supported using a Stacked Column Chart, Donut Chart, and Category Information Cards.



### 4.5 Data-Driven Law Enforcement & Policy Insights

#### i. Introduction

The objective of this analysis is to translate crime data insights into actionable recommendations that support law enforcement planning and policy formulation.

#### ii. General Description

Insights from previous analyses are summarized to highlight high-risk areas, dominant crime types, and priority intervention zones.

### iii. Specific Requirements, Functions and Formulas

- Measures used:
  - High Risk Insight (text-based)
  - Crime Category Priority
- Filters applied: Year, State/UT

### iv. Analysis Results

- Certain states and districts require focused policing due to persistent high crime levels.
- Property crimes demand increased preventive measures.
- Crimes against women require targeted safety and social interventions.

### v. Visualization

This analysis is represented using Text Cards, Summary Panels, and Comparison Charts.



## 5. Conclusion

- The **Annual Indian Crime Reports by Region Dashboard** successfully demonstrates how raw crime data can be transformed into meaningful and actionable insights using Power BI.
- Long-term trend analysis revealed that **total IPC crimes have generally increased over the period 2001–2013**, with noticeable variations across years.
- State and district-level analysis showed that **crime distribution is uneven**, with a limited number of regions contributing a significant share of total crimes.
- Separate analysis of **crimes against women** highlighted the severity and persistence of both violent and domestic crimes, emphasizing the need for focused social and safety policies.
- The comparison between **violent crimes and property/economic crimes** indicated that property-related crimes dominate overall crime volume and require stronger preventive strategies.
- The use of **interactive slicers, KPIs, rankings, and conditional formatting** improved data interpretability and supported comparative analysis across objectives.
- Data-driven insights derived from the dashboard can assist **law enforcement agencies and policymakers** in identifying high-risk areas, prioritizing resources, and adopting proactive crime prevention measures.
- Overall, the project reflects a complete **end-to-end Business Intelligence workflow**, covering data cleaning, modelling, DAX calculations, visualization, and insight generation using Power BI.

## 6. Future Scope

### 1. Real-Time Crime Data Integration:

The dashboard can be enhanced by integrating real-time or near real-time crime data through scheduled refreshes or API-based data sources. This would allow automatic updates of crime statistics, enabling authorities to monitor emerging crime patterns without manual data uploads.

### 2. Advanced DAX-Based Analytics:

More advanced DAX measures can be introduced to derive deeper insights, such as:

- Crime growth rate classification (high, medium, low)
- Crime severity scoring based on weighted categories
- Year-on-year and moving average crime trend indicators

These enhancements would provide a more detailed analytical layer.

### 3. Drill-Through and Tooltip Pages:

Additional drill-through pages can be created for individual states and districts to allow deeper exploration of regional crime patterns. Tooltip pages with mini visuals can provide quick contextual insights without navigating away from the main dashboard.

#### **4. Enhanced Visuals and Theming:**

The use of advanced Power BI visuals such as decomposition trees, key influencers, and custom visuals can improve interpretability. Applying a consistent custom theme can further enhance readability and professional appearance.

#### **5. Advanced Geospatial Analysis:**

Geographic analysis can be expanded using Shape Maps or ArcGIS visuals to support:

- District-level crime intensity heatmaps
- State-wise dominance of specific crime categories
- Layered geographic views for comparative analysis

This would provide deeper spatial understanding of crime distribution.

#### **6. Performance Optimization Techniques:**

For larger or more granular datasets, techniques such as aggregations, incremental refresh, and optimized data models can be applied to improve dashboard performance and scalability.

#### **7. Scenario and What-If Analysis:**

Power BI's What-If parameters can be used to simulate scenarios such as:

- Impact of crime reduction initiatives
- Changes in crime patterns under policy interventions
- Resource allocation scenarios for law enforcement

This would support strategic planning and decision-making.

#### **8. Deployment on Power BI Service:**

Publishing the dashboard to Power BI Service would enable:

- Secure sharing of reports
- Role-based access control
- Mobile accessibility
- Automated alerts for high-risk crime indicators

#### **9. Natural Language Q&A Capabilities:**

Enabling the Power BI Q&A feature would allow users to ask natural language questions (e.g., “Which state recorded the highest violent crimes in 2013?”) and receive instant visual answers, improving usability for non-technical users.

#### **10. Predictive and AI-Driven Insights:**

Leveraging Power BI AI features such as Key Influencers, Smart Narratives, and anomaly detection can help uncover hidden crime patterns, identify sudden crime spikes, and provide predictive insights for proactive crime prevention.

## 7. References

1. OpenDataBay. Indian Crime Data (IPC Crimes).  
<https://www.opendatabay.com/data/government/157f4656-4632-45b3-815e-2046551aabd1>
2. Microsoft. Power BI Documentation.  
<https://learn.microsoft.com/power-bi/>