Crime Committed Against Women in India in 2013: A User Evaluation Report

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Abstract—**In India, while crimes committed against women like Rapes and Sexual Assaults are treated with outmost severity, most people are unaware about Domestic Violence which is still treated as "personal issue of families". In spite of higher number of such crimes, no strict rule or law is in place to strictly punish the perpetrator. The visualization is an effort to increase the awareness of Indian people for such crimes. The report provides a brief description of the data, the visualization and its goals and then describes the user evaluation that was conducted on the visualization.**

I. DESCRIPTION OF DATA

The data regarding crimes against women is taken from Open Government Data Platform, India which is being maintained by National Informatics Centre (NIC), Department of Electronics & Information Technology, Ministry of Communications & Information Technology, falling under Government of India. The data comprises of State wise crime committed against women in the year 2013 under different crime heads like Rape, Assault, Dowry, Domestic Violence, etc. The data is collected for annual monitoring purposes and has been contributed by Ministry of Home Affairs, Department of States and National Crime Records Bureau (NCRB). It is released to public under National Data Sharing and Accessibility Policy (NDSAP) of India. The population density per square kilometer data for different states of India is taken from Indiaonlinepages.com.

II. DESCRIPTION OF VISUALIZATION

The visualization (Appendix 1) comprises of a bubble chart with coordinate axis where each bubble represent a state in India. It is made using the Tableau tool and is refined using Adobe Illustrator. The different aspects of the visualization are as mentioned below:

- Axes: The X-axis has the total number of assaults and rape crimes committed against women in 2013, while the Y-axis contains the number of Domestic Violence crimes committed against women in India in 2013.
- Size of the bubble: The size of the bubble represents the density of people per square kilometer in the respective state.
- Color and Saturation: The color saturation level of bubbles indicate the total number of crimes committed against women in the respective states of

India in 2013. Blue color is chosen as color blindness for blue color is very rare.

III. GOALS OF VISUALIZATION

The main purpose behind making this visualization is to increase the awareness towards the major crimes that are committed against women in India. The aim is to provide a message to people regarding the seriousness of Domestic violence, a crime towards which most people in India along with the Government are ignorant. While there are strict measures that are taken towards crimes like Rape and Assaults, no such concrete rule or awareness exists for domestic violence. Along with this, the visualization also attempts to inform the viewer about the states in India where these crimes are highest in number with respect to the density of people per square km.

IV. TARGET AUDIENCE

The target audience for this visualization are common citizens of India including both men and women with age ranging from 18 years to 60 years and having educational levels of high school and above. The audience group could also include Indian government officials or people working in the field of women empowerment and crime control units.

V. TASKS TO BE ACCOMPLISHED

As mentioned earlier, the aim behind this visualization is to increase awareness towards crimes like domestic violence and to recognize problematic states having high ratios of these crimes. The major tasks that should be accomplished by this visualization include:

1. Ability to compare the number of domestic violence cases vs rape and assault cases in different states of India.
2. To identify the states where the domestic violence cases are highest in number.
3. To identify the states having highest number of total crimes committed against women.
4. To understand the problematic states where the ratio of crimes against women vs people per square km is highest.

VI. USER STUDY TASK LIST

All the users were asked 4-6 questions depending upon the responses. The usability test tasks that were given to all the users are mentioned below:

1. (Before viewing the visualization) Please rate the following according to your understanding of the most frequently committed as well as most severe crime against women in India. (1 being most severe and frequent crime.)
   a. Rapes
   b. Assaults
   c. Domestic Violence
   d. Sexual Harassments
2. Please tell me the approximate value of rapes and assault cases and domestic violence cases in Gujarat and Assam. In which state of these two the total number of crimes is highest?
3. Can you tell the names of the states in which according to you the issue of crime against women is most severe?
4. Please tell the factors that you have taken into consideration while choosing these states.
5. What are your thoughts about Domestic Violence vs Rapes and Assault cases after viewing the visualization?

VII. USER SELECTION

The user study was conducted with three users matching the target audience as closely as possible. Table 1 provides the description of the three users in the study along with the key similarities as well as dissimilarities with target audience.

VIII. OUTCOMES AND CHANGES TO BE MADE

Table 2 describes the results for different tasks with the three users. A brief summary of the important findings and the changes that could be made are mentioned below:

1. All the users were able to understand the seriousness of Domestic Violence and its frequency in India by viewing the visualization. Hence, the visualization was successful in achieving this goal.
2. All users were able to tell the approximate value for the number of cases for the two crimes in states. But as the third user mentioned, finding the exact value of cases was difficult. In order to enable this, labels/tooltips could be used to mention the number of cases or the number of tick marks on both the axis could be increased.
3. All the three users were able to understand the values of crimes committed in relation to the density of people. But, two from three users did not considered the change of color saturation in different bubbles. The reason could be that not much focus was given in the visualization on that and no visual cue was given to users to make sure that they look at it. To rectify it, some bright colors whose saturation difference could be very prominent like red could be used or else some cues like text/labels could be included to focus the concentration of users to that point.

User	Gender/Nationality	Age/Highest Education level	Similarities to target audience	Dissimilarities to target audience
User I	Male/ Indian	30/Master Degree	Indian citizen. Falling in the specific age and education range. This user was selected to view the effect of visualization on males and people with higher education level.	Not currently residing in India. Not working in field of social change.
User II	Female/Indian	28/Bachelor Degree	Indian citizen. Falling in the specific age and education range. Interested in social work for women.	Not currently residing in India.
User III	Female/Indian	18/High School	Indian citizen. Falling in the specific age and education range. This user was selected to view the effect on young-adult population with mid-education level.	Not currently residing in India. Not working in field of social change.

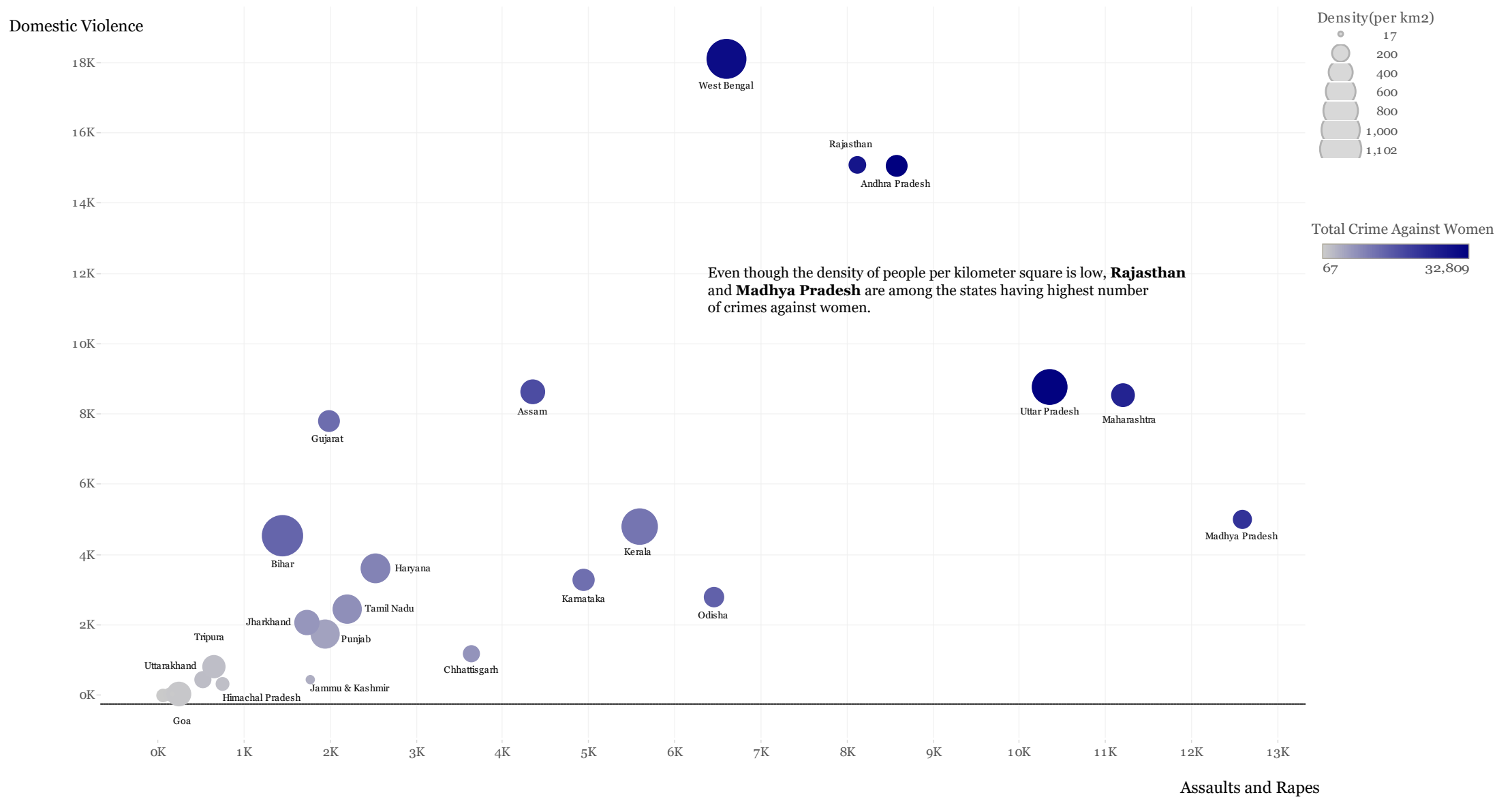**Table 1: Description of the users in the study**

TASKS/USERS	USER I	USER II	USER III
Task 1: Rating	Rapes, Sexual Harassments, Domestic Violence, Assaults	Rapes, Sexual Harassments, Domestic Violence, Assaults	Rapes, Domestic Violence, Sexual Harassments, Assaults
Task 2: Reading the graph	Values given were correct for the two states. Able to visualize the meaning of the size of bubble i.e. the density of people. Not able to make out the color saturation difference for visualizing total crimes.	Correct values for the two crimes in the two states. When asked for total crimes, calculated by doing addition of x-y coordinate value for that state. Didn't considered the color saturation.	Correct values for two crimes. Able to understand the difference in saturation and answered correctly without having to add the x-y coordinates.
Task 3/Task 4: Visualizing all variables	West Bengal, Andhra Pradesh, Rajasthan. Chose West Bengal because it was at top most point. But considered density for choosing the other two states.	Madhya Pradesh and Rajasthan. Considered the size of bubble (density of people) and the sum of the x-y coordinates to make the judgement. Didn't considered color saturation.	Madhya Pradesh, Maharashtra, Rajasthan. Considered the darkness of bubble and its size.
Task 5: Final comments	Didn't had the idea that Domestic Violence occur so frequently in India. The visualization is effective in comparing the cases for the two crimes.	Able to understand that Domestic Violence is also a serious issue. But surprised to see that so many cases were reported then also not much awareness among people.	Shocked to see the number of crimes committed against women in India in just a year. Thought that reading exact values of cases is bit difficult in visualization.

Table 2: Description of the user test results

APPENDIX 1: The Visualization:

Domestic Violence vs Assaults and Rapes in India in 2013

Rapes and Assaults on women have always been treated as the most serious and most frequently commited crimes against women in India. But the data shows that Domestic Violence is another frequently commited crime that demands the same attention and seriousness by the Government as well as by the common people.

Domestic Violence

Density(per km2)
- 17
- 200
- 400
- 600
- 800
- 1,000
- 1,102

Total Crime Against Women

67   32,809

Even though the density of people per kilometer square is low, **Rajasthan** and **Madhya Pradesh** are among the states having highest number of crimes against women.

West Bengal
Rajasthan
Andhra Pradesh
Assam
Gujarat
Uttar Pradesh
Maharashtra
Kerala
Bihar
Haryana
Madhya Pradesh
Karnataka
Tamil Nadu
Jharkhand
Punjab
Odisha
Tripura
Chhattisgarh
Uttarakhand
Jammu & Kashmir
Himachal Pradesh
Goa

0K 1K 2K 3K 4K 5K 6K 7K 8K 9K 10K 11K 12K 13K

Assaults and Rapes

REFERENCES

IndiaOnlinePages.com. (n.d.). *Statewise Population of India*. Retrieved from IndiaOnlinePages.com: http://www.indiaonlinepages.com/population/state-wise-population-of-india.html

National Informatics Centre (NIC), Department of Electronics & Information Technology, Ministry of Communications & Information Technology,. (2016, April). *Crime against Women*. Retrieved from Open Government Data Platform India: https://data.gov.in/catalog/crime-against-women