

PROJECT 3

AN INTERACTIVE DATA VISUALISATION OF CRIME IN INDIA

Interaction Design
AJINKYARAJ MORE

Guide
PROF. VENKATESH RAJAMANICKAM

IDC SCHOOL OF DESIGN
IIT BOMBAY

APPROVAL SHEET

The project titled 'An Interactive Data Visualization of Crime In India' by Ajinkyaraj More, is approved for partial fulfillment of the requirement for the degree of 'Master of Design' in Interaction Design.

DECLARATION

I declare that this written document represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources.

I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/ source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

AJINKYARAJ MORE
Industrial Design Centre,
Indian Institute of Technology,
Bombay
May 29th, 2017

ACKNOWLEDGMENT

I would like to thank Prof. Venkatesh Rajamanickam for his guidance and support throughout the tenure of project.

Thanks to Prof. Anirudha Joshi, Prof. Girish Dalvi, Prof. Ravi Poovaiah, Prof. Jayesh Pillai and Prof. Alka Hingorani for their valuable inputs during the course of the project.

Thanks to Arihant Parsoya for helping me in coding of the prototype. Also thanks to all calssmates for criticising and motivating me regularly.

ABSTRACT

Indian government records and releases vast quantities of data about us and our surroundings by means of the census, crime, budgets, population human development reports etc.

The national crime record bureau under the ministry of the home affairs is sharing the crime data at different levels which can be used to find insight about the crime rate in India and can prove to be very helpful to analyze the cause of crime up to a certain extent.

This project aims to enable an easy way to visualize the crime data of India. This is done by means of a web-based application of open data visualization tool given by OGD platform. The higher goal is to enable faster and better decision-making by means of data visualization.

The series of interactive visualization will help people to understand the crime data from India. Interacting and observing the crime data visualization will help user to find correlation, causes, effects and trends.

TABLE OF CONTENTS

Introduction	1	- Possible Users	17	Final Design	35
- Crime in India	1	- Possible Use of Data	17	Final Information Architecture Content	36
- The Project	1	- Data Mapping	18	Final Information Architecture	37
- What is in it?	1	Preliminary Design Ideas	20	Work Flow Through Scenario	38
- Scope for exploration	1	User Studies	21	Overview of Data Viz.	44
Process Followed	3	- Contextual Enquiry	21	Objective of Evaluation	45
- Tool Used	3	- User Interviewed	21	Protocol of Evaluation	46
Secondary Research	4	- Questionnaire	21	Findings of Evaluation	47
- Open data	5	- Insights	22	Feedback	49
- Big data	5	- User requirements	22	Future Scope	51
- Challenges of Big Data Viz.	5	- User Objectives	22	References	52
- Visualization Techniques and Concepts	5	- Finalize Users	22	Appendix	54
- Crime and other Interactive Viz.	7	Possible Features	23		
- Existing Data Tools	11	Goal Setting	24		
Crime Data of India	22	Design Approach	25		
- Cognizable Crime	16	Initial Design	26		
- Non-Cognizable Crime	16	- Exploration sketches	28		
- Looking for Dataset	16	Information Architecture	32		
- Data Sources	16	List of Interactions	33		
- Data Validation	17				
- Availabel Data List	17				

INTRODUCTION

CRIME IN INDIA

In the ever changing world and the fast moving life everyone is finding a safe place to live.

THE PROJECT

Through interactive data visualizations (for the web), the project proposes to help find out the correlation, effects and trends through available data.

IMPORTANCE OF CRIME DATA VISUALISATION

India is a diverse nation and is the 7th largest nation in the world in terms of area. Crime has always been one of the larger problems in India, especially since it is the second most populous country in the world and a bane of India's development efforts.

A detailed analysis of crime and its various aspects helps to determine the crime rate.

Crime in India is reported by the National Crime Records Bureau (NCRB).

Open government data portal is a platform for sharing the dataset pertaining to different sectors through different ministries and departments. These datasets are available for free use by any individual or group for different purposes.

SCOPE FOR EXPLORATION, WHAT IS IN IT?

Different ministries and departments have shared many valuable datasets on the portal. The National Crime Record Bureau under the ministry of the home affairs is sharing the crime data at different levels which gives insight about the crime rate in India and can prove to be very helpful to analyze the causes of crime up to a certain extent.

The project brings all crime data to a single platform in a visualized way.

One can get the data regarding the details of Cases registered under Cyber Crimes by Motives like Revenge /Settling scores, Greed/ Money, Extortion, Cause Disrepute, Prank/ Satisfaction of Gaining Control, Fraud/ Illegal Gain, Eve teasing/ Harassment and Others. Similarly, details of Cases

registered under Cyber Crimes by Suspects like Foreign National /Group, Disgruntled Employee / Employee, Cracker/Student/ Professional learners, Business Competitor, Neighbors/Friends and Relatives, and Others can also be found. Dataset is also available based on the person arrested under crime against women, Convict by type of IPC offense, convict by type of offense under special and local law etc.

Not only this, one can also gather information about the prison inmates like how the government is helping them to become a good human through datasets like Prison Inmates Trained Under Different Vocational Trainings, Kinds Of Goods/ Vocational Activities And Gross Value Of Goods Produced By Inmates, Details Of Wages Payments Of Prisoners, Details Of Prison Inmates Released On Parole etc.

Hence the datasets available with wide categories which can be used differently to minimize the crime rate at all the levels by combined efforts.

PROCESS FOLLOWED

Secondary Research
Existing Data Viz. and Tools
Available Data
Analyze Data
Possible Users
Possible Use of Data
Preliminary Design Ideas
Contextual Inquiry
User Insights
Finalize Users
Design Brief
Initial Design
Heuristic Evaluation
Final Design
Coding
Evaluation
Future Scope

TOOLS USED

Design: For designing the UI, I used Adobe Illustrator.

Analysis:

We extensively used Tableau and Excel for our exploratory data analysis and some of the final visualizations.

Coding:

We used D3.js and HTML coding for final Data Visualization. All the coding was done in Atom.

SECONDARY RESEARCH

To visualize vast quantity of data it is an important look at what this data is and might be. The secondary research examines the concept of Open Data which is one of the main types of data that the project attempts to use.

OPEN DATA

Open data is the idea that some data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control. [10] This large volume of data unlocks a new potential of using bureaucratic and other datasets and information to enable new policies, services; thereby improving the lives of the citizen, making the government and society work better. The increase in efficiency of processors and declining costs of storing data leads to a tremendous amount of resources to capture and store data. This has led to vast quantities of data about individuals, companies, climate, economy, health, etc. Every type of data that can be quantified, is being quantified. Some of these areas include:

- Transparency and democratic control
- Participation and Self-empowerment
- Improved or new private products and services
- Innovation
- Improved efficiency of government services and effectiveness of government services
- Impact measurement of policies
- New knowledge from combined data sources and patterns in large data volumes

Governments in that sense, collect large quantities of data by means of the census, budgets, livelihood, etc. They are significant due to the quantity and the centrality of the data and it is binding on the government to provide this data to its citizens. Most of this data is public data and could be made open for individuals or institutions to freely analyze and generate new knowledge. There are numerous examples of individuals using Open Government Data in clever ways, thereby improving the lives of fellow citizens. Examples: Mumbai Safe Area Graph

BIG DATA

Big Data analytics plays a key role through reducing the data size and complexity in Big Data applications. Visualization is an important approach to helping Big Data get a complete view of data and discover data values.

CHALLENGE OF BIG DATA VISUALISATION

There are also following problems for big data visualization [8][9]

- Visual noise: Most of the objects in dataset are too relative to each other. Users cannot divide them as separate objects on the screen.
- Information loss: Reduction of visible data sets can be used, but it leads to information loss.
- Large image perception: Data visualization methods are not only limited by aspect ratio and resolution of device, but also by physical perception limits.
- High rate of image change: Users observe data and cannot react to the number of data change or its intensity on display.

- High performance requirements: It can be hardly noticed in static visualization because of lower visualization speed requirements and high performance requirement.

VISUALISATION TECHNIQUES, CONCEPTS [9]

Big data visualization can be performed through a number of approaches such as more than one view per representation display, dynamical changes in number of factors, and filtering (dynamic query filters, star-field display, and tight coupling), etc. [8]. Several visualization methods were analyzed and classified [8] according to data criteria:

1. Large data volume
2. Data variety
3. Data dynamics.

- Treemap: It is based on space-filling visualization of hierarchical data.
- Circle Packing: It is a direct alternative to treemap. Besides the fact that it has primitive shape, it uses circles, which also can be

included into circles from a higher hierarchy level.

- Sunburst: It uses treemap visualization and is converted to polar coordinate system. The main difference is that the variable parameters are not width and height, but a radius and arc length.
- Parallel Coordinates: It allows visual analysis to be extended with multiple data factors for different objects.
- Streamgraph: It is a type of a stacked area graph that is displaced around a central axis resulting in flowing and organic shape.
- Circular Network Diagram: Data objects are placed around a circle and linked by curves based on the rate of their relativeness. The different line width or color saturation is usually used to measure object relativeness.

Visualizations can be static or dynamic. Interactive visualizations often lead to discovery and do a better job than static data tools. Interactive visualizations can help gain great insight from big

data. Interactive brushing and linking between visualization approaches and networks or Web-based tools can facilitate the scientific process. Web-based visualization helps get dynamic data timely and keeps visualizations up to date. The extension of some conventional visualization approaches to handling big data is far from enough in function. More new methods and tools of Big Data visualization should be developed for different Big Data applications. Advances of Big Data visualization are presented and a SWOT analysis of current visualization software tools for big data visualization has been conducted in this paper. This will help develop new methods and tools for big data visualization. Big Data analytics and visualization can be integrated tightly to work best for Big Data applications. Immersive virtual reality (VR) is a new and powerful method in handling high dimensionality and abstraction. It will facilitate Big Data visualization greatly.

CRIME AND OTHER INTERACTIVE VISUALIZATION

CRIME REPORTS USA

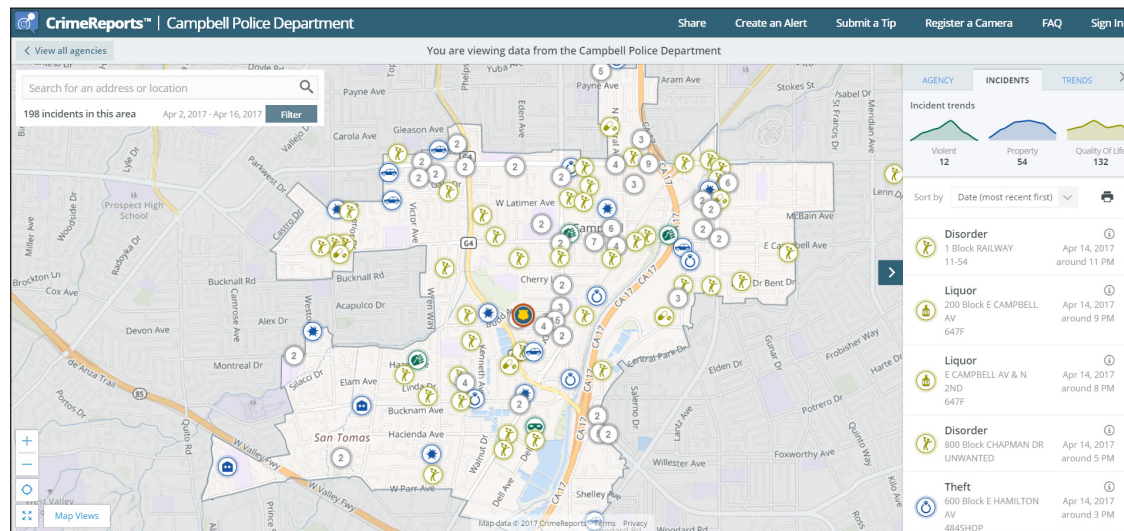
Crime Reports is the United States' largest collection of law enforcement agencies committed to transparency, public access, and citizen engagement. The data on Crime Reports is sent on an hourly, daily, or weekly basis from more than 1000 participating agencies to the Crime Reports map. Each agency controls their data flow to Crime Reports, including how often they send data, which incidents are included, etc. The data finally

obtained is interactive.

RELEVANCE

Crime Reports' interactivity makes it possible to navigate and explore information in more ways, enabling the user with access to layers of it as and when a detailed look is needed.

<https://www.crimereports.com/>



SAVE THE GIRL CHILD

The data viz displays information regarding child rape in India.

Data categorizes into state view and districts view for the years 2001 to 2013, positioned by the number of incidents.

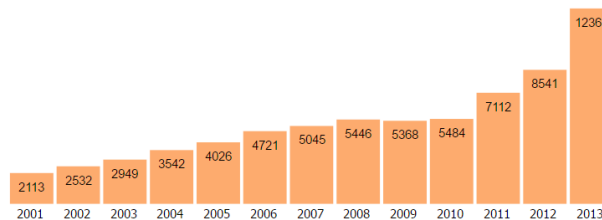
RELEVANCE

Preloaded insights create interest in data viz and it also helps to find important points.

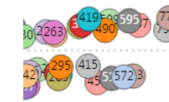
Shame! 12363 Child Rape incidents in **India** in 2013

Child Rape incidents in India rose to **12363** in 2013 from **8541** in 2012, an increase of **45 %** from the previous year.

Data-Source : <http://ncrb.gov.in/> | Visuals : [Gramener](#)



[Click here for State wise Analysis](#)



National Shame

Number of Child Rape crimes in **Madhya Pradesh** in 2013 - **2112** . Reported Child Rape crimes in **India** in 2001 - **2113** .

[Click here for District wise Analysis](#)



Scary Neighbourhoods

Mumbai Commr. area reported **221** incidents of child rape in 2013, the largest number of incidents recorded until 2013 for any district.

Belgaum Dt

Belgaum Dt, Karnataka has been reporting the highest number of incidents in Karnataka since 2008 barring 2012.

Indore

112 - The number of Child Rape victims in **Indore, Madhya Pradesh** in 2012, an increase of **331 %** since 2011.

Pratapgarh

Between 2010 & 2012, **Pratapgarh** in **Rajasthan** had been reporting the highest number of incidents in the state.

Tripura

West Tripura reported **40+** incidents consecutively for 3 years from 2008 to 2010.

<https://gramener.com/savethe-girlchild/districtanalysis.html?insight=Maharashtra>

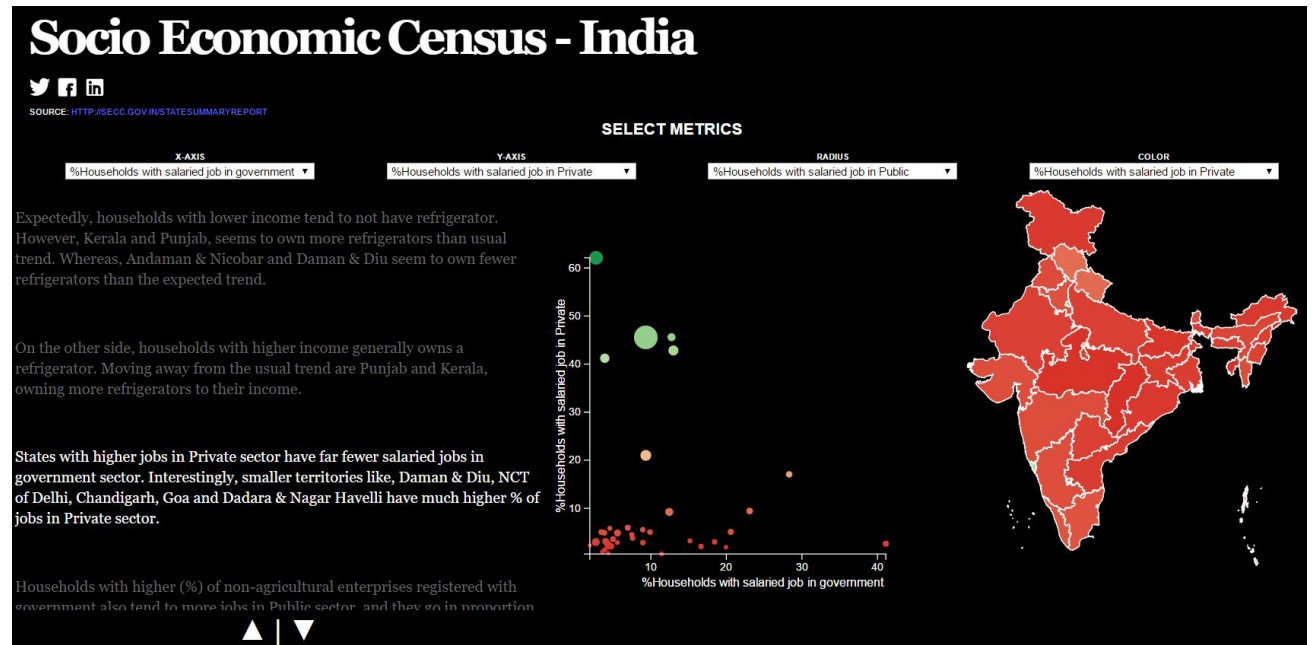
SOCIO ECONOMIC CENSUS – INDIA

Visualization explores the Economic Diversity in States of India from the Socio-Economic and Caste Census (SECC) - 2011 data. Scroll down to see the observations emerged from SECC data.

RELEVANCE

Visualization gives control on x and y axis. This helps to get more information and comparison options using a single graph.

<https://gramener.com/playground/secc/#?x=%25Households+Own+a+landline+phone&y=%25Households+Own+a+refrigerator&r=%25Total+Households+owning+other+land&c=%25Households+having+2+wheeler>
It is a Web-based Socio Economic Census data exploratory tool.



SELFIE CITY

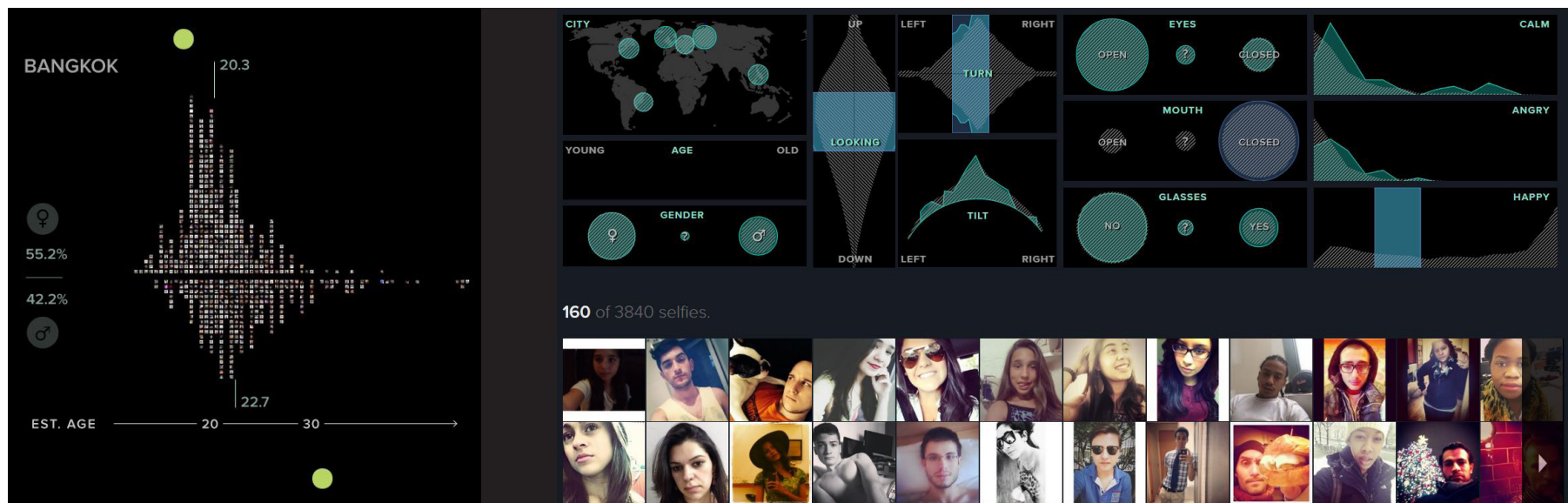
Selfiecity investigates selfies using a mix of theoretic, artistic and quantitative methods.

- It presents findings of the demographics of people taking selfies, their poses and expressions.
- Rich media visualizations (image plots) assemble thousands of photos to reveal interesting patterns.

<http://selfiecity.net/#>

RELEVANCE

- This interactive self-explanatory allows you to navigate the whole set of 3200 photos.
- Finally, theoretical essays discuss selfies in the history of photography, the functions of images in social media, methods and dataset.



EXISTING DATA TOOLS

TIMELINEJS

It is an open-source tool that enables anyone to build visually rich, interactive timelines. Beginners can create a timeline using nothing more than a Google spreadsheet, like the one we used for the Timeline above. Experts can use their JSON skills to create custom installations while keeping TimelineJS's core functionality.

<https://timeline.knightlab.com/>



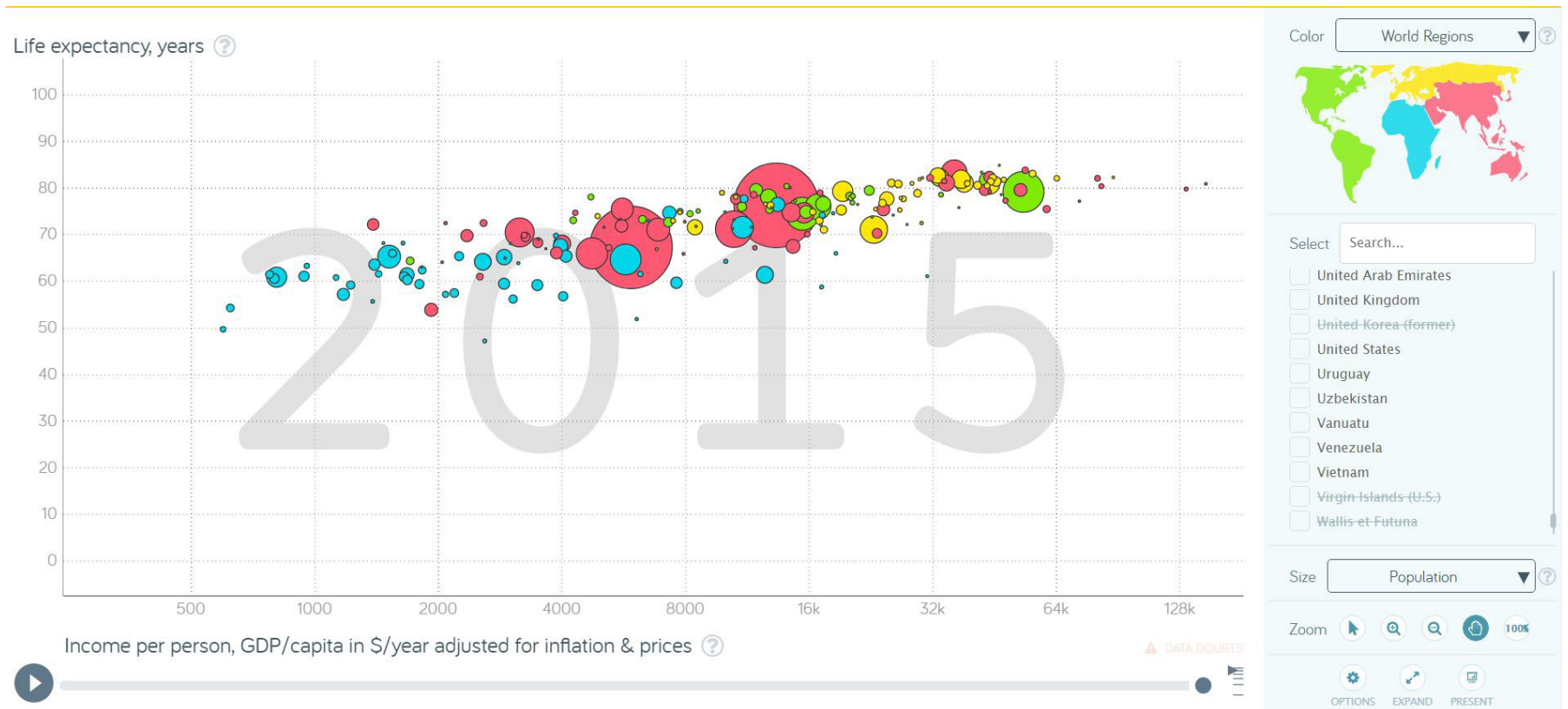
RELEVANCE

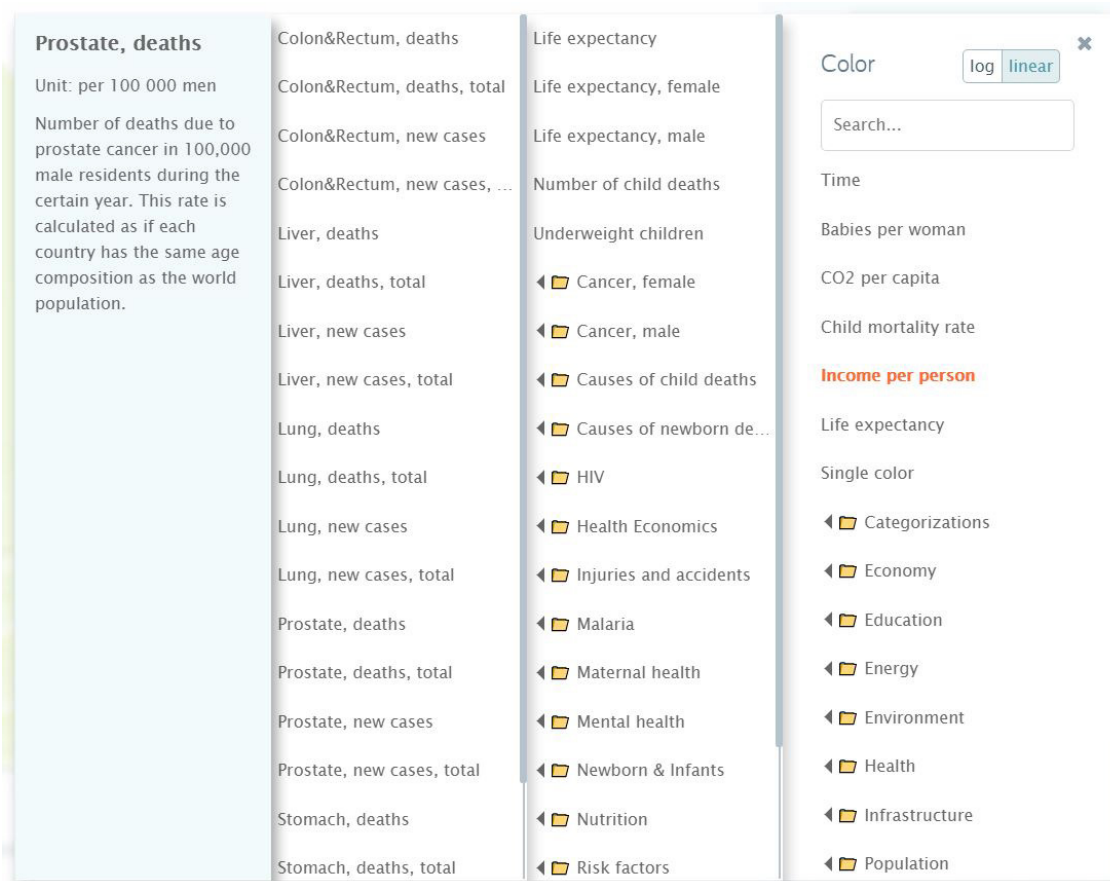
- TimelineJS can pull in media from a variety of sources such as Twitter, Flickr, YouTube, Vimeo, Vine, Dailymotion, Google Maps, Wikipedia, SoundCloud, Document Cloud and more!
- It allows to write each event as a part of a larger narrative.
- It includes events that build up to major occurrences — not just the major events.
- All data shows on a single timeline.

GAPMINDER

This is a tool to help you answer questions about global development using data. Gapminder has two free products: Gapminder World, which is

available online and Gapminder Desktop, which is a software you can install on your computer. Both tools sit on top of substantial and well arranged collections of statistics from the World Bank,





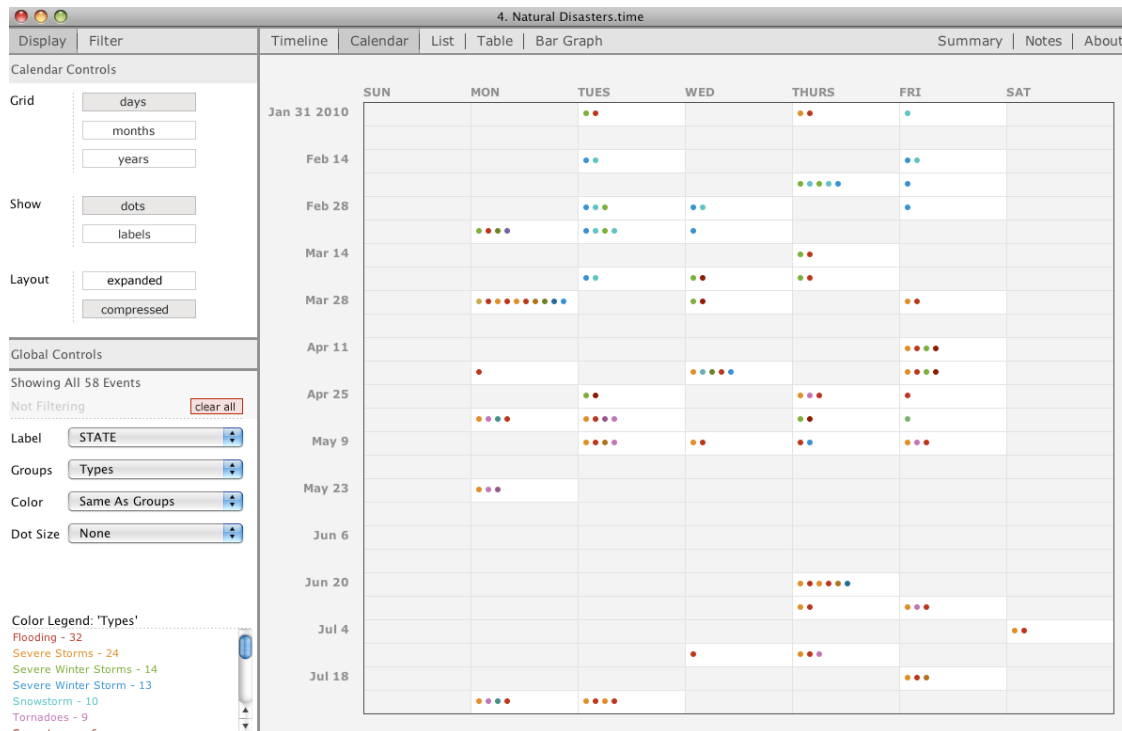
<http://www.gapminder.org/tools>

the United Nations and other international organisations. Gapminder encourages you to compare different indicators from different countries over time and experiment with various ways of combining datasets.

Gapminder's main innovation is the motion chart, which animates how statistics about any issue change over time. Two other neat features are- being able to select and highlight different countries as a way of making comparisons, and flick between viewing chart and world map views of the data.

RELEVANCE

Its huge built-in data catalogue makes it likely to have something relevant to your work, and will help you present it in a stylish way.



TIMEFLOW

TimeFlow was designed as a tool to help journalists show data on a timeline or in a calendar, bar chart, table or list. It assists with compiling, reconstructing, organising and making notes on long and complex stories. This tool aims to show as much textual detail about the data as possible rather than standard timeline tools that focus more on aggregating data.

RELEVANCE

It helps you understand relationships between events over time and to keep track of temporal information in as much textual detail as required. It also allows you to enter, edit and delete data directly in the tool itself.

<https://github.com/FlowingMedia/TimeFlow/wiki>

TABLEAU

It is a business intelligence (BI) software tool that supports interactive and visual analysis of data. It has an in-memory data engine to accelerate visualization. Tableau has three main products to process large-scale datasets, including Tableau Desktop, Tableau Server, and Tableau Public. Tableau also embeds Hadoop infrastructure. It uses Hive to structure queries and cache information for in-memory analytics. Caching helps reduce the latency of a Hadoop cluster. Therefore, it can provide an interactive mechanism between users and Big Data applications. [7]

RELEVANCE

It's as easy to use as a spreadsheet and makes suggestions about how your data could be visualised.

INFORGR.AM

It is open source tool to make instant infographics and charts.
<https://infogr.am/>

IBM WATSON ANALYTICS

It is data analytics tool. A smart data discovery service available on the cloud, it guides data exploration, automates predictive analytics and enables effortless dashboard and infographic creation. It helps to get answers and new insights.

DATA WRAPPER

It is a user-friendly, open-source web tool that you can use to create basic interactive charts. By loading any CSV dataset into Datawrapper user can make a chart or a map that can be embedded onto a website. Among others, user can generate pie charts, line charts, bar charts (horizontal and vertical) and maps.

CRIME DATA OF INDIA

The Criminal Procedure Code (Cr.P.C.) classifies all the crimes into two categories:

- (i) Cognizable - Sec.2(c) Cr.P.C.
- (ii) Non-cognizable - Sec.2(l) Cr.P.C.

COGNIZABLE CRIMES

A cognizable offence or case is defined as the one which an officer in-charge of a police station may investigate without the order of a magistrate and effect arrest without warrant. The police have a direct responsibility to take immediate action on the receipt of a complaint or of credible information relating to such crimes, visit the scene of the crime, investigate the facts, apprehend the offender and arraign him before a court of law having jurisdiction over the matter. Cognizable crimes are broadly categorised as those falling either under the 'Indian Penal Code (IPC)' or under the 'Special and Local Laws (SLL)'. [10]

NON-COGNIZABLE CRIMES

Non-Cognizable crimes are defined as those which cannot be investigated by police without the order

of a competent magistrate. Police do not initiate investigation in non-cognizable crimes except with magisterial permission. First schedule of the Cr.P.C. gives the classification of the offences of the IPC into cognizable & non-cognizable categories. [10]

LOOKING FOR DATASETS

National Crime Record Bureau have all recorded data about crime. The data is available on NCRB website as well as open gov. data portal. These datasets are available and are free to be used by any individual or group for different purposes.

DATA SOURCES

- Numbeo: <https://www.numbeo.com>
- National Crime Records Bureau: <http://ncrb.nic.in/>
- Open Data: <https://data.gov.in/>
- <http://data.worldbank.org/>
- <http://praja.org/>
- <http://censusindia.gov.in/>

DATA VALIDATION

Data validation means checking the accuracy and quality of source data before using, importing or otherwise processing data. Data validation is a form of data cleansing. When moving and merging data it's important to make sure data from different sources and repositories will conform to original files and not become corrupted due to inconsistencies in type or context. The goal is to create data that is consistent, accurate and complete so as to prevent data loss and errors during a move. Validation is performed by comparing and matching following government certified data sources.

- National Crime Records Bureau
<http://ncrb.nic.in/>
- Open Data
<https://data.gov.in/>

AVAILABLE DATA LIST

This list is attached in Appendix page.

POSSIBLE USERS

- Police Officer
- Policy Maker
- Urban Planners
- Journalist
- Academician
- Reporter
- Editor
- Freelance writer Volunteer

POSSIBLE USE OF DATA

With Crime data, the communities can make informed judgments about public safety and also provide transparency into how local police power is being exercised, on the contrary, local police can also use these statistics for making the strategies to control the situation. Knowing what crime happened and where it has happened, more often will help people to update the more public security issues. This data will also prove to be helpful for different agencies in addressing crime issues. The journalist will use it as a secondary research.

DATA MAPPING

IPC - Indian Penal Code

SLL - Special and Local Law

Parameters

- Age
- Gender
- District
- State
- Yaer
- Types of Crime

Crime against

- All
- Juvinales
- SC
- ST
- Women
- Children

Categories

- Convicted Crime
- Committed Crime
- Victim of crime
- Cases Registered
- Cases Reported
- Person Arrested

			FILE NAME			
	Age		Prison inmate population by sex and age-group at the end of the reference year during 2001-2012		STATE/UT	YEAR
Convicts	Age		Age - Sex wise Number of convicts by the type of IPC offences at the end of the year during 2001-2012		STATE/UT	YEAR
Arrested	Age	WOMEN	Age and sex wise persons arrested under crime against women during 2012.xls		STATE/UT	YEAR
Arrested	Age	WOMEN	Age and sex wise persons arrested under crime against women during 2012.xls		STATE/UT	YEAR
Victim, Registered	Age		Age-group-wise Victims Of Incest, Other and Total Rape Cases During 2001-2012.xls		STATE/UT	YEAR
Victim	Age		Age-group-wise victims of kidnapping and abduction during 2001-2012.xls		STATE/UT	YEAR
Victim	Age		Age-group-wise Victims of murder during 2001-2012.xls		STATE/UT	YEAR
Registered			Cases registered and their disposal under Cruelty by Husband or his Relatives during 2001-2012.xls		STATE/UT	YEAR
Registered			Cases registered and their disposal under Dowry Deaths during 2001-2012.xls		STATE/UT	YEAR
Registered			Cases registered and their disposal under Dowry Prohibition Act during 2001-2012.xls		STATE/UT	YEAR
Registered			Cases registered under Special and Local Laws (SLL) crimes during 2001-2012.xls		STATE/UT	YEAR
		WOMEN	Cases-Persons held under crime against Women during 2010-2012.xls		STATE/UT	YEAR
		WOMEN	Cases-Persons held under crime against Women during 2010-2012.xls		STATE/UT	YEAR
		WOMEN	Cases-Persons held under crime against Women during 2010-2012.xls		STATE/UT	YEAR
All			Details disposal of cases and arrested persons held under Special and Local Laws (SLL) during 2010-2012.xls		STATE/UT	YEAR
All			Details disposal of cases and arrested persons held under Special and Local Laws (SLL) during 2010-2012.xls		STATE/UT	YEAR
All			Disposal of Cases and Persons held under Indian Penal Code (IPC) crimes during 2010-2012.xls		STATE/UT	YEAR
All			Disposal of Cases and Persons held under Indian Penal Code (IPC) crimes during 2010-2012.xls		STATE/UT	YEAR
		JUVENILES	Classification of Juveniles Apprehended (Under IPC And SLL) By Attributes During 2001-2012.xls		STATE/UT	YEAR
		JUVENILES	Disposal Of Juveniles Apprehended (Under IPC And SLL Crimes) And Sent To Courts During 2001-2012.xls		STATE/UT	YEAR
			State per UT-wise details of Incidence, Deaths and Injuries due to Police Firing during 2001-2012.xls		STATE/UT	YEAR
Committed			Incidence of crime committed against children under different crime heads during 2001-2012.xls		STATE/UT	YEAR
			Motives of murder during 2001-2012.xls		STATE/UT	YEAR
Victim			Offenders Relation And Proximity To Rape Victims 2001-2012.xls		STATE/UT	YEAR
Arrested			Recidivism Amongst Persons Arrested Under IPC Crimes During 2001-2012.xls		STATE/UT	YEAR
Arrested			Recidivism Amongst Persons Arrested Under IPC Crimes During 2001-2012.xls		STATE/UT	YEAR
Arrested			Persons Arrested In Cognizable Crime Cases Under The Prevention Of Corruption Act and Related Sections Of IPC In States and UTs During 2001-2012		STATE/UT	YEAR
Arrested			Persons Arrested In Cognizable Crime Cases Under The Prevention Of Corruption Act and Related Sections Of IPC In States and UTs During 2001-2012		STATE/UT	YEAR
Committed	DISTRICT		Cognizable Crimes Registered and their disposal By Anti-Corruption And Vigilance Departments of State and UTs Under Prevention Of Corruption Act Of IPC During 2001-2012		STATE/UT	YEAR
Committed	DISTRICT	CHILDREN	District-wise crime under various sections of Indian Penal Code (IPC) crimes during 2001-2012.xls		STATE/UT	DISTRICT
Committed	DISTRICT	CHILDREN	District-wise crimes committed against Children during 2001-2012.xls		STATE/UT	DISTRICT
Committed	DISTRICT	SC	District-wise crimes committed against Schedule Caste during 2001-2012.xls		STATE/UT	DISTRICT
Committed	DISTRICT	ST	District-wise crimes committed against Schedule Tribe during 2001-2012.xls		STATE/UT	DISTRICT
Committed	DISTRICT	WOMEN	District-wise crimes committed against Women during 2001-2012.xls		STATE/UT	DISTRICT
Committed		CHILDREN	Incidence of crime committed against Children in India during 2001-2012.xls			
Committed		SC	Incidence of crime committed against Schedule Castes in India during 2001-2012.xls			
Committed		ST	Incidence of crime committed against Schedule Tribes in India during 2001-2012.xls			
Committed		WOMEN	Incidence of crime committed against Women in India during 2001-2012.xls			
			Details of Custodial Deaths during 2001-2012.xls		STATE/UT	YEAR
Arrested		CHILDREN	Crime head-wise persons arrested under crime against children during 2001-2012.xls		STATE/UT	YEAR
Arrested		SC	Persons arrested under crime against Schedule Caste during 2001-2012.xls		STATE/UT	YEAR
Arrested		ST	Persons arrested under crime against Schedule Tribe during 2001-2012.xls		STATE/UT	YEAR
Arrested		WOMEN	Persons arrested under crime against Women during 2001-2012.xls		STATE/UT	YEAR
Arrested			Persons arrested under Indian Penal Code (IPC) Crime cases during 2001-2012.xls		STATE/UT	YEAR
Arrested			Persons arrested under Special and Local Laws (SLL) crime cases during 2001-2012.xls		STATE/UT	YEAR
Arrested			Persons Arrested In Cognizable Crime Cases Under The Prevention Of Corruption Act and Related Sections Of IPC In States and UTs During 2001-2012		STATE/UT	YEAR
Arrested			Persons Arrested In Cognizable Crime Cases Under The Prevention Of Corruption Act and Related Sections Of IPC In States and UTs During 2001-2012		STATE/UT	YEAR
Arrested			Recidivism Amongst Persons Arrested Under IPC Crimes During 2001-2012.xls		STATE/UT	YEAR
		SC	Crime against Schedule Caste during 2001-2012.xls		STATE/UT	YEAR
		ST	Crime against Schedule Tribe during 2001-2012.xls		STATE/UT	YEAR
		WOMEN	Crime against Women during 2001-2012.xls		STATE/UT	YEAR
			Crime head-wise cases reported under Indian Penal Code (IPC) during 2001-2012.xls		STATE/UT	YEAR
	Place		Crimes by Place of Occurrence during 2001-2012.xls		STATE/UT	YEAR
Registered	Place		Number of Cases Reported And Value Of Property Stolen By Place Of Occurrence During 2001-2012.xls		STATE/UT	YEAR
	Property		Cases and their Value Of Property Stolen and Recovered During 2001-2012.xls		STATE/UT	YEAR
			Details_of_inmates_escapae_during_the_year 2001-2012		STATE/UT	YEAR
Victim			Number_of_women_prisoners_with_children		STATE/UT	YEAR
			Recidivism Amongst Persons Arrested Under IPC Crimes During 2001-2012		STATE/UT	YEAR
			Rehabilitation of prisoners during 2001-2012		STATE/UT	YEAR

Data mapping done using excel.

PRELIMINARY DESIGN IDEAS

1. **How much do you know**

People in India don't know about rate and figures related to crime.

Idea is to ask questions related to crime and user has to answer it by drawing a line (could be a trend line) on a graph. After drawing, the line graph will show actual line and then the user can see the difference between their line and actual line. It is a fun way to explore data. But big data can't be shown through this.

Ask questions

Draw a graph

Calculate percentage

Guess number

2. **A series of visualization on insights**

(Comparison of state data and district data)

Comparison of data is an important task done by the users while making any decisions pertaining to the district or state. In case of Mumbai district.

3. **Data analytics tool**

Current crime data is not analysed. All the data is in raw format. Data analytics tool helps to find out insights and correlations in data.

4. **Data analytics tool + Visualization on insights.**

It's a combination of insights driven visualization and data analytics tool, where user can find insights and add it to insights panel. It could be crowd sourced but the insights added by users can't be valid.

USER STUDIES

CONTEXTUAL ENQUIRY

A method of contextual enquiry was employed to conduct the user study. The aim of the enquiry was to generate insights about the type of visualizations used by the user group and the needs and problems faced while making strategic decisions. A semi-structured interview was conducted for different types of users.

USERS INTERVIEWED

- Police (2)
- Editors (2)
- Social Scientist (1)
- Professor (1)
- Architecture (1)
- Students (2)
- Other (2)

QUESTIONNAIRE

- How do you use crime datasets?
- Where do you find these data?
- When was the last time you had to use one of the datasets?

- Did you find what you were looking for?
- What do you wish was easier in the process?
- How did you access the Information, what medium did you use? (mobile, desktop, registers etc.)
- What data should people know about? What matters?
- What are the important parts of the data?
- What is not so important?
- What will you like to see using these data?
- What data do you want to compare?

INSIGHTS

- Police officers rarely use data viz tools.
- Half of the data stored in registers needs to be digitized.
- People spend most of the time digging data.
- People are more interested to see their regional data rather than other data.
eg. Maharashtra's user will first check Maharashtra's crime data.
- Data stored online and offline is in raw format.

USERS REQUIREMENTS

- Comparison between crimes
- Crime against certain category vs Total crime (juvenile crime vs total crime)
- Definition of complex data-words
- Pre-search, filter data, add insights, share option, archive, rating, comment on insights to minimize error.
- Look at what other people are searching for through previous searches.
- Number of cases with respect to women
- How much has happened to which category

- Five biggest crimes in every category.
- Five largest crime states.
- Make your own data viz.
- Show recent cases on timeline.

USERS OBJECTIVES

Based on user requirements and available data set objectives are decided.

- Show comparison between all crimes.
- Show comparison between all states.
- Show relations between data.
- Give predefined insights.
- Show affecting factors.
- Need of search option for crimes and states.

FINALIZE USERS

Anyone who is looking for crime related data.
Eg. Students for their academic project

POSSIBLE FEATURES

Based on the insights and users requirements, following features are intended to be incorporated into the data viz tool:

location and visualization will start by showing location realated crime data.

- **Meaning of complex words**
Many of the terms/ words are not familiar to users. Providing glossary would help user to understand graphs.
- **Add insights**
User can add their insights in visualisation and also refer other inisghts added by other people.
- **Download filtered data files**
Giving data download option to user would help user to download filtered data.
- **Share data viz**
Providing this feature people would be able to edit data and share their insights. This would help reporters to write e-news paper/article on crime, etc.
- **GPS location**
In user studies we found that users are more interested to see their regional data rather than other regions' data. GPS will track user

GOAL SETTING

The stated goals of the projects evolved through the research process and available datasets. From an interactive object point of view, the goals are:

- Providing richer context.
- Simple to grasp visualization and interactions.
- People should be able to find insights and trends.
- People should be able to correlate information.

DESIGN APPROACH

Based on available data, user requirements and feature list, the decisions have been made to use wide screen(desktop, for instance).

Why Desktop?

A wide screen with data viz having detail data and its insights will allow user to interact with the data.

Also it gives user bigger space for the interaction.

In the user study we found, most of the users use laptop and desktop to check crime data.

E.g. Police stations have desktop to analyze crime data.

INITIAL DESIGN

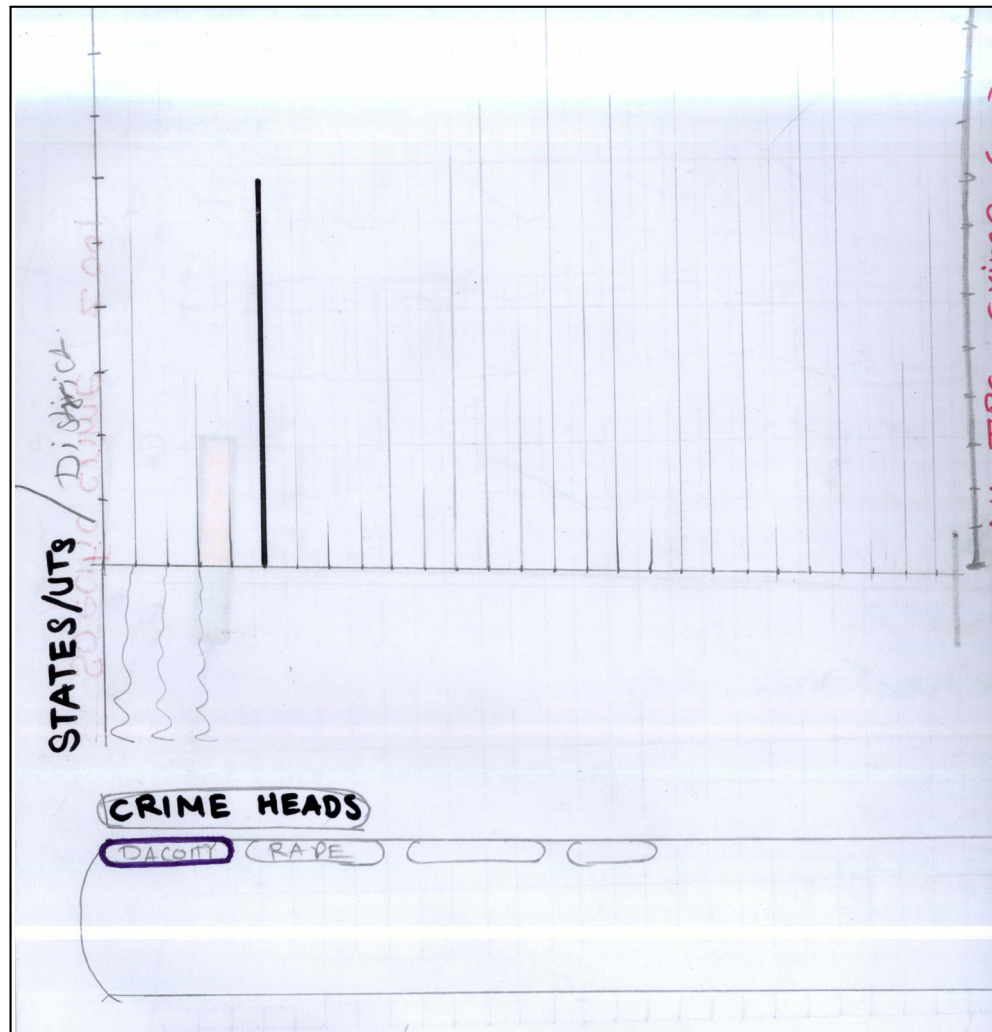
The combination of preliminary ideas, insights, and users objectives from the user studies and the design decisions led to an initial design idea which is shown below.

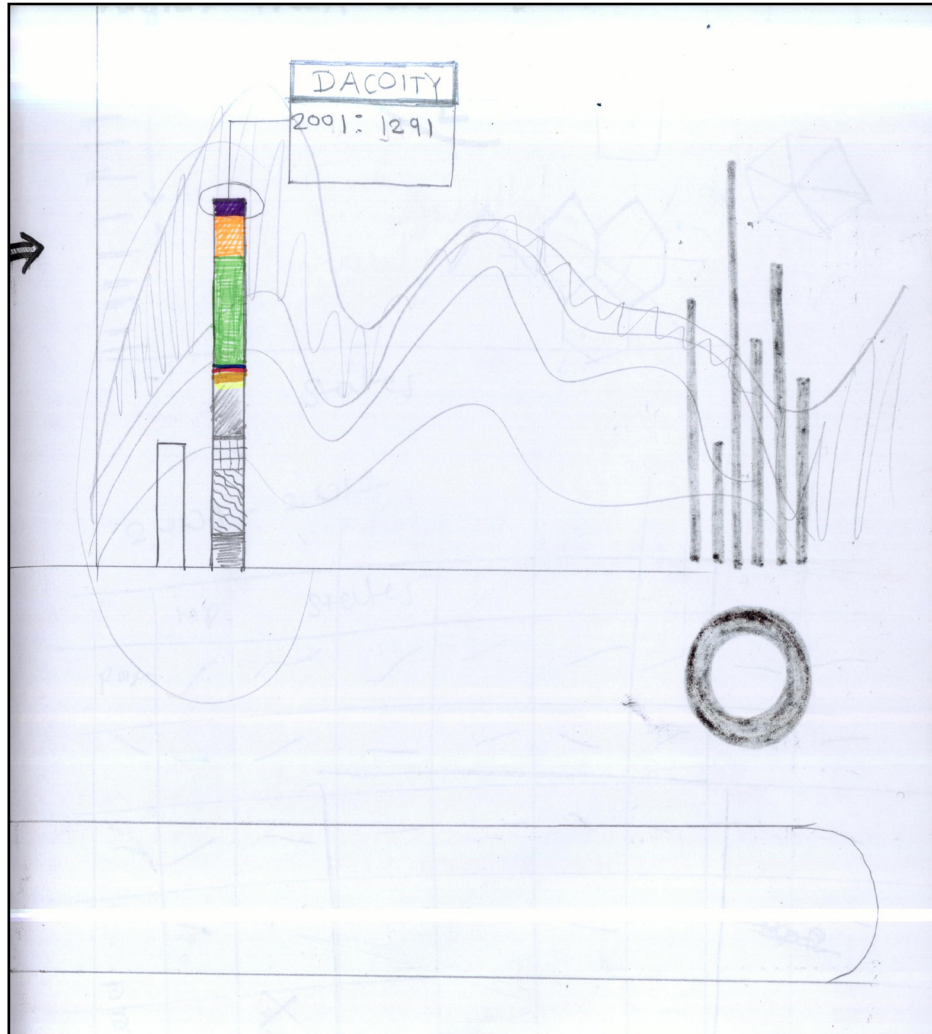
A combination of series of visualizations and data comparing tool on insights will help to find out new trends and insights.

The visualization devided in following three basic designs:

- **Circles**
- **Lines**
- **Rectangles**

← *This is the bar graph of all states, UTs, districts and their criminal activities.*

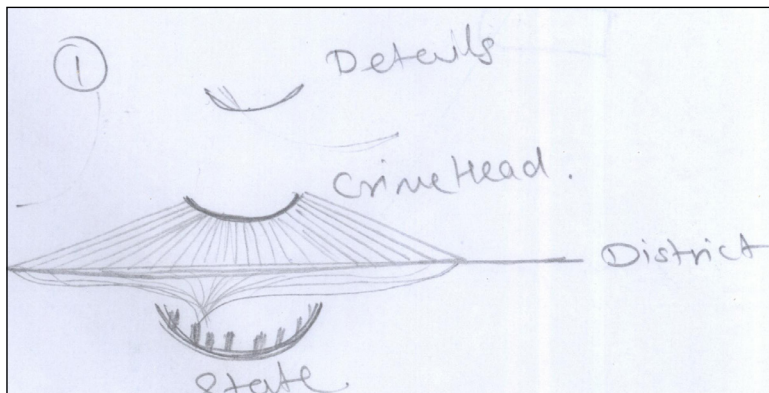
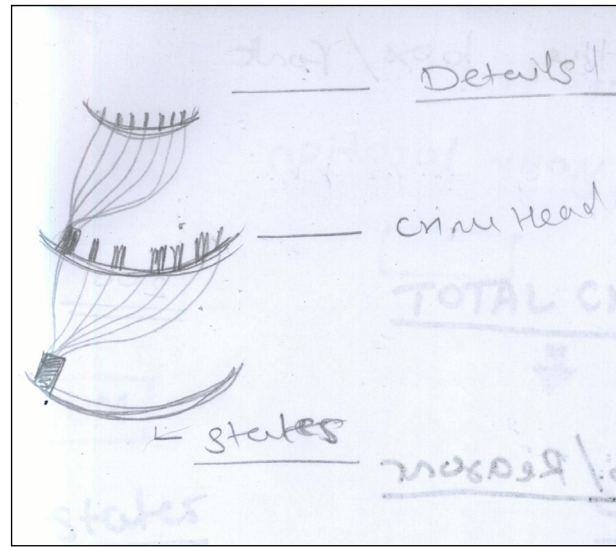
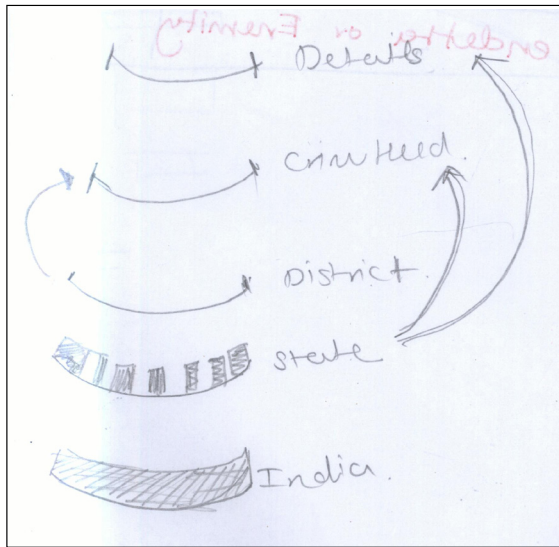


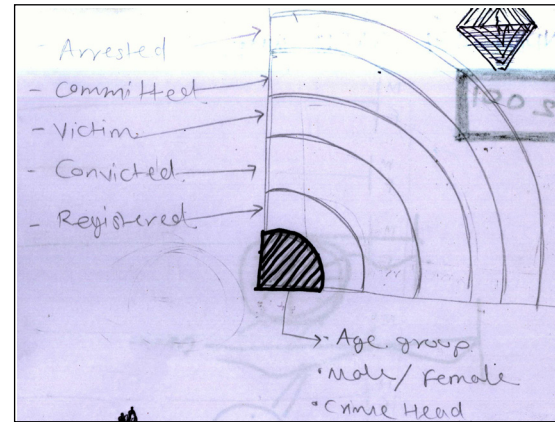
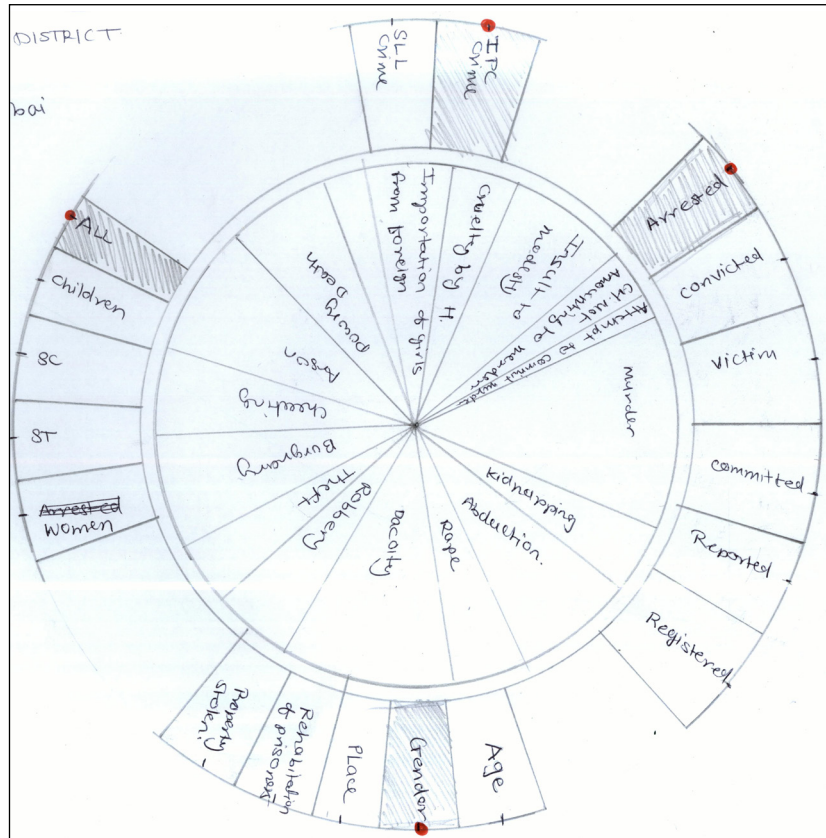


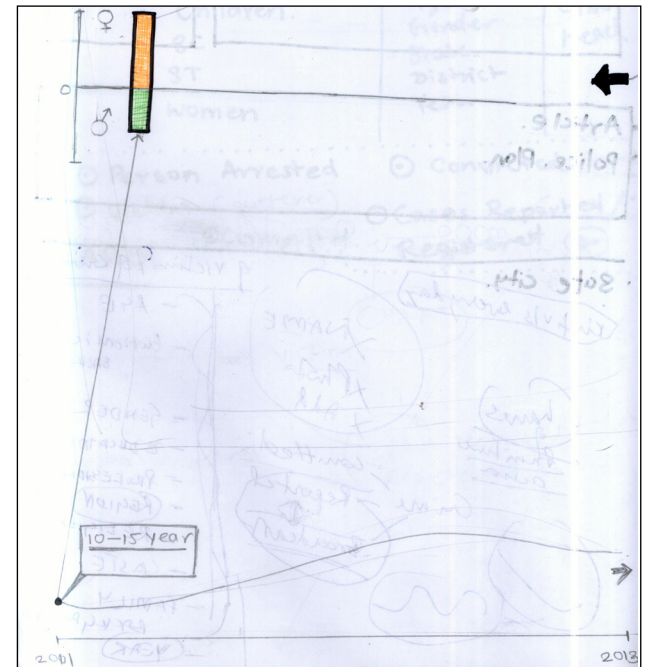
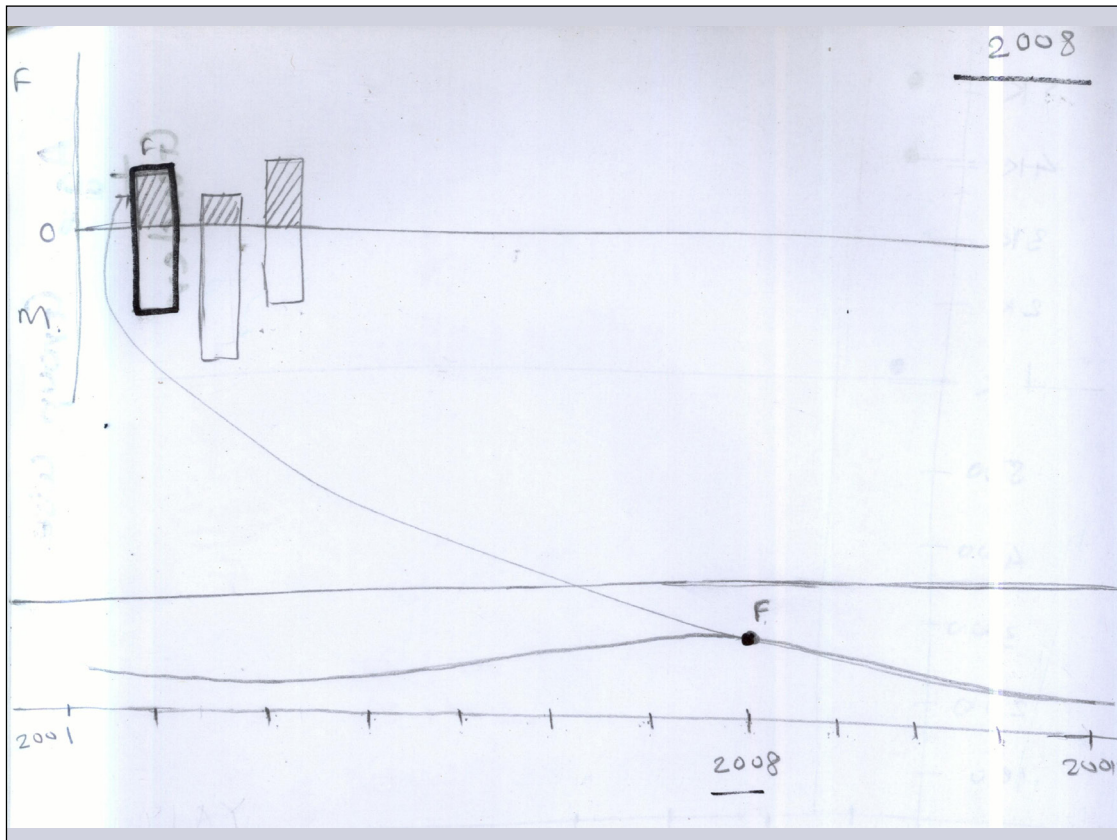
← Here previous graph turns into total year wise crime in a state.

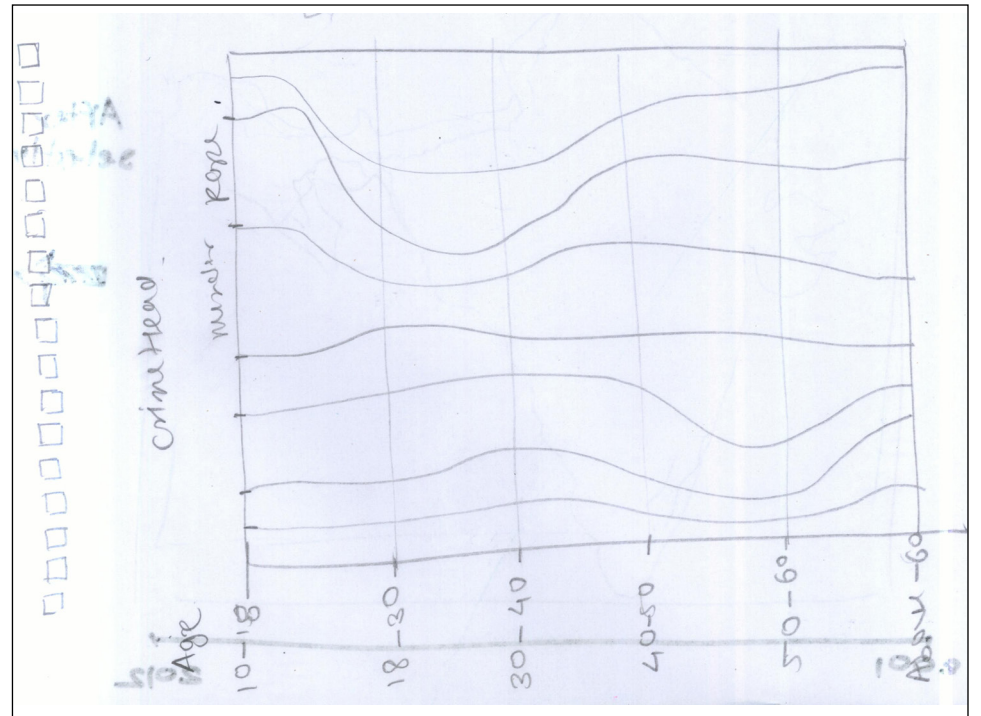
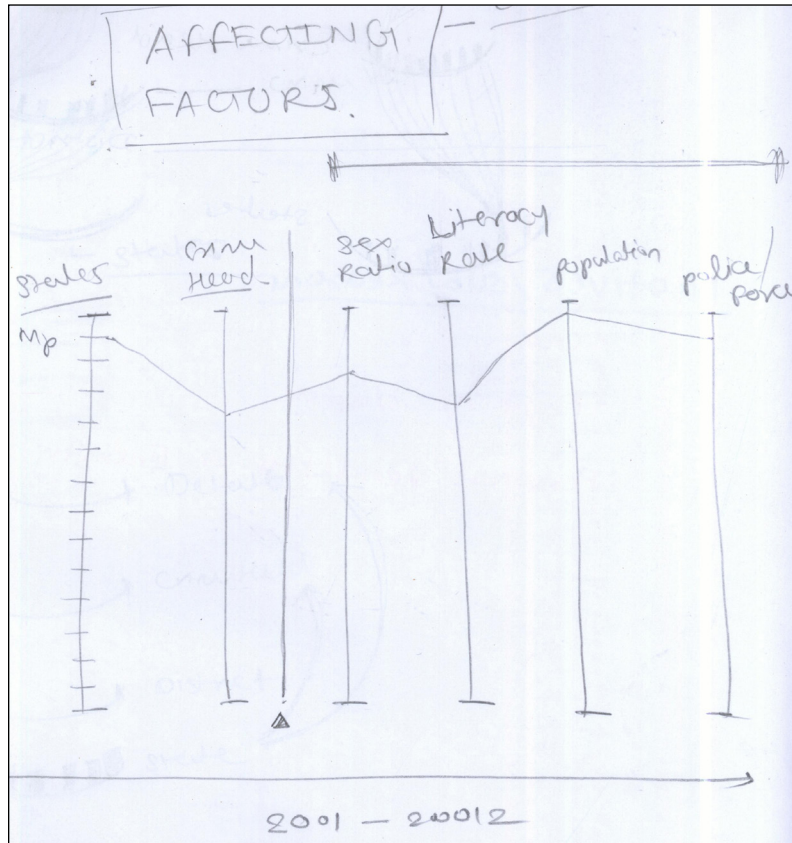
EXPLORATION SKETCHES

← Some of the crime data have many sections within them. To show all data at one point at once, this hierarchical graph was created.









INFORMATION ARCHITECTURE

Bar Diagram (Age Group Graph)

- All crimes
- All states

Sankey Diagram

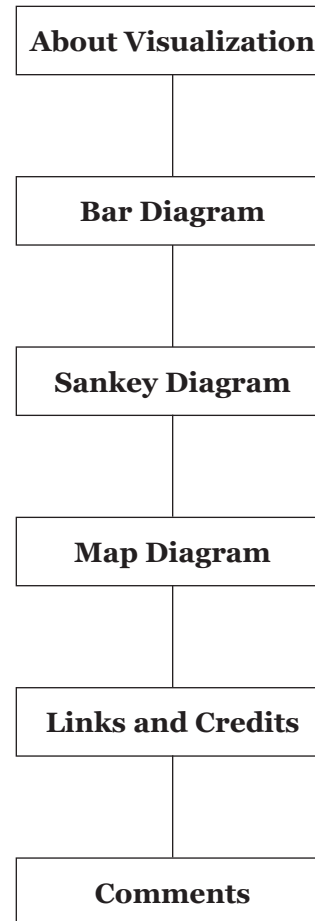
- All states
- All crimes
- Affecting factors

Map Diagram

- All crimes
- All states

Detailed Graph

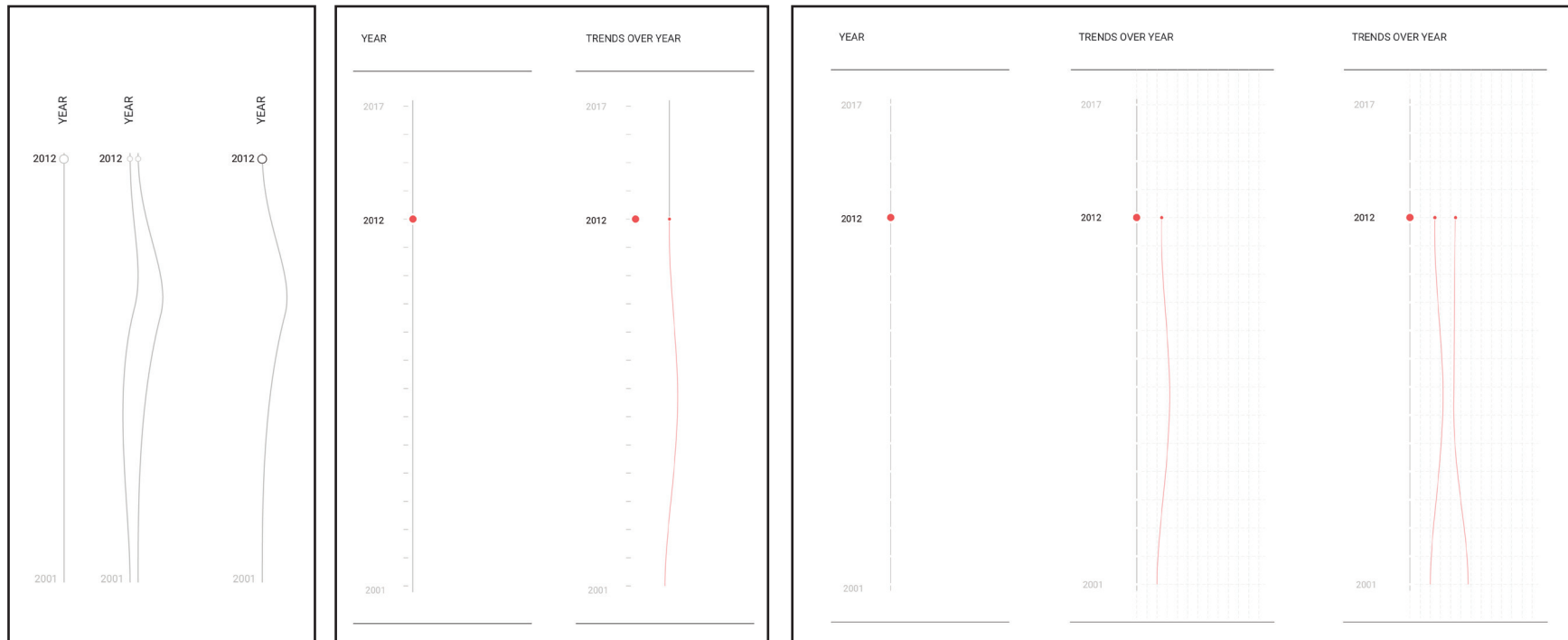
- Age Group Graph (Line and Bar Chart)
- Specific crimes
- Specific states
- Year wise trend
- Specific crime/ state



LIST OF INTERACTIONS

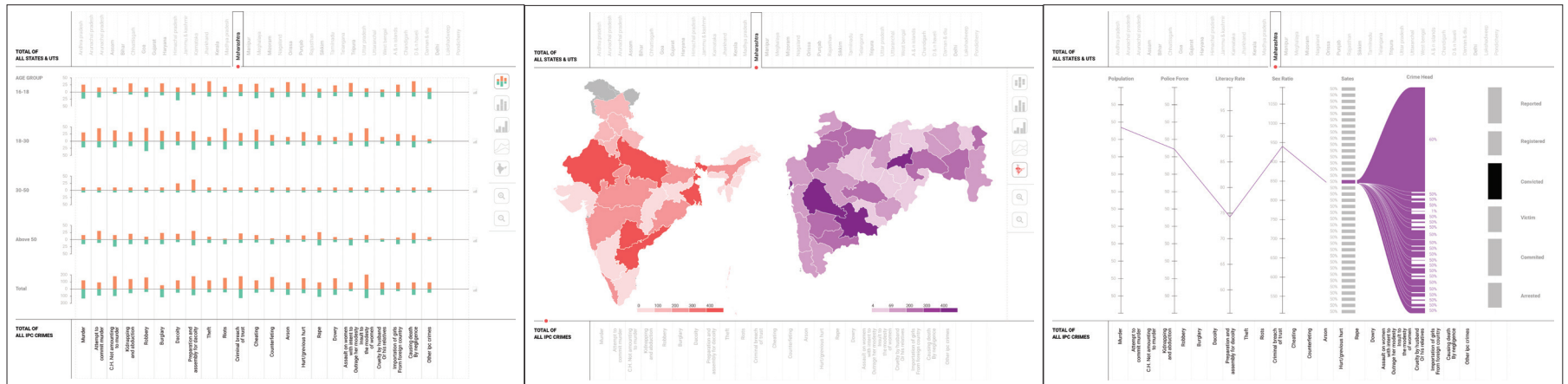
MODE	POINTS	HOVER	CLICK	SCROLL
Tour	Insights	Look up the graph		Change insight
Explore	Graph	Get value	Specific selection Trend throughout the year	Change insight
	Insights	Look up the graph		
About us				
Graph 1 (In explore page)	Graph	Get value	Specific selection Trend throughout the year	

DESIGN EXPLORATION



FINAL DESIGN

An analysis of the initial design ideas and their limitations along with the user requirements from the user studies led to the formation of the Crime Data Tool. Final design is the iteration and additions of all design explorations. Final design contains three specific graphs for specific data set. Eg. Devided bar graph to show age and gender.



FINAL INFORMATION

ARCHITECTURE CONTAIN

PAGES

Tour
Explore
Insights
About

MASTER PAGE FOR EXPLORE PAGE (GRAPH)

(Most common feature)

- Trends over the years
- Insights
- Graph
- Filter
- About data

GRAPH 1: Age and Gender

- Trends over the years
- Insights
- Bar chart to show total
- Divided bar chart to show gender difference
- Line chart to show trends

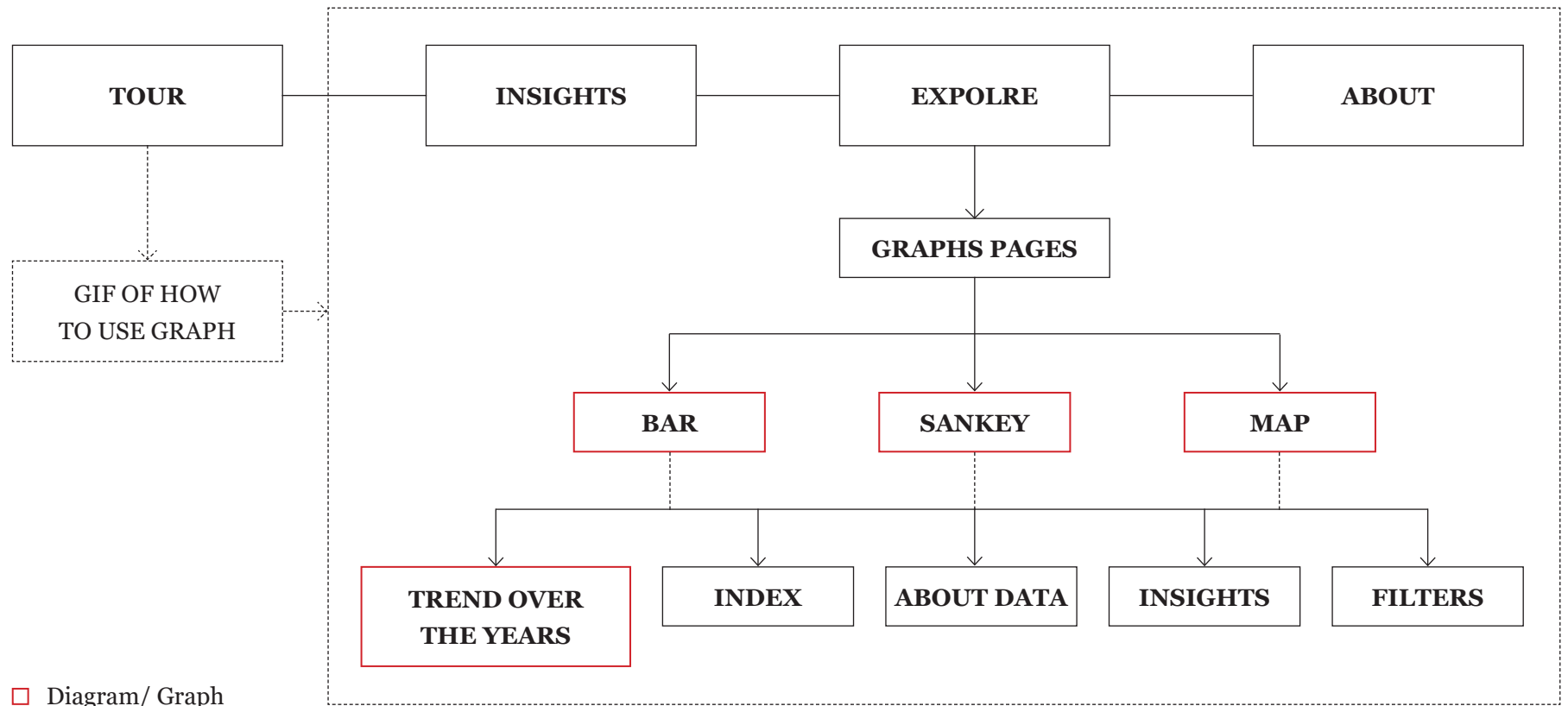
GRAPH 2: Affecting Factors (Sankey Diagram)

- Trends over the years
- Insights
- Affecting factor (Population, Police force, Literacy rate, Sex ratio)
- All state and All IPC crime types
- Reported cases, registered cases, convicted crime, committed crime, victims of crime and arrested persons, etc.

GRAPH 3: Map

- Trends over the years
- Insights
- All state and All IPC crime types

FINAL INFORMATION ARCHITECTURE



WORK FLOW THROUGH SCENARIO

SCENARIO

A journalist of a national daily has to write a report on a crime that has happened on a senior citizen. For that, the reporter needs an ample amount of background data regarding that particular kind of crime to present as the premise of the report. This data also helps the reader to have a relative perspective of the crime happened and hence, is necessary.

Without Crime data visualization tool

- The journalist will have to go through many resources, both online and offline to gather the data.
- At the same she will have to validate it from the various sources and analyze it further.
- If it is raw data she will have to extract different data pieces, perform various graph analysis in order to organize it and then present it in reference of the context of the crime happened.

With Crime data visualization tool

- She will search the crime data on internet.
- She will open 'crimes in India' website.
- If she is visiting first time to the site then site will give small tour about how to use the tool through preloaded insights.
- If she has already visited then she will skip the tour and start with the graph exploration.

Filters
Insights

The highest ratio is for insult to the modesty of women (molestation), which would not typically involve many women.

Males below 18 years are the least likely to be involved in crimes against women

The highest ratio is for insult to the modesty of women (molestation), which would not typically involve many women.

Males below 18 years are the least likely to be involved in crimes against women

The highest ratio is for insult to the modesty of women (molestation), which would not typically involve many women.

Males below 18 years are the least likely to be involved in crimes against women

- When she will click on specific insights, graphs would turn into highlighted insights.
- Then she will explore different filters related to the committed crime, person arrested etc.
- After choosing one of the filters, she will get the required data.

Category ^

Victim

 Committed

 Convicted

 Person Arrested

 Cases Registered

 Cases Reported

Crime Against ^

All

 SC

 ST

 Children

 Women

Age Group v

Gender v

Year v

State v

District v

Crime Haed v

Data file File v

About Data: The data refers to State/UT-wise details on total number of cases reported under murder and number of victims of murder by gender. The Age group of victims (both male and female) of murders are classified into 0-10, 10-15, 15-18, 18-30, 30-50, 50 and above.v

- She will read the information shown above about current data use by graphs after applying filter.

Convicts Per Lakh

Absolutel Number of Convicts

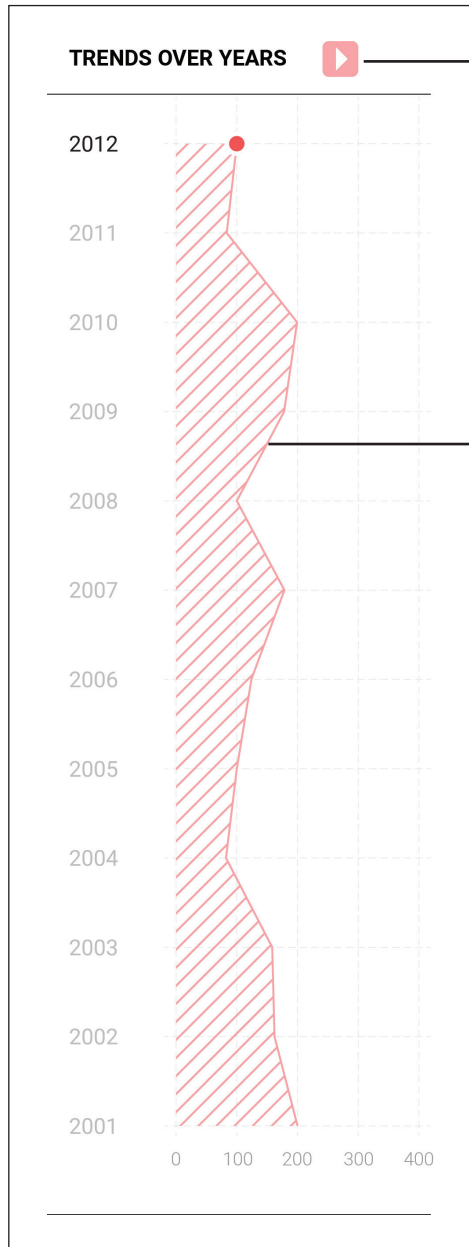
Female

Male

- She will use absolute number by population radio button to get data. eg. Murder crime per population of Maharashtra State.

Problem Solved:

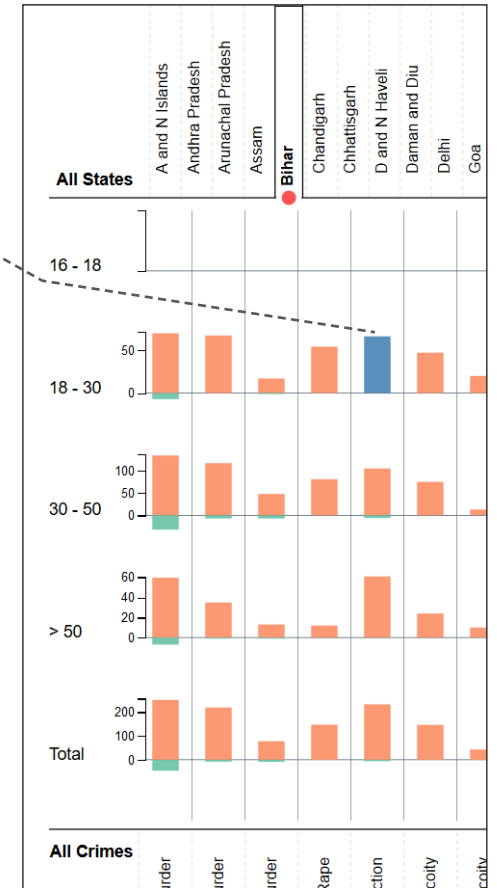
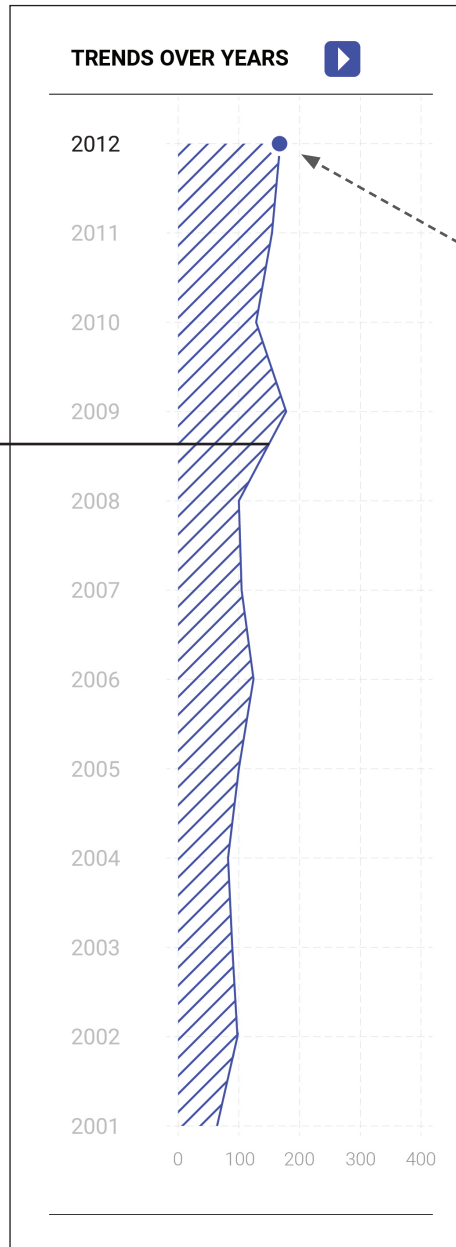
- She won't have to go through the extensive process of data extraction and organizing.



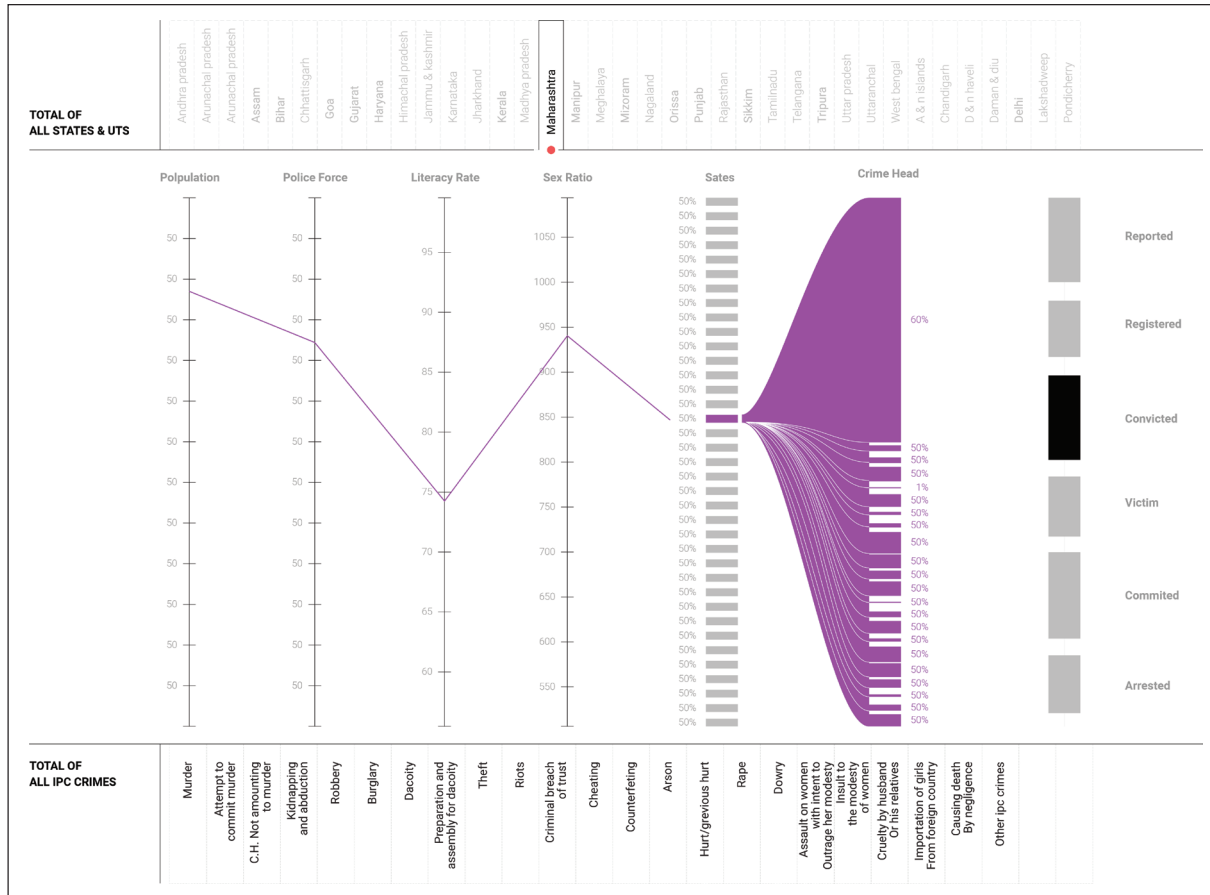
To check how trend changes over the years, user will click on the play button.

Trend Line

When she clicks on specific point on data this graph show trend over years of that selected data.

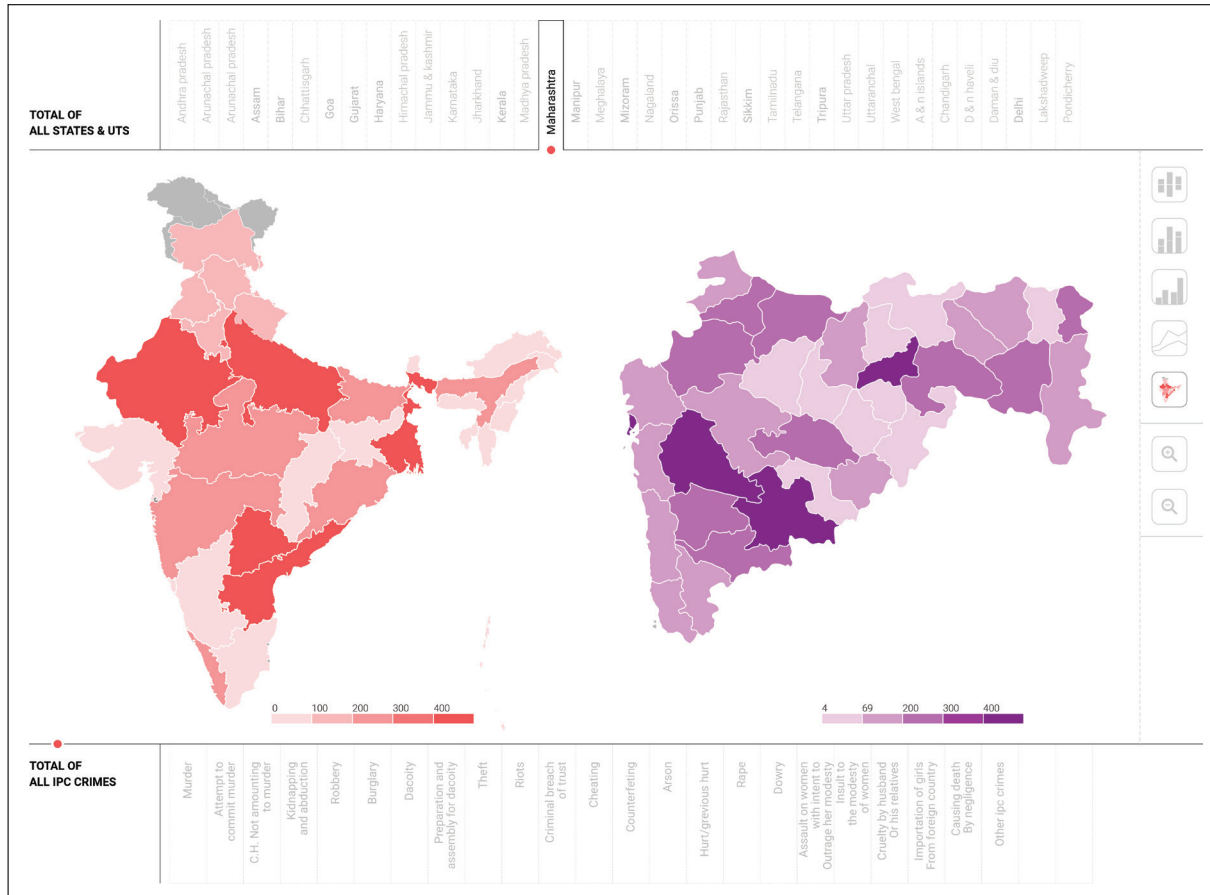


- When she clicks on specific data shown in the graph, she gets trends related to her selected data.
- She clicks on play button to see trends over years.



Explore Sankey Graph

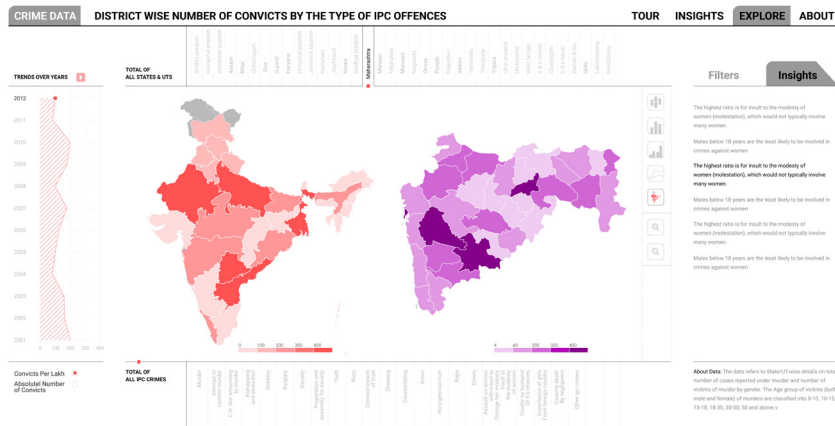
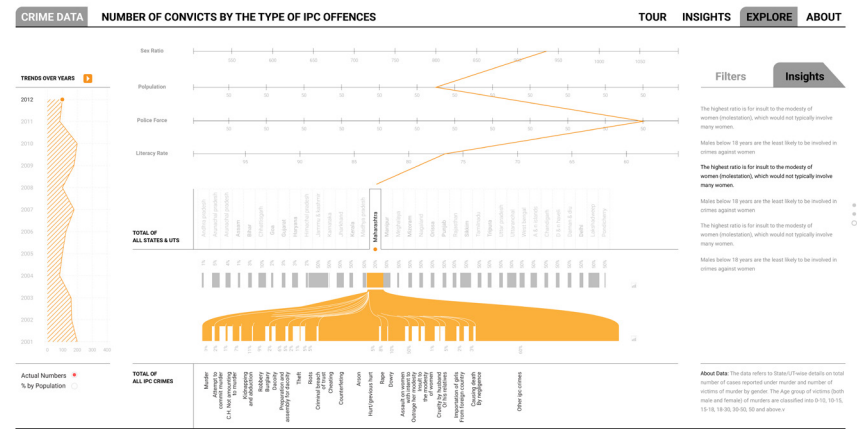
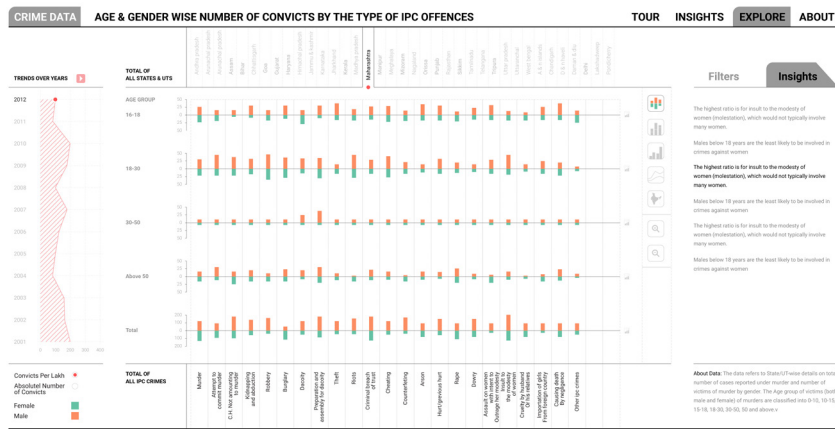
- To compare crime data with external factors, she use sankey diagram.
- She selects Maharashtra to see all crime data for all crimes along with data regarding population, police force, literacy rate and sex ratio of Maharashtra.
- She also checks how many crimes are reported, registered, convicted, committed; how many crime victims are there; and how many convicts are arrested.
- Later she selects theft crime to see all crime data for all states along with the states' population, police force, literacy rate and sex ratio.



Explore Heat Map

- To check highest and lowest district of crime on senior citizen she uses heat maps.

OVERVIEW OF DATA VIZ



2012 Punjab remains India's drug capital 35 cases per 100,000 population, followed by Maharashtra merchant of that city, the original of the famous whaling house of Enderby & Sons; a house which in my poor whaleman's opinion, comes not far behind the united royal houses of the Tudors and Bourbons, in point of real historical interest. How long, prior to the year of our Lord 1775, this great whaling house was in existence, my numerous fish-documents do not make plain; but in that year (1775) it fitted out the first English ships that ever regularly hunted the Sperm Whale; though for some score of years previous (ever since 1726) our valiant Coffins and Maceys of Nantucket and the Vineyard had in large fleets pursued that Leviathan, but only in the North and South Atlantic: not elsewhere. Be it distinctly recorded here, that the Nantucketers were the first among mankind to harpoon with civilized steel the great Sperm Whale; and that for half a century they were the only people of the whole globe who so harpooned him. In 1778, a fine ship, the Amelia, fitted out for the express purpose, and at the sole charge of the vigorous Enderbys, boldly rounded Cape Horn, and was the first among the nations to lower a whale-boat of any sort in the great South Sea. The voyage was a skilful and lucky one; and returning to her berth with her hold full of the precious sperm, the Amelia's example was soon followed by other ships, English and American, and thus the vast Sperm Whale grounds of the Pacific were thrown open. But not content with this good deed, the indefatigable house again bestirred itself: Samuel and all his Sons—how many, their mother only knows—and under their immediate auspices, and partly, I think, at their expense, the British government was induced to send the sloop-of-war Rattler on a whaling voyage of discovery into the South Sea. Commanded by a naval Post-Captain, the Rattler made a rattling voyage of it, and did some service; how much does not appear. But this is not all. In 1819, the same house fitted out a discovery whale ship of their own, to go on a tasting cruise to the remote waters of Japan. That ship—dash;well called the 'Syren'—made a noble experimental cruise; and it was thus that the great Japanese Whaling Ground first became generally known. The Syren in this famous voyage was commanded by a Captain Coffin, a Nantucketer. All honour to the Enderbys, therefore, whose house, I think, exists to the present day; though doubtless the original Samuel must long ago have slipped his cable for the great South Sea of the other world. The ship

OBJECTIVE OF EVALUATION

The purpose of evaluation for the project is to understand the usability, feasibility and conceptual issues with the Crime Data Visualization Tool on multiple form factors.

What to test?

- To evaluate the usability of the user interface.
- Findability
 - Filters
 - Trend
 - Insights
- To check the find-ability of the datasets.
- To examine the utility of the Crime Data

PROTOCOL FOR EVALUATION

A think aloud test was conducted for the user testing. The participants have to use the tool while continuously thinking out loud, or verbalizing their thoughts as they move through the interface or perform the tasks given. It is assumed that the users have a knowledge of English.

Protocol for the Think Aloud Test:

- Ask user to filter the dataset of his choice.
- Ask user to explore the data
- To check the find-ability of the tool, give slightly complex task to user.

Step 1: let user explore data viz. (think aloud)

This is to familiarize the user with the Visualization Control Panel and it will help user to understand data.

Step 2: Give a data viz tour. if they don't understand the visualization.

Step 3: Task

1. Which state has most number of burglaries in 2001? *This is an early success task to instil confidence in the user.*
2. Find out Gujarat's Arson trend in 2003.
3. In 2012, which age group and which crime has maximum number of convicts in Uttaranchal?
4. Find out the trends of women affected by "Cruelty by Husband or Relative of Husband" of West Bengal state in 2008.
5. Give the list of states which have lowest kidnapping and abduction in 2011 against women.
6. Try to find some insights within 5 min.

Step 4: Ask questions and fill the google form.

1. Are you familiar with interactive visualization?
2. Used graphs are appropriate graphs for data set?
3. Is it useful information?
4. Did you find, what you want to find?
5. Over all ease of navigation
6. Ease of Bar Graph
7. Ease of Navigation - Map
8. Ease of Navigation - Sankey

FINDINGS OF EVALUATION

Users	Age	T1	T2	T 3	T4	T5	T6
U1	18-25	Yes	No	No	Yes	Yes	No
U2	18-25	Yes	Yes	Yes	Yes	Yes	Yes
U3	18-25	No	No	Yes	Yes	No	Yes
U4	18-25	Yes	No	Yes	Yes	Yes	Yes

- As they started using visualization, users' conceptual model improved.
- For ease of navigation and understanding, user prefers to use Map Diagram, followed by Bar Diagram and Sankey Diagram
- Used graphs are appropriate for data sets.
- User found given data visualization very useful
- User was more interested to know gender wise crime details and crime in their states.

Based on step 3 tasks

Based on step 4 questions

Users	Age	Q1	Q2	Q3	Q4	Q5	Q6	Q7
U1	18-25	Yes	Not Appropriate	Very useful	Maybe	Very Hard	Easy	Very Hard
U2	18-25	No	Very Appropriate	Very useful	Maybe	Mildly	Easy	Hard
U3	18-25	Yes	Very Appropriate	Mildly	Maybe	Mildly	Easy	Hard
U4	18-25	Yes	Very Appropriate	Very useful	Yes	Easy	Easy	Hard

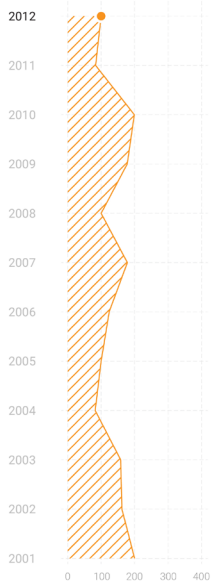
FINDINGS OF EVALUATION

- As they started using visualization, users' conceptual model improved.
- For ease of navigation and understanding, user prefers to use Map Diagram, followed by Bar Diagram and Sankey Diagram
- Used graphs are appropriate for data sets.
- User found given data visualization very useful
- User was more interested to know gender wise crime details and crime in their states.

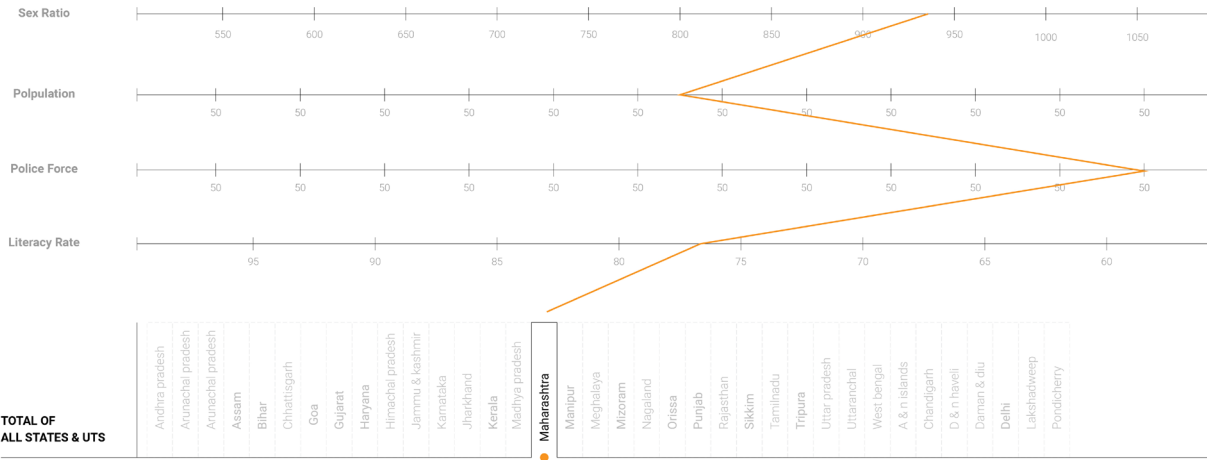
FEEDBACK

- Try vertical layout for all diagrams
- Give hint for clickable buttons
- Use colour code for Sankey Diagram
- Give check box options for all states and crimes
- Show minimum data for comparison
- Make value box: it will show selected data's number of crimes
- Show value while hovering on trend line

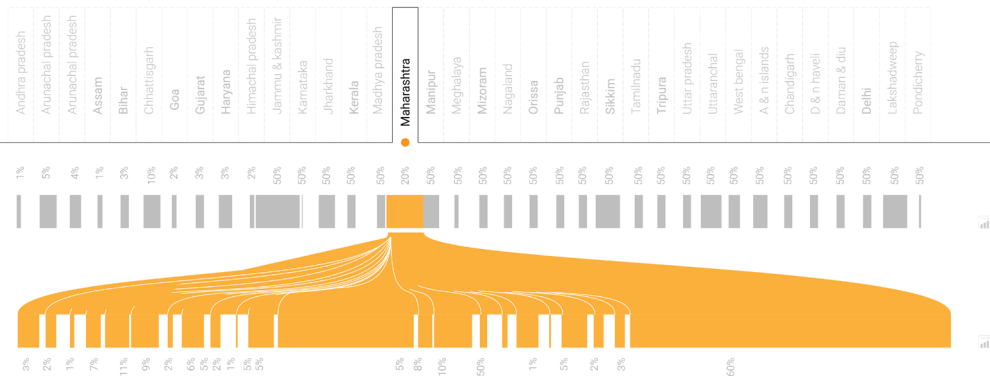
TRENDS OVER YEARS



Actual Numbers ●
% by Population ○



TOTAL OF ALL STATES & UTS



TOTAL OF ALL IPC CRIMES

- Murder
- Attempt to commit murder
- C.H. Not amounting to murder
- Kidnapping and abduction
- Robbery
- Burglary
- Dacoity
- Preparation and assembly for dacoity
- Theft
- Riots
- Criminal breach of trust
- Cheating
- Counterfeiting
- Arson
- Hurt/grievous hurt
- Rape
- Dowry
- Assault on women with intent to outrage her modesty
- Insult to the modesty of women or women of her relatives
- Cruelty by husband or his relatives
- Importation of girls from foreign country
- Causing death by negligence
- Other ipc crimes

Filters Insights

The highest ratio is for insult to the modesty of women (molestation), which would not typically involve many women.

Males below 18 years are the least likely to be involved in crimes against women

The highest ratio is for insult to the modesty of women (molestation), which would not typically involve many women.

Males below 18 years are the least likely to be involved in crimes against women

The highest ratio is for insult to the modesty of women (molestation), which would not typically involve many women.

Males below 18 years are the least likely to be involved in crimes against women

About Data: The data refers to State/UT-wise details on total number of cases reported under murder and number of victims of murder by gender. The Age group of victims (both male and female) of murders are classified into 0-10, 10-15, 15-18, 18-30, 30-50, 50 and above.v

FUTURE SCOPE

- Give option to add causes and famous criminal incidents.
- Provide external reference link for insights and findings.
- Make it crowd sourced.
- Provide various graph options for each crime data.

REFERENCES

[1] Hans Rosling: Let my dataset change your mindset -

https://www.ted.com/talks/hans_rosling_at_state?utm_source=tedcomshare&utm_medium=referral&utm_campaign=tedspread

[2] Is Pivot a turning point for web exploration?

http://www.ted.com/talks/gary_flake_is_pivot_a_turning_point_for_web_exploration?utm_source=tedcomshare&utm_medium=referral&utm_campaign=tedspread

[3] Zonal Data

<http://www.mapsofindia.com/zonal/>

[4] Domestic Violence Act: The driver behind women empowerment November 18, 2015

<https://community.data.gov.in/domestic-violence-act-the-driver-behind-women-empowerment/>

[5] Importance of Crime Data to Public Safety and an Effective Crime Prevention Planning July 12,

2015

<https://community.data.gov.in/importance-of-crime-data-to-public-safety-and-an-effective-crime-prevention-planning/>

[6] Crime in India data source:

http://ncrb.nic.in/StatPublications/CII/CII2015/CII_Additional_Tables_2015/ADDITIONAL_TABLES.htm

[7] C.L. P. Chen, C.-Y. Zhang, Data-intensive applications, challenges, techniques and technologies: A survey on Big Data, Information Sciences, 275 (10), August 2014, pp. 314-347. In article <http://www.sciencedirect.com/science/article/pii/S0020025514000346>

[8] E.Y. Gorodov and V.V. Gubarev, Analytical Review of Data Visualization Methods in Application to Big Data, Journal of Electrical and Computer Engineering, 013, Article ID 969458, pp. 1-7.

[9] Big Data and Visualization: Methods, Chal-

lenges and Technology Progress. Vol. 1, No. 1, 2015, pp 33-38. doi: 10.12691/dt-1-1-7 | Review Article

[10] Auer, S. R.; Bizer, C.; Kobilarov, G.; Lehmann, J.; Cyganiak, R.; Ives, Z. (2007). "DBpedia: A Nucleus for a Web of Open Data". The Semantic Web. Lecture Notes in Computer Science. 4825. p. 722. doi:10.1007/978-3-540-76298-0_52. ISBN 978-3-540-76297-3.

APPENDIX

EXISTING DATA SET ABOUT CRIME IPC & SLL

- Crimehead-wise Cases Reported under Indian Penal Code during 2001-2015 (StateUT)
- Crimehead-wise Cases Reported under State and Local Laws during 2001-2015(StateUT)
- Year-wise Cases under Indian Penal Code during 2001-2015(StateUT)
- Year-wise Cases under State and Local Laws during 2001-2015(StateUT)
- Cases Reported under IPC and SLL during 2001-2015(All India).pdf
- Cases Registered under IPC and SLL during 2001-2015(Individual StateUT)
- Cases Reported and Crimerate Under IPC and SLL Cases during 2013-2015 (StateUT)
- Persons Arrested under IPC Crimeheads during 2001-2015(StateUT)
- Persons Arrested under SLL Crimeheads during 2001-2015(StateUT)
- Data Analysis on IPC Crimeheads under 6

Heads during 2010-2015(StateUT)

- Data Analysis on SLL Crimeheads under 6 Heads during 2010-2015(StateUT)
- Data Analysis on IPC Crimeheads under Various Heads during 2010-2015 (StateUT)
- Data Analysis on SLL Crimeheads under Various Heads during 2010-2015 (StateUT)
- Female Persons Arrested (Above 18 Years) under IPC and SLL during 2014-2015(StateUT)

CRIME AGAINST WOMEN

- Cases Reported under Crimes against Women During 2001-2015(StateUT)
- Persons Arrested under Crimes against Women During 2001-2015(StateUT)
- Yearwise Cases reported under Crimes against Women during 2001-2015(CrimeHead)
- Yearwise Cases reported under Crimes against Women during 2001-2015 (Individual State)
- Data Analysis on Crime against

Women Crimeheads under 6 Heads during 2010-2015(StateUT)

- Data Analysis on Crime against Women Crimeheads under Various Heads during 2010-2015(StateUT)
- Cases registered and their disposal under Cruelty by Husband or his Relatives during 2001-2015(StateUT)
- Cases registered and their disposal under Dowry Deaths during 2001-2015 (StateUT)
- Cases registered and their disposal under Dowry Prohibition Act during 2001-2015(StateUT)

CRIME AGAINST CHILDREN

- Cases Reported under Crimes against Children during 2001-2015(StateUT)
- Yearwise Crime against Children during 2001-2015(Crimehead)
- Persons Arrested under Crimes against Children during 2001-2015(StateUT)
- Data Analysis on Crime against Children Crimeheads under Various Heads during

2010-2015(StateUT)

CRIME AGAINST SCS & STS

- Year-wise Cases Reported under Crimes against SCs and STs during 2001-2015(All India)
- StateUT wise Cases Reported under Crimes against SCs and STs During 2001-2015(Individual States)
- Data Analysis on Atrocities against SCs and STs for 6 heads during 2012-2015(StateUT)
- Data Analysis on SCs Crimeheads under Various Heads during 2013-2015 (StateUT)
- Data Analysis on STs Crimeheads under Various Heads during 2013-2015 (StateUT)
- Data Analysis on SCs Crimeheads under Various Heads during 2012-2015 (CrimeHeadWise)
- Data Analysis on STs Crimeheads under Various Heads during 2012-2015 (CrimeHeadWise)

- Data Analysis on SCs Crimeheads under 6 Heads during 2010-2015 (StateUT)
- Data Analysis on STs Crimeheads under 6 Heads during 2010-2015 (StateUT)
- Cases Reported for Crime against SCs during 2001-2015(StateUT)
- Cases Reported for Crime against STs during 2001-2015 (StateUT)
- Persons Arrested for Crime against SCs during 2014-2015 (StateUT)
- Persons Arrested for Crime against STs during 2014-2015 (StateUT)

CRIME AGAINST SR. CITIZENS

- Cases Reported under Crime against Senior Citizen during 2014-2015 (Crimehead)
- Data Analysis on Crime against SrCitizen 6 Heads during 2014-2015 (StateUT)

CRIME AGAINST FOREIGNERS

- Crimes committed against Foreigners during 2014-2015 (CrimeHead)
- Data Analysis on Crime against

Foreigners under Various Heads during 2014-2015 (StateUT)

CRIME BY FOREIGNERS

- Crime committed by Foreigners during 2014-2015(Crimehead)
- Data Analysis on Crime by Foreigners under Various Heads during 2014-2015(StateUT)

HUMAN TRAFFICKING

- Human Trafficking 6 heads during 2010-2015(Crimehead)
- Human Trafficking 6 heads during 2010-2015(StateUT)
- Cases Reported under Child Trafficking during 2014-15(StateUT)
- Data Analysis on Child Trafficking Crimeheads under 6 Heads during 2010-2015(StateUT)

CYBER CRIMES

- Cases Reported Under Cyber Crimes during 2014-2015(StateUT)
- Data Analysis on Cyber Crimes under 6 Heads during 2014-2015(Crimehead)
- Data Analysis on Cyber Crimes under 6 Heads

during 2014-2015(StateUT)

MISCELLANEOUS

- Crimes by Place of Occurance 2001-2015
- Custodial Deaths during 2001-2015
- Human Rights violation by Police during 2010-2015
- Reasons or Purpose of Kidnapping and Abduction for the year 2010-2015
- Motives or Causes of Murder during 2001-2015
- Casualties under Police Firing during 2001-2015

DISTRICT-WISE REPORTS

2001-2013

- District-Wise IPC Cases During 2001-2013
- District-Wise SCs Cases During 2001-2013
- District-Wise STs Cases During 2001-2013
- District-Wise Women(IPC) Cases During 2001-2013
- District-Wise Children Cases During 2001-2013

2014

- District-wise Crimes committed against Children_2014
- District-wise Crimes committed against Foreigners_2014
- District-wise Crimes committed against SCs_2014
- District-wise Crimes committed against Senior Citizen_2014
- District-wise Crimes committed against

- STs_2014
- District-wise Crimes committed against Women_2014.
- District-wise Crimes committed by Foreigners_2014
- District-Wise IPC Cases Reported_2014
- District-wise SLL Cases Reported_2014

2015

- District-wise Crimes committed against Children_2015
- District-wise Crimes committed against Foreigners_2015
- District-wise Crimes committed against SCs_2015
- District-wise Crimes committed against Senior Citizen_2015
- District-wise Crimes committed against STs_2015
- District-wise Crimes committed against Women_2015
- District-wise Crimes committed by Foreigners_2015

- District-Wise IPC Cases Reported_2015
- District-wise SLL Cases Reported_2015

NATIONAL CAPITAL REGION (NCR) 2014

- NCR Crimes committed against Children_2014
- NCR Crimes committed against Foreigners_2014
- NCR Crimes committed against SCs_2014
- NCR Crimes committed against Senior Citizen_2014
- NCR Crimes committed against STs_2014
- NCR Crimes committed against Women_2014
- NCR Crimes committed by Foreigners_2014
- NCR IPC Cases Reported_2014
- NCR SLL Cases Reported_2014

2015

- NCR Crimes committed against Children_2015

- NCR Crimes committed against Foreigners_2015
- NCR Crimes committed against SCs_2015
- NCR Crimes committed against Senior Citizen_2015
- NCR Crimes committed against STs_2015
- NCR Crimes committed against Women_2015
- NCR Crimes committed by Foreigners_2015
- NCR IPC Cases Reported_2015
- NCR SLL Cases Reported_2015