

# Political Violence in India

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## The Issues:

India, a historically significant nation, grapples with countless challenges on its political landscapes, which stems from a long, complex history and rich socio-cultural diversity. Its history is marked by a tapestry of cultures, religions and traditions which had shaped its identity over time. Communal tensions between religious and ethnic groups continue to persist and occasionally erupt into violence, most notably between Hindus and Muslims. The Kashmir region is a symbol of that struggle, contributing to India's political instability and unrest. Terrorism also remains a concern, with the 2008 Mumbai attacks being most notable. In 2022, India had surpassed China to become the world's most populous country. This in turn offers economic potential but also challenges in terms of resource management, governance and economic policies. Ensuring peace will require the government to undertake a heavy task of fostering unity and managing India's diversity.

## The Findings:

The analysis of political violence in India from 2016 to the present reveals a concentration of such incidents in proximity to major cities. New Delhi and Mumbai, two of India's world renown cities, have some of the highest total number of political violent events. This observation is consistent with the logical expectation that a higher population density increases interactions of people, thereby contributing to a higher likelihood of disagreements and violence. Over this dataset's timeframe, 2016 to 2024, there have been 36,383 recorded instances of political violence, excluding Ladakh, the Islands or Kashmir, because of the constant violence in the regions. Notably, 2019 was the most violent year in this dataset, which was also an election year, closely followed by 2023. More than half of the events came in the form of riots, more specifically, mob violence. Over the eight years and 36,383 violent events, there were a total of 14,026 fatalities.

India has one of the largest land masses in the world. It also shares borders with seven other countries, China, Nepal, Bhutan, Myanmar, Pakistan, Afghanistan and Bangladesh. Notably, the regions in India that border China, Tibet, Pakistan and Bangladesh have experienced escalated levels of political violence, which has been going for generations. These events underscores the intricate relationship between government, border proximity and heightened unrest, as well as historical conflict.

Within its own borders, there are approximately 2,000 different ethnic groups, each with their own customs, traditions and ideas. However this diversity has sometimes led to political tensions and occasional violence between ethnic groups. The majority of people fall in the two groups of Muslim and Hindu, and they often clash. There have also been fighting in national parks, which don't have metropolitan cities, between Naxalites, a Maoist group, and the Indian government, on the east side of India.

## Discussion:

By having much of the concentration of political violence be near or in major cities in India, indicated by the data, it prompts a thoughtful discussion on the factors driving these incidents. The correlation between higher population density and increased instances of violences is expected, highlighting the potential impact of social interactions and diversity within an urban setting. The prevalence and popularity of riots in the form of mob violence raises questions about underlying socio-political dynamics, such as terrorism, Naxalism, religious and caste related issues.

By having a population of 1.4 billion people, there are bound to be religious, political and ethnic differences. The environment created by persistent conflict in Kashmir and territorial disputes with neighboring countries such as China, Pakistan, Bangladesh and Tibet contribute to the heightened geopolitical tension. Moreover, the prevalence of local, state and country wide corruption, insurgency and economic challenges compound the situation. All these issues are intertwined and when further compounded, often lead to acts of political violence. Addressing India's political violence requires a holistic approach which considers its history, religious diversity, economic inequalities, and effective governance.

## Appendix A: Method

This dataset comprises 36,383 instances of political violence, featuring 10 distinct features or columns that provide a comprehensive breakdown of the data. First, to delve into the specifics, an initial breakdown of the dataset is done by outlining the details of a number of features. A barchart (Figure 1) spanning from 2016 to 2024 will visually represent the annual distribution of political violence incidents. Furthermore, another barchart (Figure 2) showcases the overall distribution of violent instances for each month. Among the features is a key column that details the reasoning behind the occurrences and the corresponding types of action involved. Two more barcharts (Figure 3 and 4) are generated to visualize these aspects, which are event types and sub-event types. These charts aim to provide a clear and concise overview of some of the most important details.

Since this paper primarily focuses on geographical distribution of political violence incidents in India, geographical mapping using Leaflet in R studio will plot the incidents in each

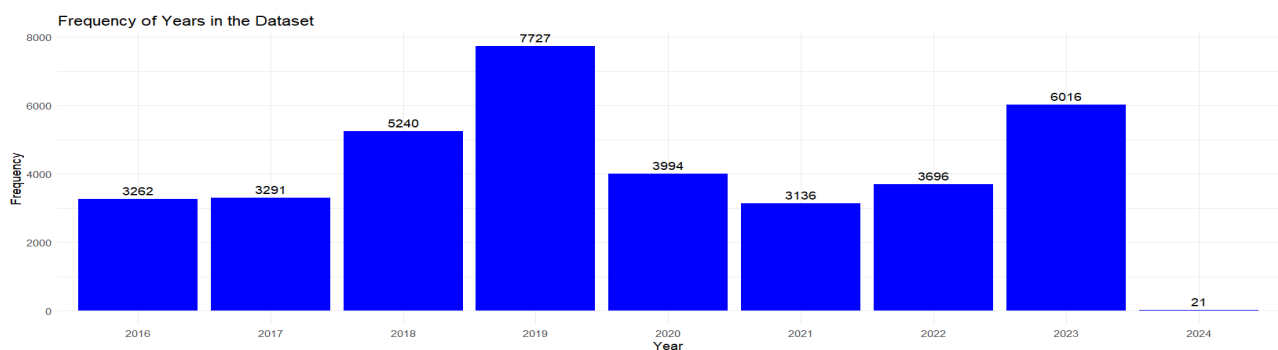
individual longitude and latitude point on the map. India is divided into six major regions: Central, East, North, North claimed, Northeast, South and Western. To analyze the spatial distribution, I then used k-means clustering method to further break India down to 6 clusters, with 6 centroids, with each cluster represented by a distinct color (Figure 6). A closer examination of each individual cluster can be found in Figures 7 through 12. Given the vastness of India on the global map, it is important to take into account the curvature of the earth, which is why geographic mapping, Leaflet, is used to accurately visualize the distribution.

Lastly, a GGplot is produced to distinctly show the density map of these political violent occurrences (Figure 14). However, Leaflet did not allow me to add the map of India similar to Figure 6 to this plot. So instead of using Leaflet, I just imported a basic map of India through `map_data(world)` and then plotted the dots that represent the political violent events. From an interactive website that displays the world's density, I then took a screenshot, Figure 13, and placed it next to our political violence GGPlot. To add another way to visualize the density of the violent events, a heatmap was plotted on a map to compare against Figure 13 and 14.

## Appendix B: Results

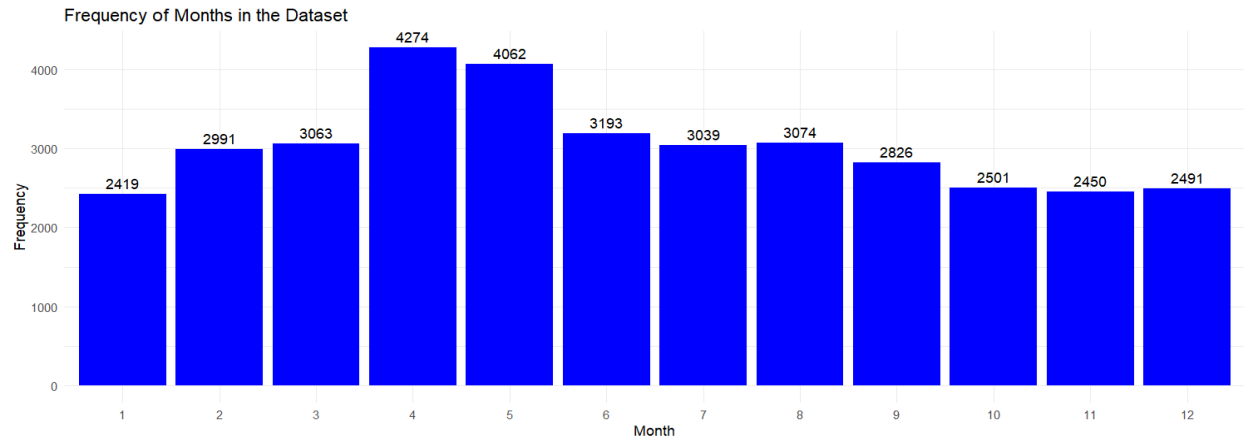
Figure 1 provides an overview of the yearly distribution of political violence incidents. The highest number of instances occurred in 2019, with 2023 coming second. 2019 was the last Indian general election, which may have increased the political tension between the opposing sides. 2021 had the fewest events, other than 2024, which may be influenced by the impact of COVID.

Figure 1: Yearly distribution of attacks



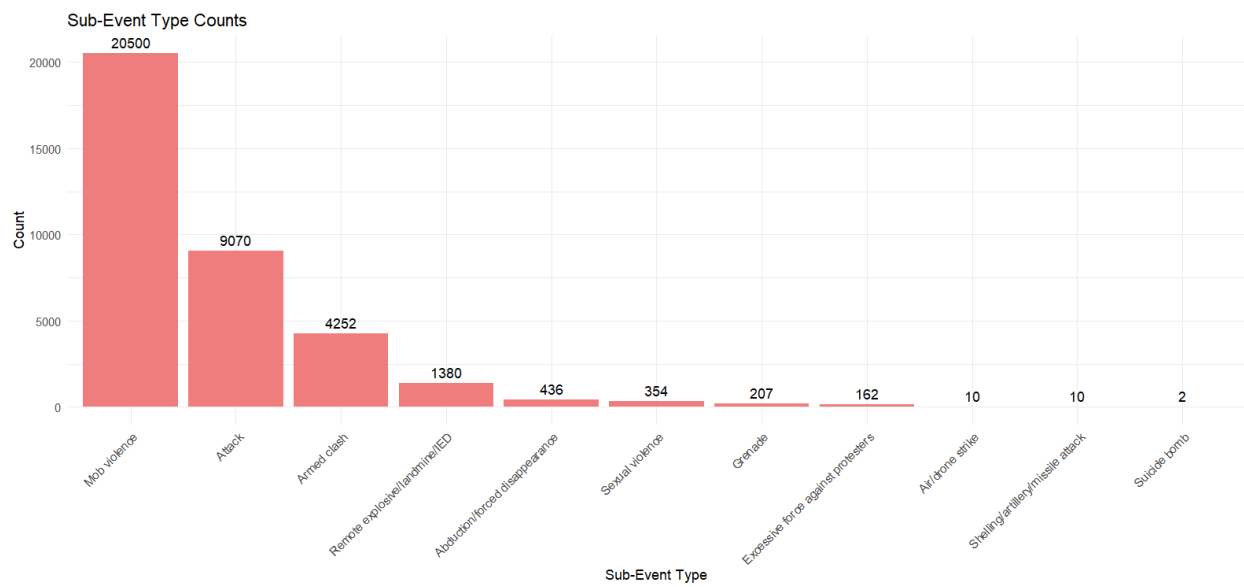
In Figure 2, the breakdown of events by month reveals that most of the months recorded around 2500 to 3000 events, however, April and May had more than 4000 violent events each. Intertwined with Figure 1, the 2019 general elections were held from April to May.

Figure 2: Monthly distributions of attacks



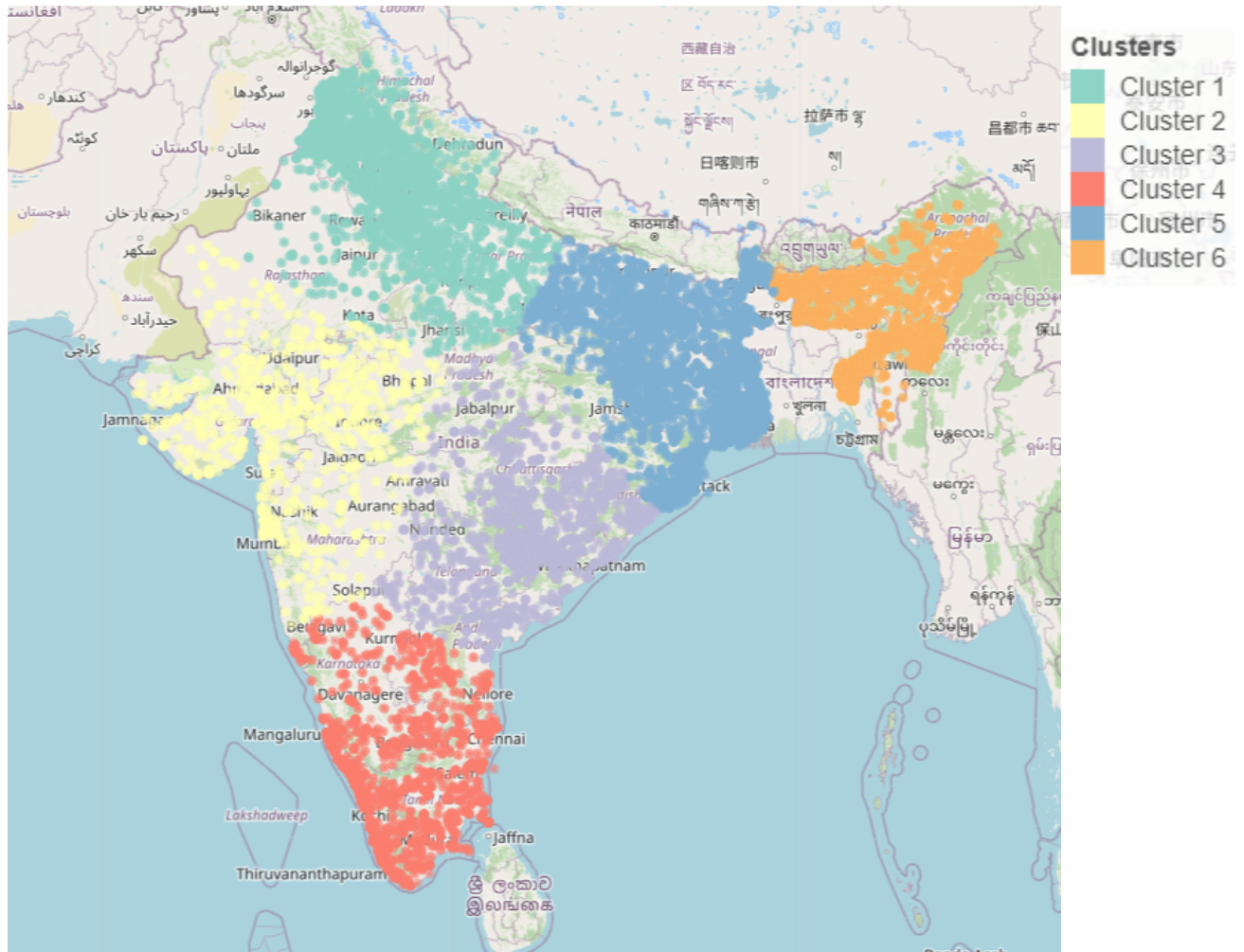
Figures 3 delve into the specifics of the attacks. More than half of the events came in the form of mob violence. Around  $\frac{1}{4}$  of the instances were general attacks, with the remaining instances being some different type of event.

Figure 3: Violent Events



In figure 6, each of the 36,383 dots on the map indicate one individual event of political violence. Other than cluster 2, the entire map is concentrated. Figures 5 through 10 provide zoomed-in views of the isolated clusters, offering a more detailed perspective on the most prevalent areas of political violence.

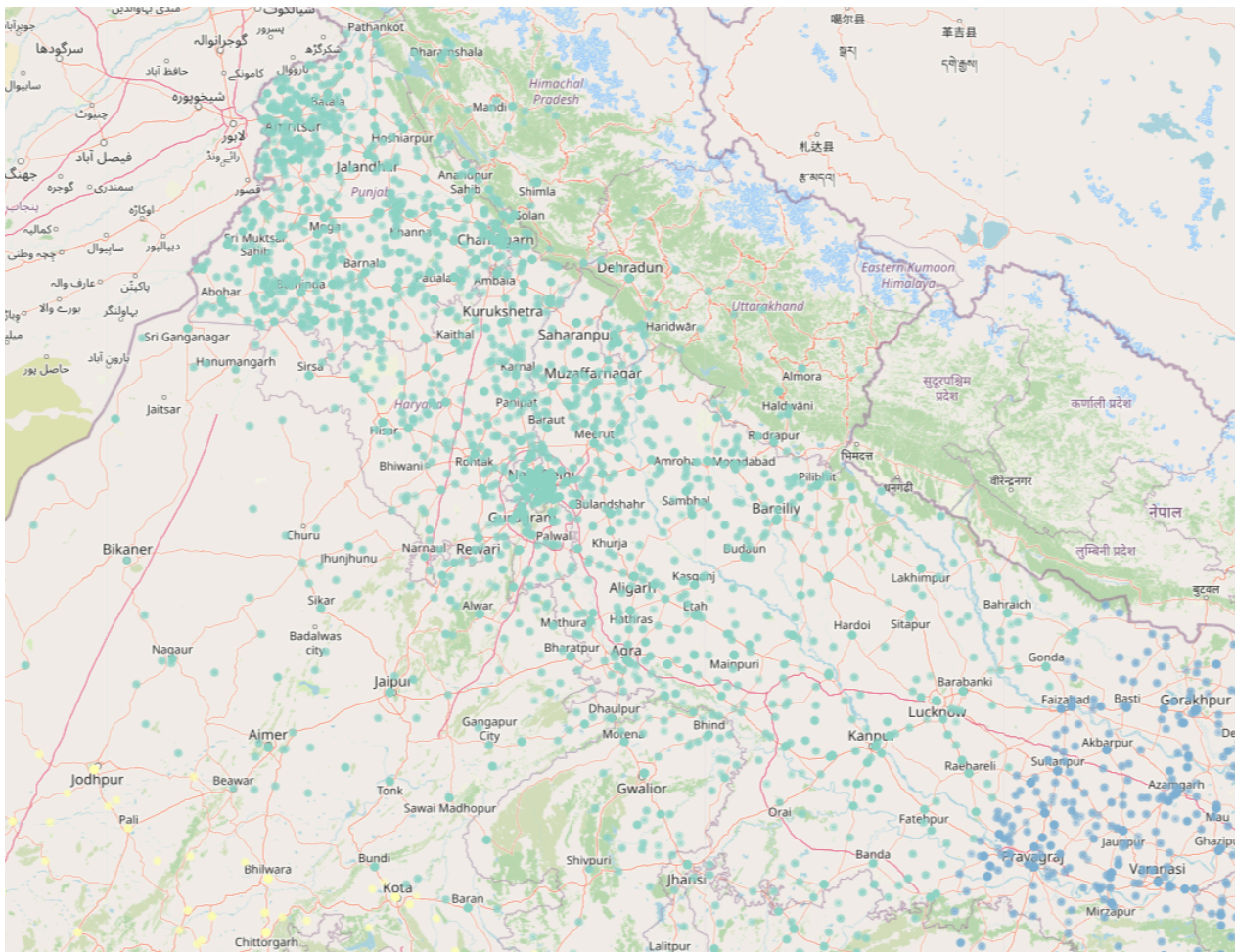
Figure 4: Map of India and political violence instances



Cluster 1 represents the northern region of India. This region had 8164 instances of political violence. High density metropolitans like New Delhi have high concentrations of political violent events. The significant population density in the capital underscores an increased likelihood of diverse perspectives and values, which can potentially contribute to the occurrence of an event.

The western border of this cluster shares a border with Pakistan. There is a long history of dispute between these two countries, including the region of Punjab, which is a partitioned province. This cluster also shares a border with Tibet(China) and Nepal. This exemplifies the challenges governments face in sharing land and resources. Consequently, Cluster 1 is the second most affected region in terms of political violence instances.

Figure 5: Cluster 1:





Cluster 2 exhibits the least amount of instances of political violence, totaling just 2921 instances over the 8 year period. Over the majority of the area, instances of political violence are much more spread out, except for the major city of Mumbai, which has an approximate population of 24 million people.

Interestingly though, Ahmedabad, which has a population of 9 million people, doesn't have many points of violence, when compared to Chandigarh from Figure 1, which had a much lower population but many more instances of violence. This variation could be due to regional differences.

Unlike Cluster 1, Cluster 2 only shares a border with Pakistan. There is a distinct difference in the density of incidences between the border of India and Pakistan in Cluster 1 when compared to Cluster 2. This emphasizes a need for comprehensive understanding of the regions.

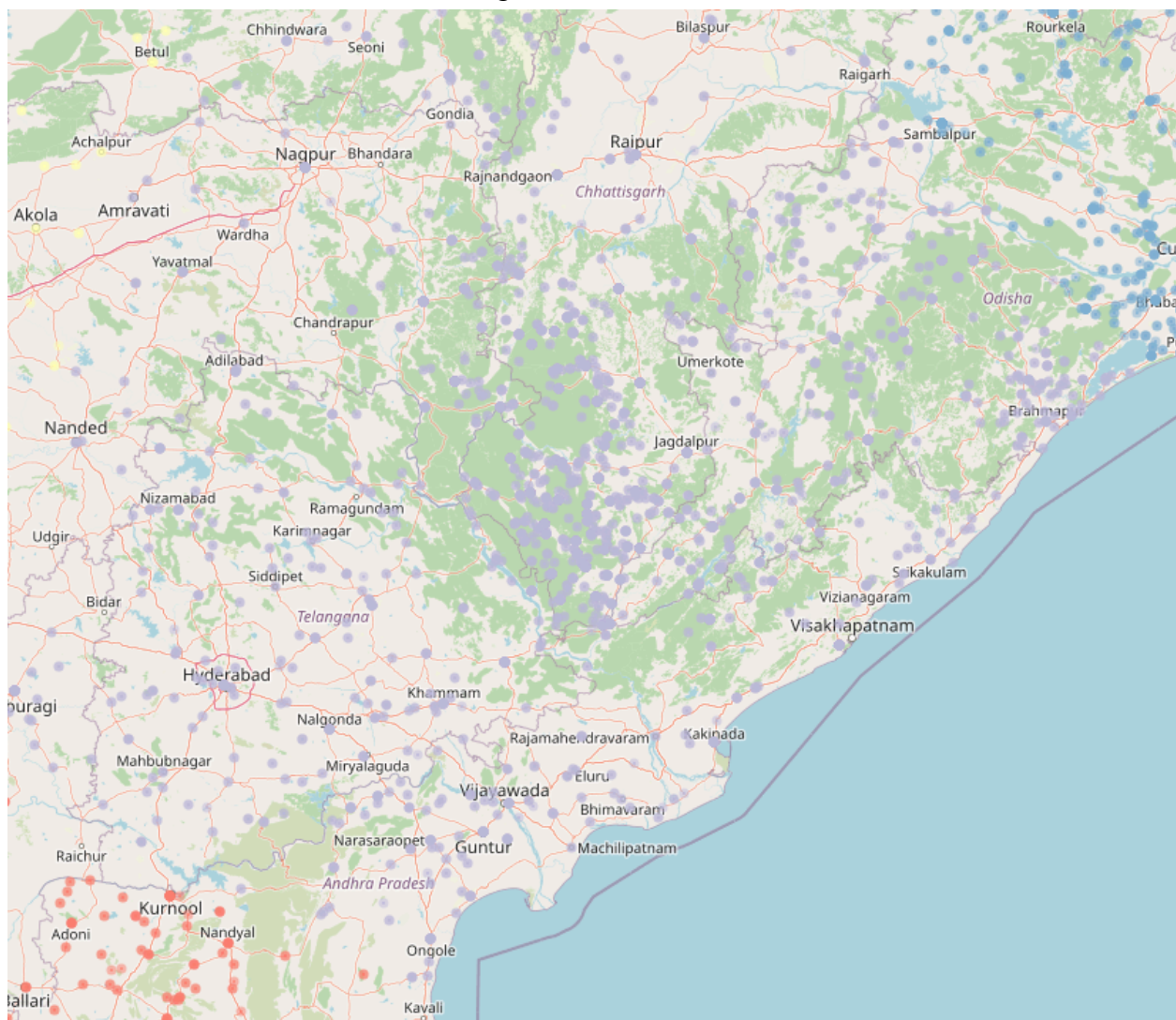
Figure 6: Cluster 2:



Cluster 3 records 4,800 instances of political violence. Similar to Cluster 1 and 2, some of the areas with higher density of dots are cities, such as Hyderabad in the Southwest part of the cluster.

However, in this more central area, the Sukma, Bijapur, Kondagaon and Uttar Bastar Kanker districts seem to have more politically violent events. This region has an ongoing conflict between Maoist groups, commonly known as Naxalites, and the Indian government, which is illustrated by the number of dots in the center of the cluster where major cities are absent. This emphasizes the varied nature of conflicts and it is not only based on major urban centers.

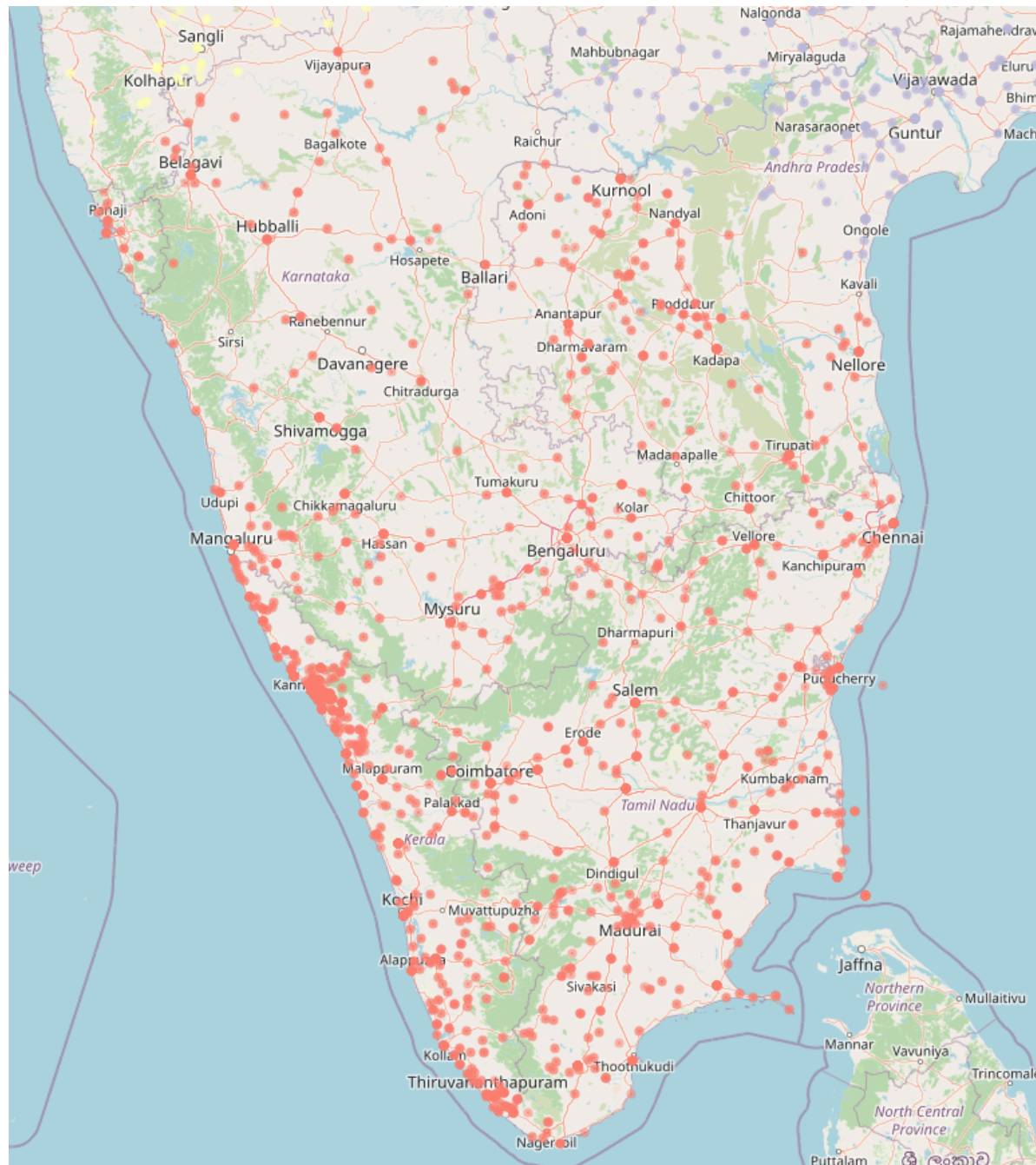
Figure 7: Cluster 3:





Cluster 4 stands out as a relatively peaceful region, as it records the second least amount of instances in the data set. The southwest to south coastline, however, exhibits some concentration of violent events. Notably, there are some highly populated cities that lie beside the Indian ocean coastline, as well as Madurai in the middle. This adds to the idea that a higher concentration of people tends to lead to more violent events.

Figure 8: Cluster 4:



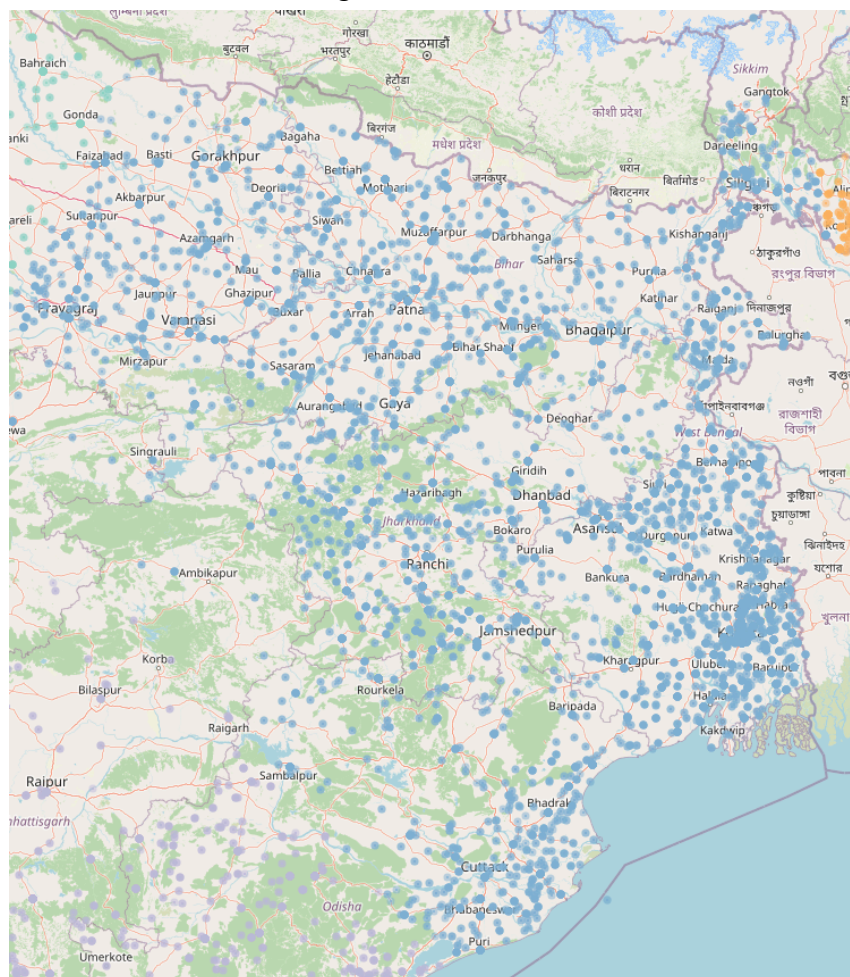
Cluster 5 emerges as the most violent cluster, as it has 10397 instances of political violence, more than 2000 more than the second most violent cluster, Cluster 1. This cluster shares borders with two of India's long standing rivals, Bangladesh and Tibet.

Along the right side of the cluster is Bangladesh. The significant number of events may be attributed to migration issues as there is a steady influx of Bangladeshi migrants, which led to a fence being built, which has faced criticism similar to the US-Mexico wall criticism. There have also been religious disputes and nationalism related tension.

Along the northern part of the cluster, the cluster shares a border with Nepal, which also has been a source of diplomatic tension because of border disputes of the Himalayan region.

Because of the proximity with the Banglaeishi and Tibetan border, the resulting ideas and mindset may influence the remaining parts of the region which leads to a complex layer of understanding of the reasons for political violence.

Figure 9: Cluster 5:

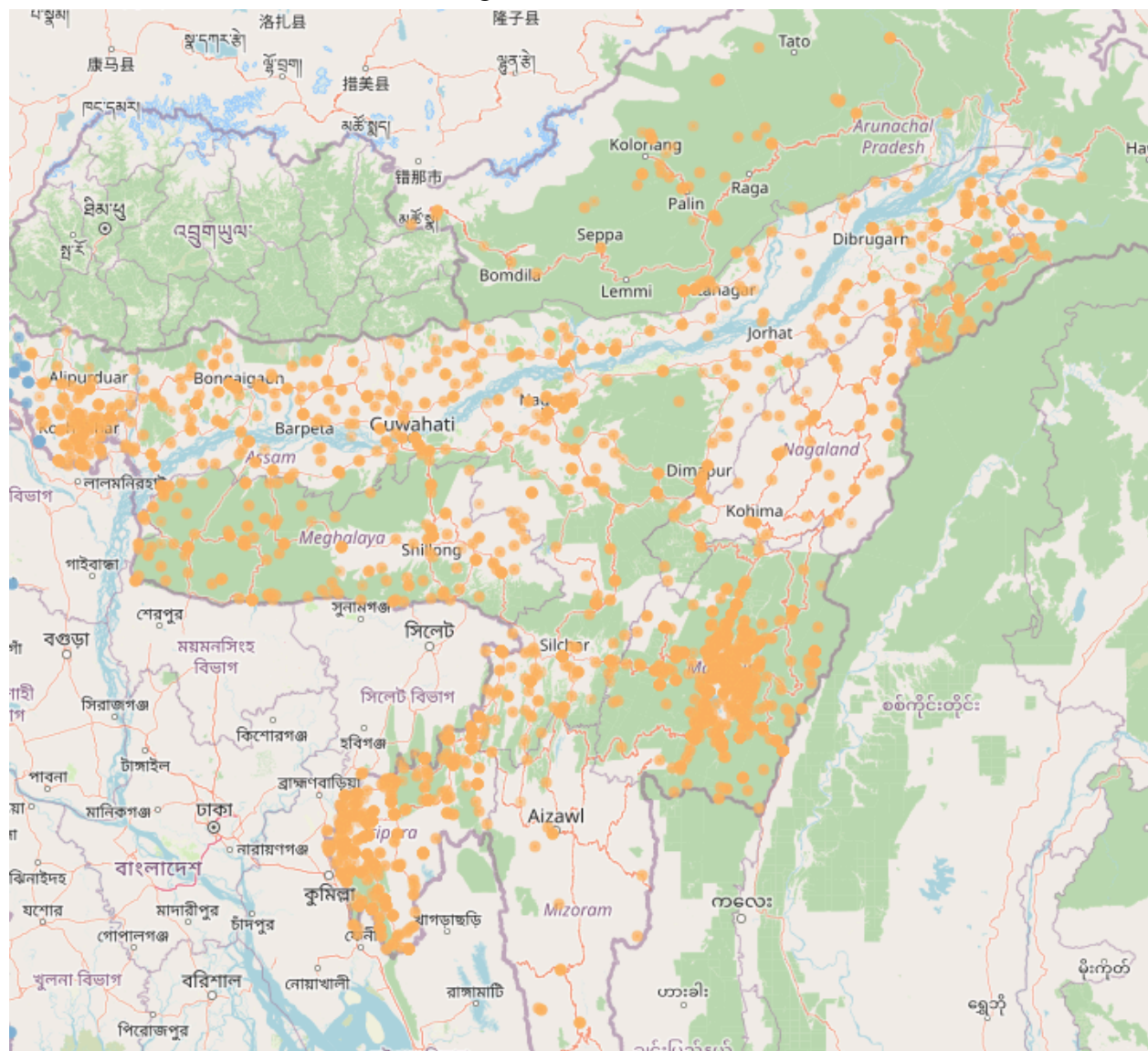


Cluster six accounts for 7059 instances of political violence. In the Manipur region, ethnic violence commonly occurs between the Meitei people and the Kuki-zo tribal community.

Again, similar to cluster 5, the western part of this cluster shares a border with Bangladesh, leading to similar reasons for violence, such as migration, religious and nationalistic disputes. The rest of the region is not as violent, as there seems to be more natural terrain.

However, in the northeast, which shares a border with Myanmar, has had some sensitivity due to the presence of the Naga community, which adds another layer to the political violence dynamics in the region.

Figure 10: Cluster 6:





The final three figures support the notion that higher population density is associated with an increase in political violence opportunities and incidents. Figure 11 is the population density of India taken from an interactive map. The northern region and southern tip, especially along the coastline, are heavily populated. Figure 12 are all the political violent events in this data set plotted on a map of India. Using those same points, Figure 13 is the heatmap to cleanly show where the hotspots are for political violence.

The patterns on all the maps are nearly identical, concluding that most of the violent events are in or near areas that have borders, major cities and ethnic minorities.

Figure11: India Population Density<sup>1</sup>

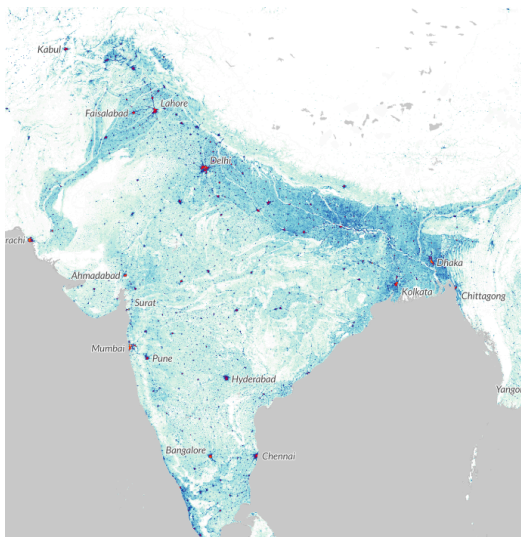


Figure 12: Political Violence GeoHistogram

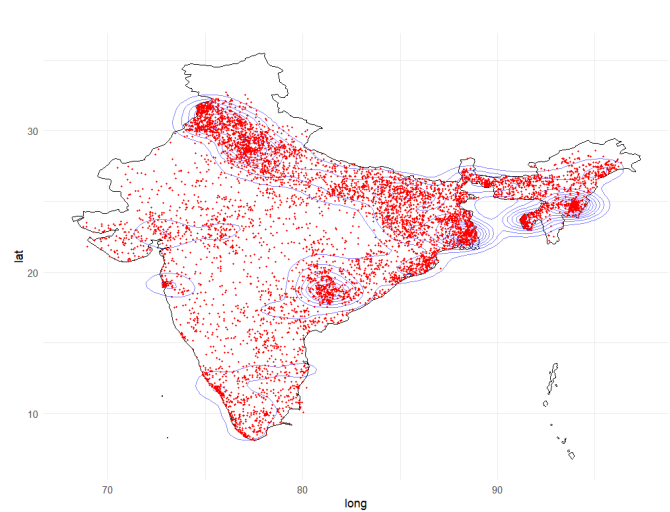
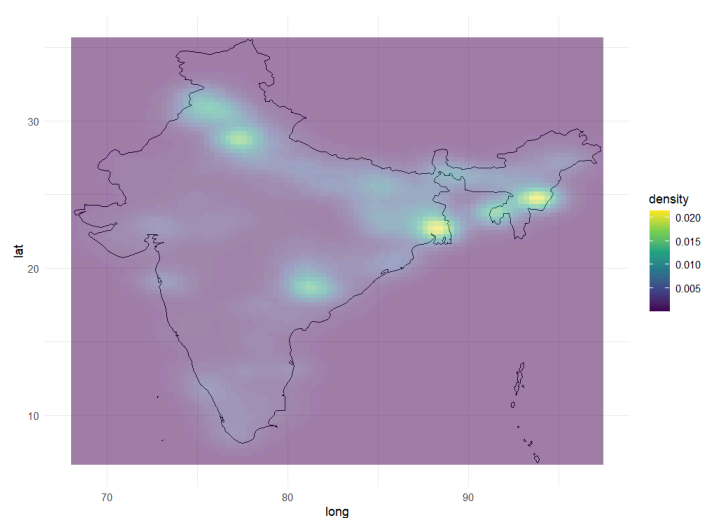


Figure 13: Heatmap of the violent events.



<sup>1</sup> <https://luminocity3d.org/WorldPopDen/#5/22.655/79.277>

## Appendix C: Code

Year Bar chart:

```
> library(ggplot2)
>
> ggplot(India, aes(x = factor(year, levels = 2016:2024))) +
+   geom_bar(stat = "count", fill = "blue") +
+   labs(title = "Frequency of Years in the Dataset",
+         x = "Year",
+         y = "Frequency") +
+   geom_text(stat = "count", aes(label = ..count..), vjust = -0.5) +
+   theme_minimal()
>
```

Month bar chart:

```
> ggplot(India, aes(x = factor(month, levels = 1:12))) +
+   geom_bar(stat = "count", fill = "blue") +
+   labs(title = "Frequency of Months in the Dataset",
+         x = "Month",
+         y = "Frequency") +
+   geom_text(stat = "count", aes(label = ..count..), vjust = -0.5) +
+   theme_minimal()
>
```

GGPlot chart for subevent type and event type, just change column names.

```
library(ggplot2)
>
> sub_event_type_counts <- table(India$Sub_event_type)
>
> sub_event_type_data <- as.data.frame(sub_event_type_counts)
>
> colnames(sub_event_type_data) <- c("Sub_Event_Type", "Count")
>
> ggplot(sub_event_type_data, aes(x = reorder(Sub_Event_Type, -Count), y = Count)) +
+   geom_bar(stat = "identity", fill = "lightcoral") +
+   geom_text(aes(label = Count), vjust = -0.5, color = "black") +
+   labs(title = "Sub-Event Type Counts",
+         x = "Sub-Event Type",
+         y = "Count") +
+   theme_minimal() +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
```

Geographical mapping using leaflet to map the violence in india

```
> library(leaflet)
> library(dplyr)
>
> coordinates <- India %>% select(longitude, latitude) %>% na.omit()
>
```



```

> num_clusters <- 6
>
> kmeans_result <- kmeans(coordinates, centers = num_clusters)
>
> India$cluster <- as.factor(kmeans_result$cluster)
>
> cluster_colors <- colorFactor(palette = "Set1", domain = levels(India$cluster))
>
> map <- leaflet(India) %>%
+   addTiles() %>%
+   addCircleMarkers(
+     lng = ~longitude,
+     lat = ~latitude,
+     color = ~cluster_colors(cluster),
+     radius = .01,
+     fillOpacity = 0.7,
+     popup = ~paste("Cluster: ", cluster),
+     label = ~as.character(cluster)
+   )
>
> legend_colors <- cluster_colors(levels(India$cluster))
> legend_labels <- paste("Cluster", levels(India$cluster))
>
> map <- map %>%
+   addLegend(
+     "topright",
+     colors = legend_colors,
+     labels = legend_labels,
+     title = "Clusters",
+     opacity = 1
+   )
>
> map
>
> cluster_counts <- table(India$cluster)
>
> print(cluster_counts)

```

## GGplot

```

library(ggplot2)
> library(mapdata)
>
> # getting the map of india from map data world
> india_map <- map_data("world")
>
> india_map <- subset(india_map, region == "India")
>
> # Creating the violence spots + india map

```

```
> ggplot() +  
+   geom_polygon(data = india_map, aes(x = long, y = lat, group = group), fill = "white", color = "black") +  
+   geom_density2d(data = India, aes(x = longitude, y = latitude), color = "blue", alpha = 0.5) +  
+   geom_point(data = India, aes(x = longitude, y = latitude), color = "red", size = 0.5) +  
+   theme_minimal()
```

## Heatmap

```
> india_map <- map_data("world", region = "India")  
>  
> ggplot() +  
+   geom_polygon(data = india_map, aes(x = long, y = lat, group = group), fill = "white", color = "black") +  
+   geom_tile(data = India, aes(x = longitude, y = latitude, fill = ..density..), stat = "density2d", alpha = 0.5) +  
+   scale_fill_viridis_c() +  
+   theme_minimal()
```