

Motives of Cyber Attack Analysis Using Tableau

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Abstract - Cyber Crime is a type of crime involving computers and networks to perform illegal and malicious activities like gaining unauthorized access to a system or installing a virus or performing DOS attack etc. The goal of this paper is to classify the motives behind cyber attacks and analyze the most common motive using Tableau visualization software. Tableau is a data visualization software mainly used in the field of business intelligence. This paper mainly focuses on the classifying and analyzing the motives behind cyber attacks such as greed, revenge, extortion etc. in various states of India and the goal is to analyze and predict the most common motive behind cyber attacks using various graphs and charts in Tableau Visualization Software. By analysing the motives behind various cyber attacks, it becomes easy for detectives and the forensics department to solve a cyber crime and prevent further cyber crimes in the future.

Key Words: Tableau, Cyber Crime, Visualization, Graphs, Dashboard, Motive

1. INTRODUCTION

Motives of cyber attack analysis refers to analysing the motives behind cyber crimes and predicting the most common motive for the attacks using Tableau Software. Tableau is a data visualization tool used in the business intelligence field. Using tableau, a raw dataset can be converted into different types of graphs and charts such as heat map, tree map, bubble chart, bar chart, pie chart etc. which becomes convenient for the user to analyze large amounts of data. Data blending and data joining is also possible using Tableau Software. Tableau is very efficient for data analysis. Tableau also allows the creation of dashboards, which serve as an insight for various organizations. Data Visualization is the graphical representation of data. Data visualization allows us to visualize data using various graphs, charts and analyze them in a convenient and efficient manner. Tableau is one such data visualization tool for analyzing data in an efficient manner. There are various types of charts and graphs involved in data visualization. Bar Graph is used for analysing data present in multiple categories like, analyzing which state produced the highest revenue etc. Scatter plot is used for analysing a time series of data, like growth of revenue of a particular state in a period of ten years. Map Chart is used for specifying locations with data. Bubble charts are usually used for representing financial data. In this research paper almost all types of graphs, charts and maps are used to analyze and visualize data.

In this research paper, the concept of data visualization is used to analyze the motives of cyber attack data collected from kaggle and predict the most common motive the software used is tableau. From this type of analysis, the motives behind cyber attacks can be predicted which will help us to remain safe and prevent us from becoming victims of cyber attacks.

1.1 Literature Review

According to the Verizon Enterprise report, 93% of motivation for the attacks is financial motivation and is performed for financial gain. Apart from that, there are other sets of less-frequent motives, known as "FIG" (Fun, Ideology and Grudges). According to Raconteur, 41% of motivation for the attacks is financial motivation. According to vircom, 72% of hackers perform the attack for financial gain, 70% do it for fun. From a survey conducted by Sandhya Keelery, in 2016 14.2% of crime happened due to hacktivism, 9.2% due to cyber espionage, 4.3% due to cyber warfare and in 2017 4.7% due to hacktivism, 14.5% due to cyber espionage and 3.5% due to cyber warfare. According to Russell and Gangemi(1993), cyber attacks can be classified into insiders attack and outsiders attack. According to Shakrian(2013), the motive of a cyber attack can be hidden, even though the attacker takes the responsibility. According to Howard 1997, Lewis 2002, Cohen 1998, the motives may also include to create fear in the opponents or public or achieve political gain. According to Gandhi, 2011, three categories for the motivation of attacks include political motivation, economic motivation and socio-cultural motivations. According to visual capitalists, 41% of motivation for cyber attacks is financial motivation and is performed for obtaining a ransom. The motivation of the attack was not possible to determine for 10% of the cases. 26% of motivation is either for political reasons or competitive reasons. 20% of the attacks were caused by anger and hatred.

2. Analysis of Data

The Dataset was taken from Kaggle.com.

1. Revenge as Motive:

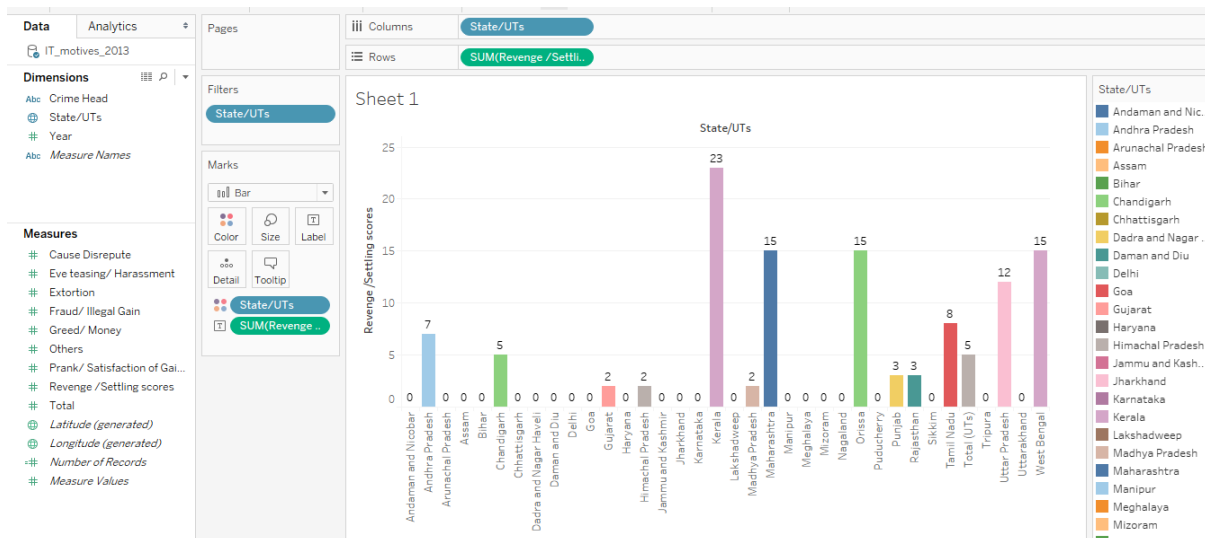


Figure2.1: Analyses of Revenge as Motive

The type of graph used in the above figure is bar graph. The x axis represents the Indian states and y axis represents the number of crimes with revenge as motive .As the figure depicts, Kerala has the highest amount of cyber crimes with revenge as motive.

2. Prank as Motive

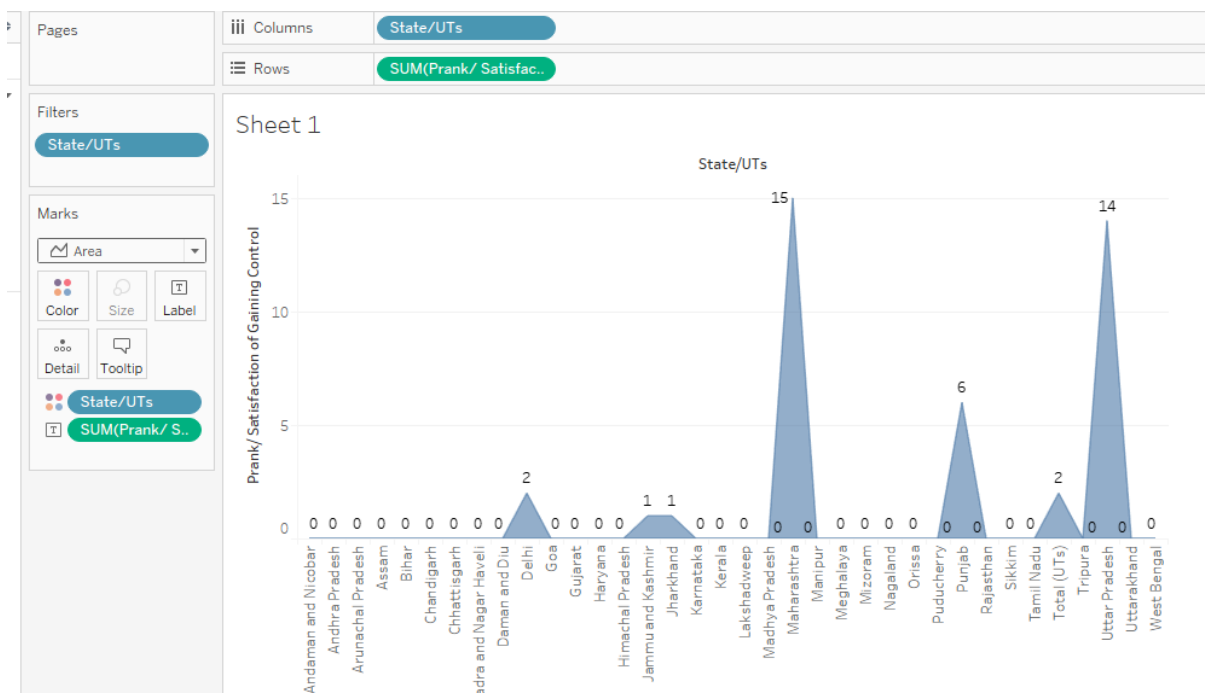


Figure2.2: Analyses of Prank as Motive

The type of the graph used is Area Chart. The x axis represents the Indian states and y axis represents the number of crimes with pranks as motive. As the figure depicts, Maharashtra has the maximum number of crimes with prank as motive, followed by Uttar Pradesh.

3. Greed as Motive:

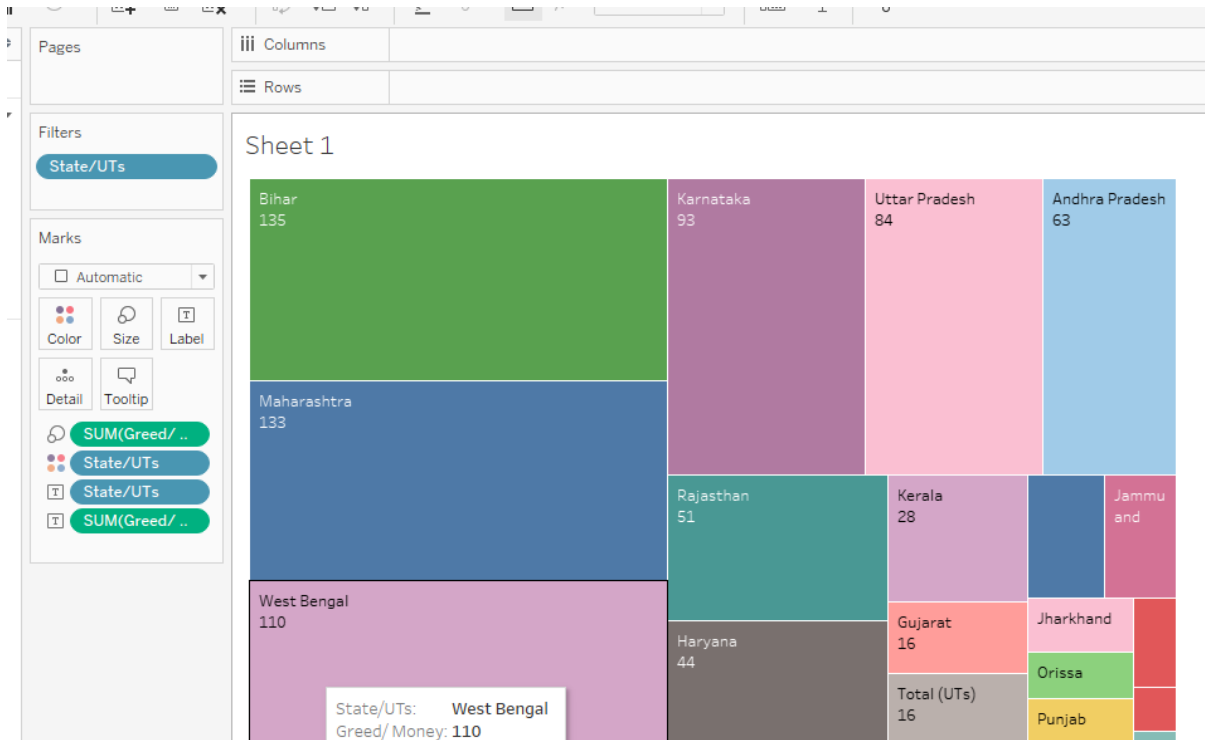


Figure2.3: Analysis of Greed as Motive

The type of Graph used is Tree Map. Tree Map is used for displaying and visualizing hierarchical data. As the figure depicts, Bihar has the maximum number of crimes with greed as motive, followed by Maharashtra.

4. Extortion as Motive:

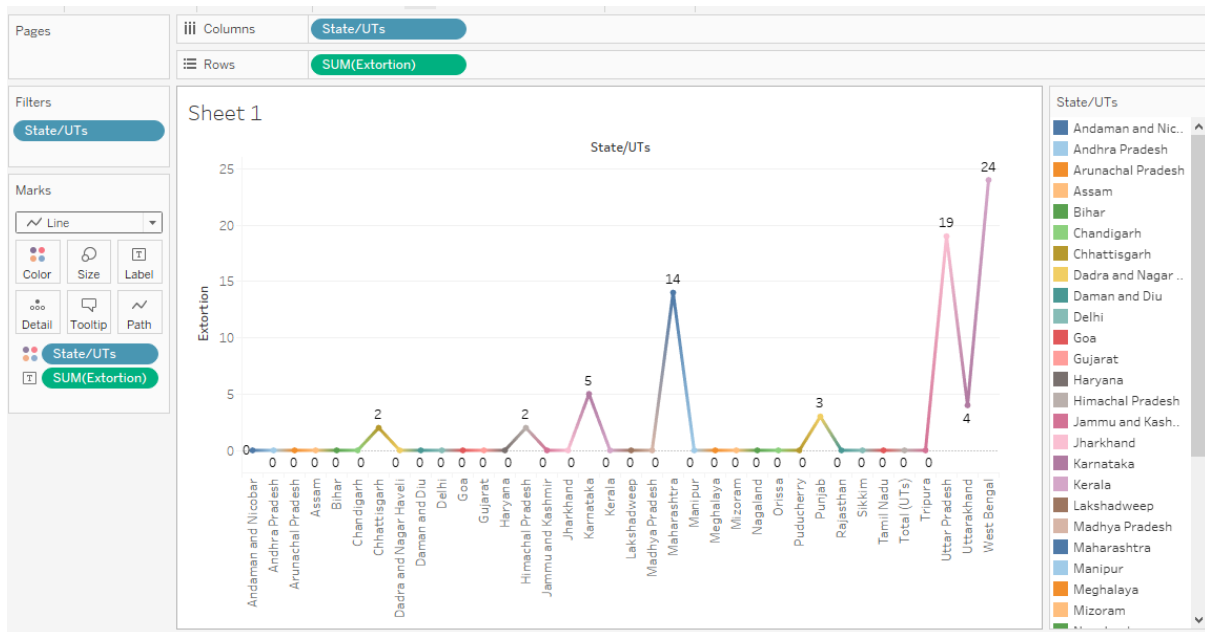


Figure2.4: Analysis of Extortion as motive

The type of graph used is line graph. The X axis represents the Indian states and the Y axis represents the number of crimes with extortion as motive. As the figure depicts, West Bengal has the highest amount of crimes with extortion as motive.

5. Other Motives:

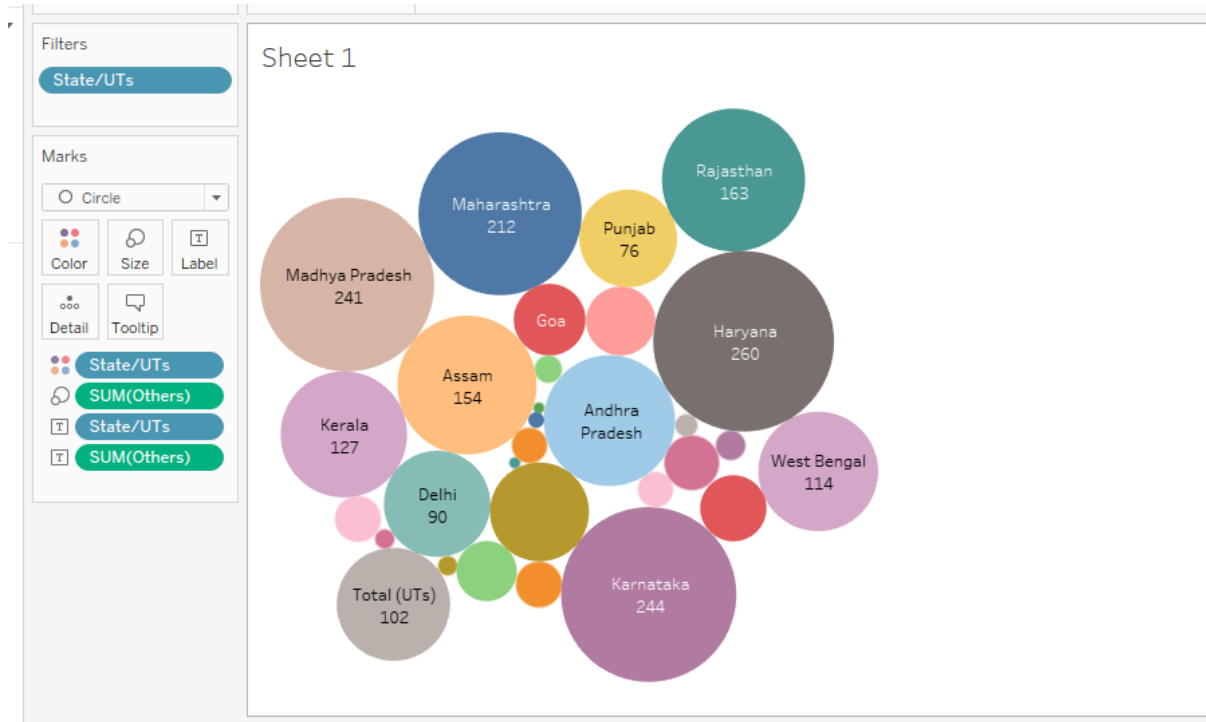


Figure 2.5: Analysis of Other Motives

The type of graph used is a bubble chart. The measure Others is dragged into size attribute, the dimension State is dragged into the color attribute to display states with different colour notations, the measure Others is dragged into Label attribute to display the value and the dimension State is dragged into Label Attribute to display the names of the states. As the figure depicts, Haryana has the maximum number of crimes with other motives.

6. Harassment as Motive:

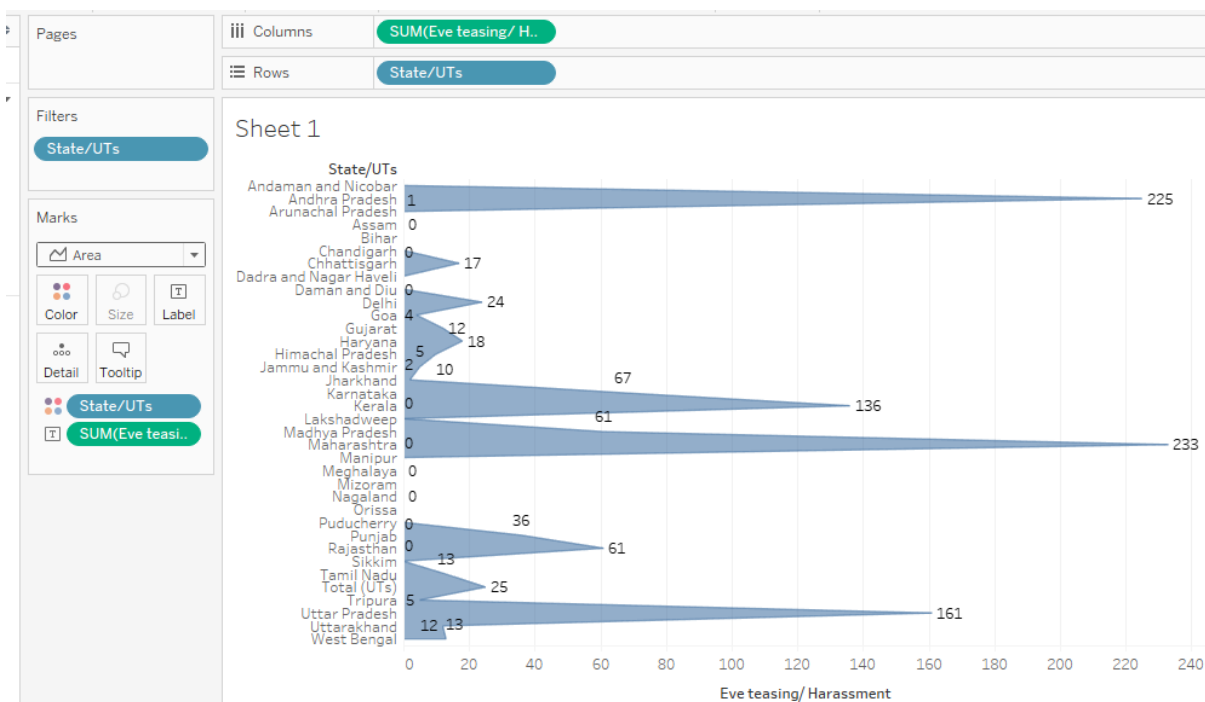


Figure 2.6:

Analysis of Harassment as Motive

The type of graph used is Area Chart. The X axis represents the number of crimes with harassment as motive and Y axis represents the various Indian states. As the figure depicts, the maximum number of crimes with harassment as motive is performed in Maharashtra.

7. Fraud as Motive:

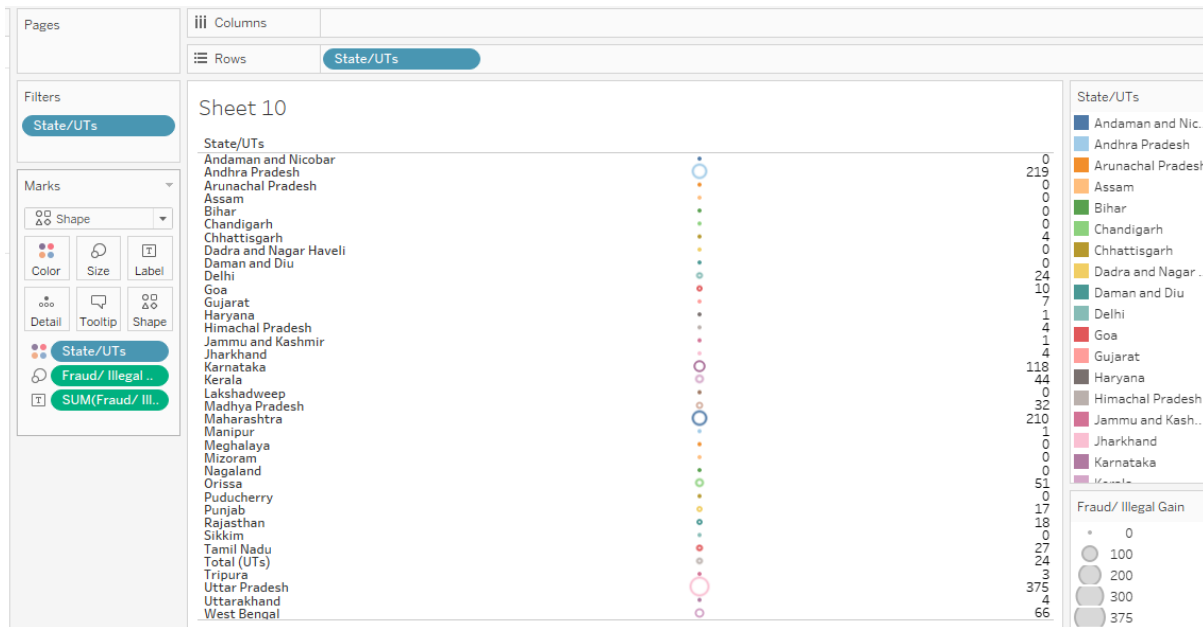


Figure 2.7: Analysis of Fraud as Motive

The type of graph used is scatter plot. The middle column with circle shape represents the number of crimes with fraud as motive. The bigger the circle, the higher the value. As the figure depicts, the maximum number of crimes with fraud as motive is performed in Maharashtra.

8. Comparison of Revenge as Motive, Greed as Motive, Prank as Motive:



Figure2.8: Comparison of Various Motives

The Type of graph used is a horizontal bar graph. Drag the revenge, prank and greed measures into the columns and the State measure into the rows to construct the graph. The Graph compares the three motives of crime- revenge, prank and greed .As the figure depicts, the maximum number of crimes are performed with Greed as motive.

9. Comparison of Revenge, Prank, Fraud:

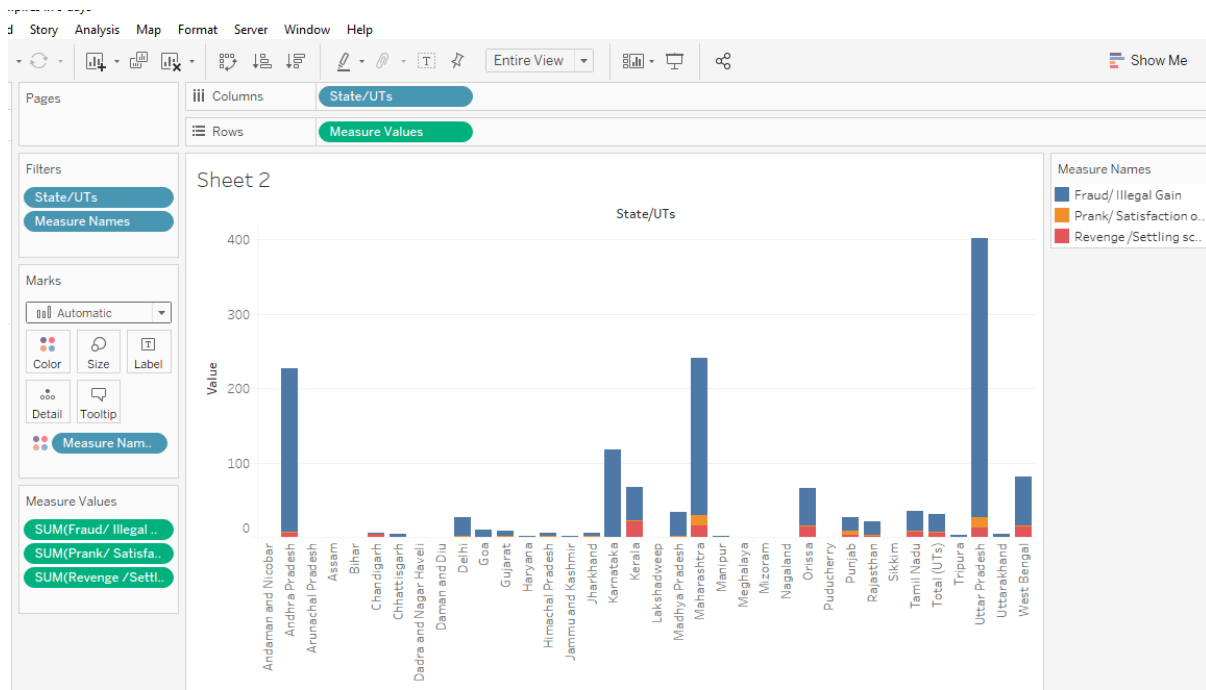


Figure 2.9: Analysis Of various motives

The type of graph is Stacked bar. The legend of the chart is given in the top right corner with blue depicting Fraud as motive, mustard depicting Prank as motive and red depicting Revenge as Motive. As the figure depicts, maximum number of crimes are performed with Fraud as Motive.

10. Comparison of Revenge, Prank, Extortion:

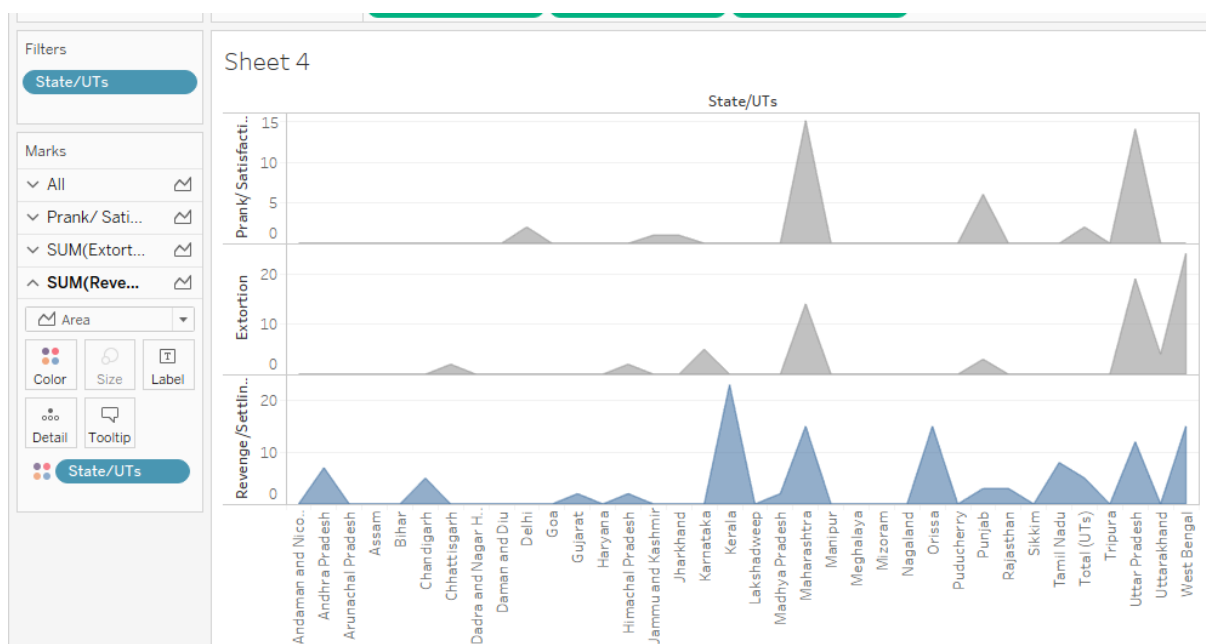


Figure 2.10: Analysis of Various Motives

The type of chart used is Area Chart. This chart depicts the comparison of Revenge as motive, Extortion as Motive and Prank as Motive. As the figure depicts, the maximum number of crimes is performed with Revenge as Motive.

11. Comparison of Revenge, Prank, Harassment:

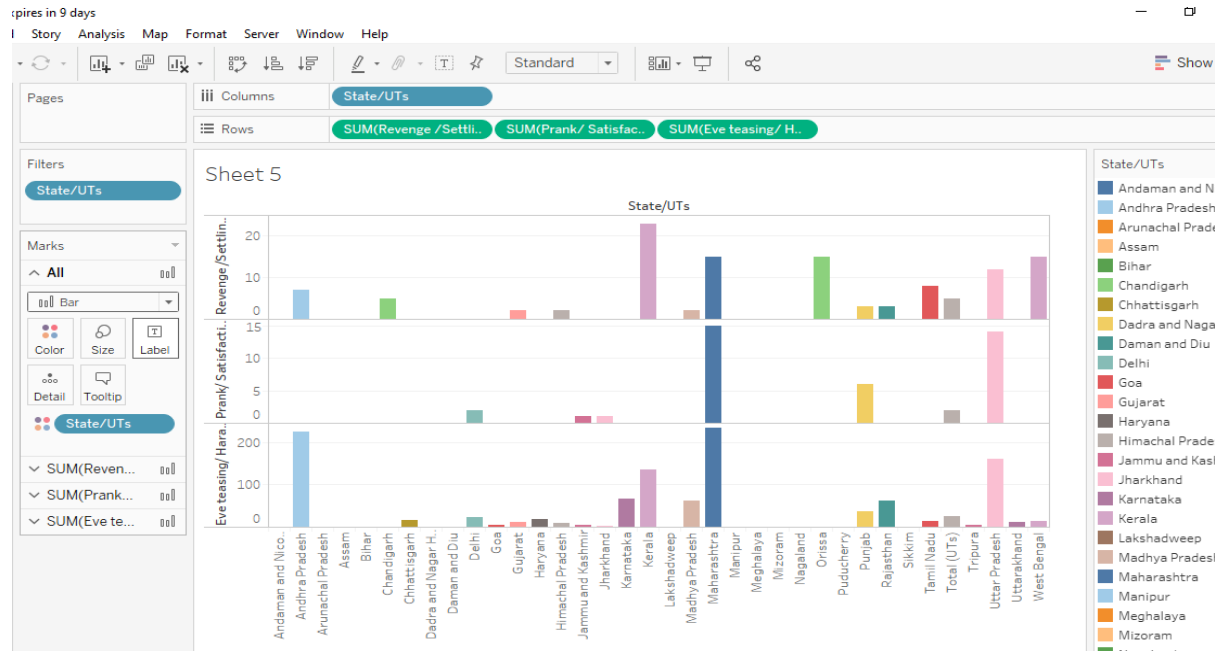


Figure 2.11: Analysis of various motives

The type of graph used is a bar graph. The X axis represents the Indian states and the Y axis represents the number of crimes with revenge as motive, prank as motive and harassment as motive. As the above figure depicts, the maximum number of crimes is performed with Harassment as motive.

12. Comparison of Greed, Fraud, Harassment

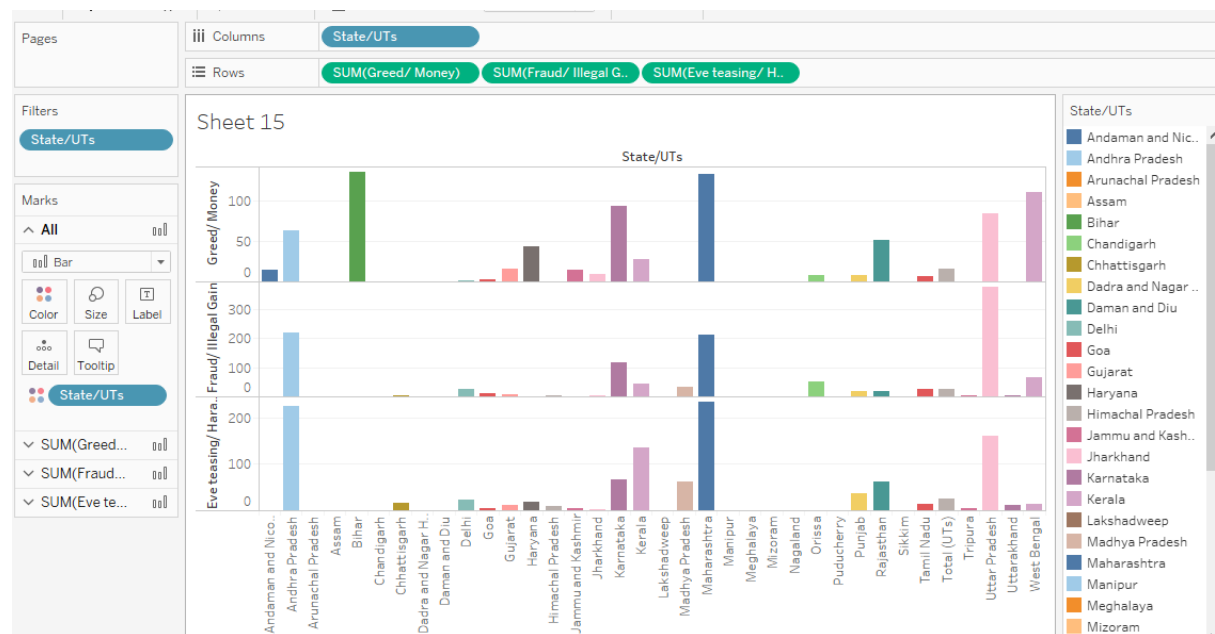


Figure 2.12: Analysis of Various Motives

The Type of graph used is a bar graph. The X axis represents the Indian states and the Y axis represents the number of crimes with harassment as motive, fraud as motive and greed as motive. As the figure depicts, the maximum number of crimes is performed with Harassment as motive.

13. Dashboard Representation:

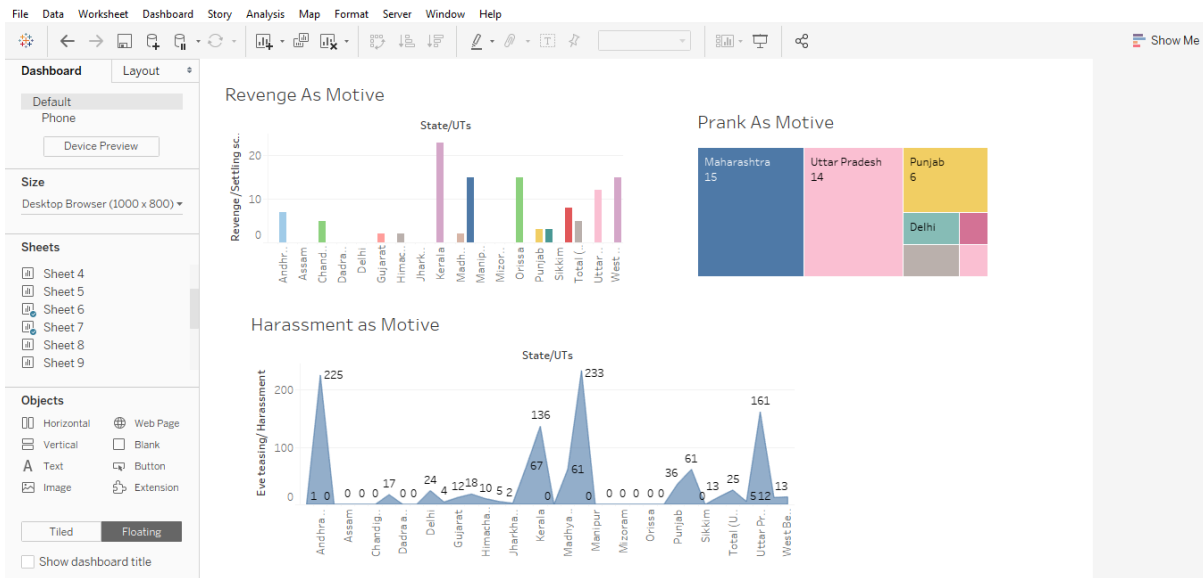


Figure 2.13: Representation of dashboard

The above figure represents the dashboard in tableau. A dashboard is used for displaying two or more sheets in a single frame. The above figure contains the revenge as motive, prank as motive and harassment motive charts. As the figure depicts, the maximum number of crimes is performed with Harassment as motive.

14. Dashboard Representation-2:

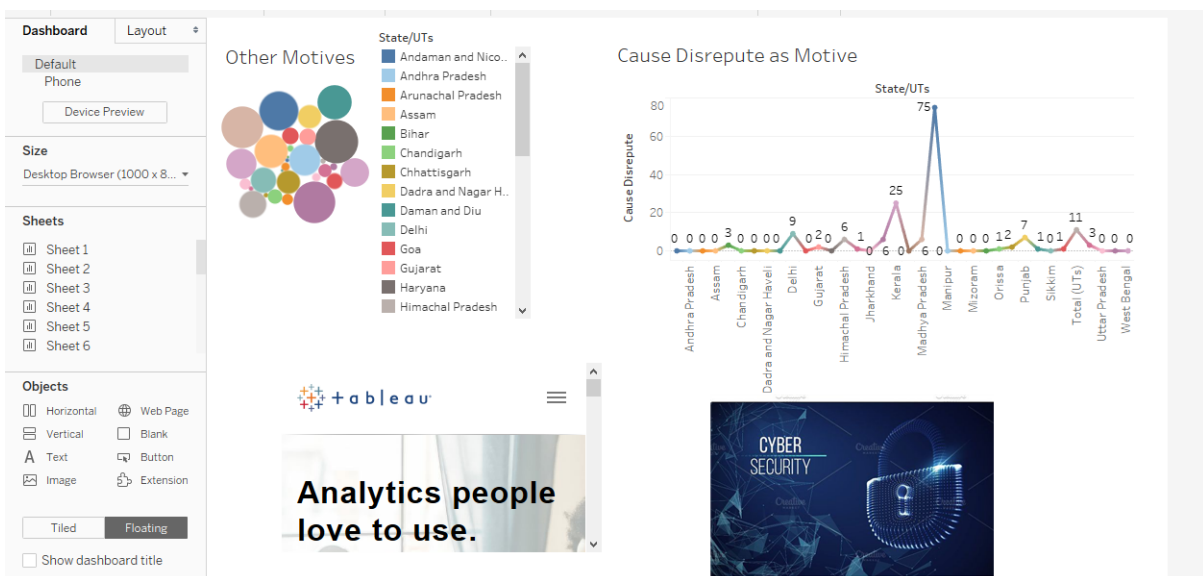


Figure 2.14: Representation of Dashboard using various features

The above figure is a dashboard representation in tableau. This dashboard contains more features compared to the previous one. This dashboard contains a web URL, leading to www.tableau .com. This contains an image of cyber security on the right end. This dashboard also contains the graphs of Cause disrepute as motive and other motives of crime.

As the figure depicts, the maximum number of crimes is performed with cause disrepute as a motive.

3. CONCLUSIONS

From the above analysis, the motives of cyber crime are classified as revenge, fraud, greed, extortion, greed, harassment, Cause disrepute and others. Each motive is analyzed with the Indian states and then each motive is compared with two other motives to find out the maximum value. Different types of graphs and charts available in tableau are used to analyze and visualize the data. The Dashboard feature is also used to compare the various motives and visualize them. According to the above analysis, the maximum number of crimes are performed with Harassment, Greed and Revenge as the motive.

From the above analysis, the various motives of cybercrimes are visualized using tableau software. Each motive is analyzed and compared with each other to find the most common motive of cybercrime in India. Using this analysis data, it becomes easy for the public to find the most common motive behind the cyber-attacks and provides a way to remain safe and secure from such attacks. Also it becomes easy for the forensics department when solving a cybercrime or cyber-attack.

3.1 Inference:

From the analysis, it is inferred that the most common motives of cybercrime are Harassment, Greed and Revenge. This is followed by extortion, cause disrepute and other motives. The least common motive of cybercrime is prank. It is also inferred that various states in India have different most common motives of cyber-crime.

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