Tech Saksham

Case Study Report

Data Analytics with Power BI

"Global Terrorism Dataset Analysis Using Power BI"

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ABSTRACT

The GTD provides comprehensive information on terrorist incidents worldwide, including details such as location, target type, attack type, and casualties. Leveraging the visualization capabilities of Power BI, this analysis aims to uncover patterns, trends, and insights within the dataset. The analysis includes interactive visualizations that allow users to explore various aspects of terrorism, including temporal trends, geographical hotspots, and the modus operandi of terrorist groups. Additionally, the study examines the effectiveness of counter-terrorism measures over time and identifies regions most affected by terrorism. The findings of this analysis contribute to a better understanding of the evolving nature of global terrorism and can inform policymakers, researchers, and security agencies in developing strategies to combat this threat.

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CHAPTER 1

INTRODUCTION

"Welcome to our analysis of global terrorism using Power BI. In today's world, understanding the patterns and trends of terrorism incidents is crucial for effective counter-terrorism efforts. In this dashboard, we'll explore comprehensive data on terrorist attacks worldwide, including their locations, types, motives, and impacts. By leveraging Power BI's robust analytical capabilities, we aim to uncover insights that can inform policymakers, security agencies, and the public about the evolving nature of global terrorism. Let's delve into the data and uncover actionable insights to enhance our understanding and response to this critical global issue."

1.1 Problem Statement:

In today's complex global landscape, combating terrorism requires a deep understanding of its multifaceted nature. However, analysts and policymakers are often challenged by the vast amount and rapid pace of terrorist-related data generated worldwide. Traditional methods of analysis struggle to keep pace, resulting in delayed or incomplete insights. This limitation impedes effective decision-making and proactive measures to prevent future attacks. Additionally, the heterogeneous nature of terrorism data, encompassing various attack types, motives, and geographical regions, further complicates analysis efforts.

1.2 Proposed Solution:

To address these challenges, we propose the development of a Power BI dashboard tailored for global terrorism analysis. This dashboard will aggregate and visualize real-time data from diverse sources, including incident reports, intelligence agencies, and media outlets. By leveraging Power BI's advanced analytics capabilities, the dashboard will provide a comprehensive view of terrorism trends, hotspots, and patterns. Its
Interactive features and customizable functionalities will empower analysts to drill down into specific regions or timeframes, enabling them to identify emerging threats and devise targeted counter-terrorism strategies. Furthermore, the dashboard's real-time analysis capabilities will facilitate timely responses to evolving threats, enhancing national security efforts worldwide.

1.3 Feature:

1. Real-Time Analysis: The Power BI dashboard will provide real-time analysis of terrorist attack data.

2. Attack Segmentation: It will segment terrorist attacks based on various parameters such as location, attack type, casualty count, etc.

3. Trend Analysis: The dashboard will identify and display trends in terrorist attack patterns over time.

4. Predictive Analysis: It will utilize historical data to predict potential future terrorist attack hotspots or trends

1.4 Advantages:

1. *Data-Driven Decision Making: Governments and security agencies can make informed decisions based on real-time analysis of terrorism data, enhancing national security.*
2. *Proactive Counterterrorism Measures: Understanding terrorist attack patterns and trends can help authorities proactively implement counterterrorism strategies and allocate resources effectively.*
3. *Enhanced Public Safety: By identifying high-risk areas or potential targets, security measures can be strengthened to mitigate the threat of terrorism and ensure public safety.*
4. *International Collaboration: Sharing and analyzing terrorism data through Power BI can facilitate collaboration between countries and international organizations in combating terrorism on a global scale.*

1.5 Scope:

"The scope of this project encompasses comprehensive analysis of global terrorism incidents, aiming to provide actionable insights for policymakers, security agencies, and researchers. The project will leverage Power BI to explore trends, patterns, and hotspots in terrorism activities worldwide. Additionally, it can be extended to incorporate diverse data sources, including socio-economic indicators, conflict zones, and geopolitical factors, to enhance the understanding of terrorism dynamics. Advanced analytics techniques, such as predictive modeling and correlation analysis, will be employed to uncover hidden patterns and forecast future trends. Furthermore, the project has the potential to be adapted for other domains, such as national security, humanitarian aid, and conflict resolution, where insights into terrorism are essential. Ultimately, this project contributes to global efforts in counterterrorism, promoting data-driven decision-making, and enhancing security measures worldwide."

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services:** The primary data source for this analysis is the Global Terrorism Database (GTD), a comprehensive dataset maintained by organizations such as the National Consortium for the Study of Terrorism and Responses to Terrorism (START).

- **Data Processing Services:** GTD provides detailed information on terrorist incidents worldwide, including location, date, attack type, casualties, perpetrators, and more.

2.2 Tools and Software used

Tools:

- **Power BI:** The main tool for this project is Power BI, which will be used to create interactive dashboards for real-time data visualization.

- **Power Query:** This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.

Software Requirements:

- **Power BI Desktop:** This is a Windows application that you can use to create reports and publish them to Power BI.

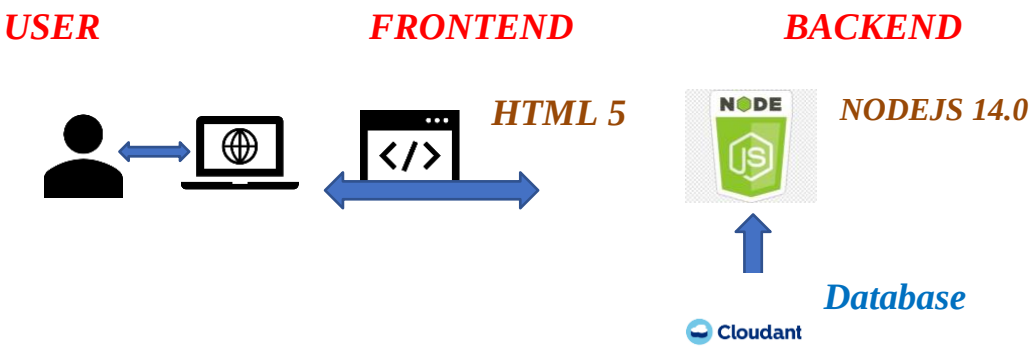
- **Power BI Service:** This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.

- ***Power BI Mobile:*** *This is a mobile application that you can use to access your reports and dashboards on the go.*

CHAPTER 3

PROJECT ARCHITECTURE

3.1 Architecture



*1. *Data Collection:** *The global terrorism dataset is collected from reputable sources such as the Global Terrorism Database (GTD) or governmental agencies. This data includes information on terrorist incidents, perpetrators, targets, and casualties, and is gathered through extensive research and reporting mechanisms.*

*2. *Data Preparation and Transformation:** *Upon collection, the dataset undergoes rigorous preprocessing to address inconsistencies, missing values, and outliers. This ensures the data is clean and formatted correctly for analysis in Power BI. Transformation steps may include data normalization, feature engineering, and merging with supplementary datasets for enriched insights.*

*3. *Data Modeling:** *The preprocessed dataset is imported into Power BI Desktop for further analysis. Data modeling techniques are employed to establish relationships between different tables within the dataset,*

enabling seamless navigation and exploration. Measures and calculated columns are defined to derive meaningful metrics and insights from the data.

*4. *Data Analysis and Visualization:** Utilizing Power BI's suite of visualization tools, the global terrorism dataset is analyzed to uncover trends, patterns, and correlations. Visualizations such as heat maps, time series charts, and geospatial maps are employed to effectively communicate key findings. Interactive features such as filters and slicers enable users to drill down into specific regions, time periods, or attack types for deeper analysis.*

*5. *Advanced Analytics (Optional):** For enhanced insights, advanced analytics techniques such as clustering, sentiment analysis, or time series forecasting may be applied within Power BI. Integration with external tools or programming languages like R or Python allows for custom analytics and machine learning models to be incorporated into the analysis pipeline.*

*6. *Deployment and Sharing:** The finalized dashboards and reports are published to the Power BI service for online access. Stakeholders and decision-makers can securely access the analysis from any device using Power BI Desktop, Power BI Service, or Power BI Mobile app. Granular access controls ensure that sensitive information is protected and only accessible to authorized users.*

This architecture provides a robust framework for analyzing the global terrorism dataset using Power BI, enabling stakeholders to gain valuable insights into terrorist activities worldwide. However, it's essential to adapt the architecture to specific project requirements, existing infrastructure, and compliance with relevant data privacy and security regulations.

CHAPTER 4

MODELING AND RESULT

1. ***Establishing Relationships:*** ***The GTD likely consists of multiple tables with related information such as terrorist incidents, locations, perpetrators, and attack types. In Power BI, establishing relationships between these tables is crucial to combine data from different sources and perform integrated analysis.***

2. ***Defining Cardinality and Cross Filtering Direction:*** ***Understanding the cardinality (one-to-one, one-to-many, many-to-one, many-to-many) and cross-filtering direction between tables is essential. For instance, there may be a one-to-many relationship between the 'Incidents' table and the 'Locations' table, where one incident can occur in multiple locations.***

3. ***Utilizing Bidirectional Filtering:*** ***Depending on the analysis requirements, bidirectional filtering may be***

necessary. For example, when analyzing terrorism incidents by country, bidirectional filtering allows users to filter incidents by country and also filter countries by incidents.

4. *Handling Many-to-Many Relationships: In some cases, there might be many-to-many relationships between tables. For instance, multiple perpetrators could be involved in various incidents, and vice versa. Power BI provides techniques such as bridge tables or using DAX functions like 'RELATEDTABLE' to handle many-to-many relationships effectively.*

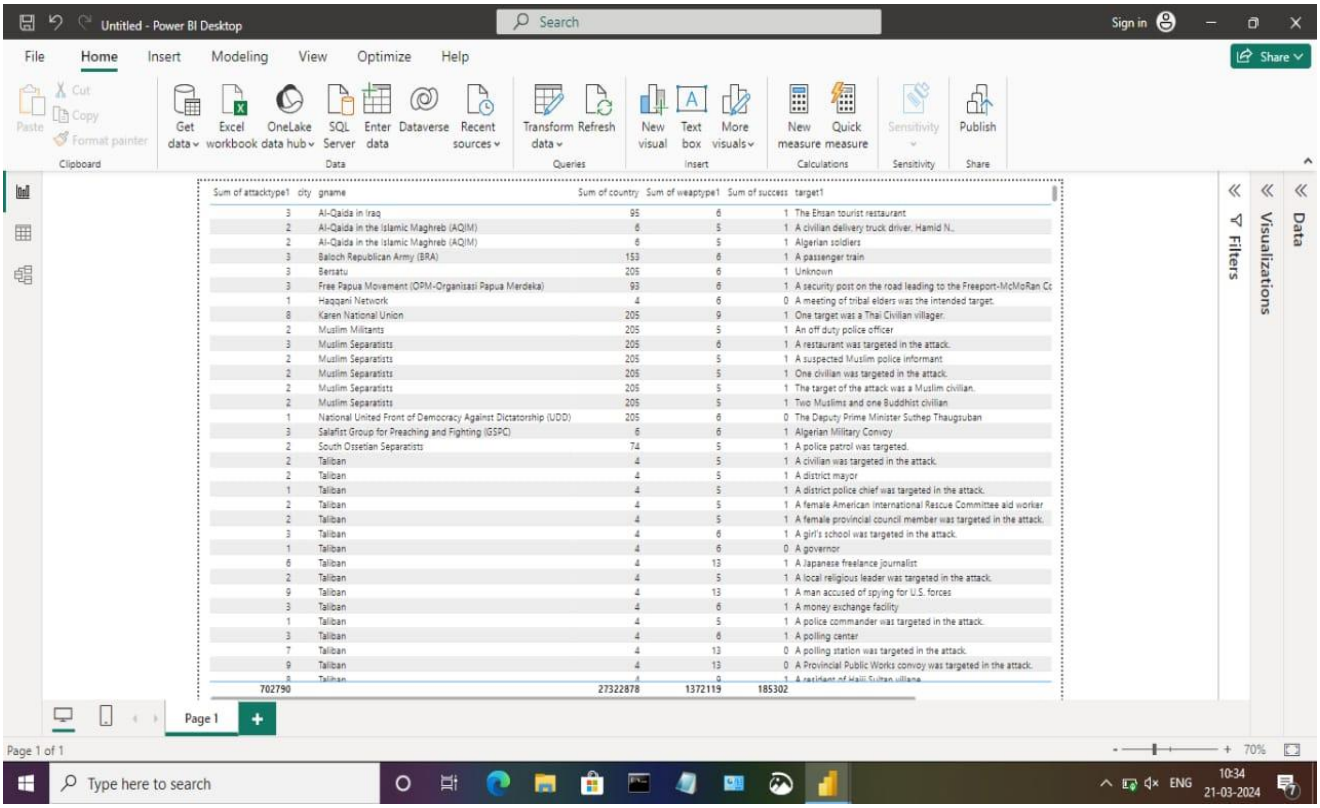
5. *Optimizing Relationship Performance: Optimizing relationships is crucial for efficient data retrieval and visualization. Power BI offers features such as using inactive relationships, creating bi-directional filters selectively, and avoiding circular dependencies to enhance performance.*

6. ***Implementing Role-Playing Dimensions:*** *If there are date-related tables in the GTD (e.g., incident date, claim date), role-playing dimensions can be utilized to handle different perspectives of time within the analysis. For example, analyzing incidents by incident date versus claimed responsibility date.*

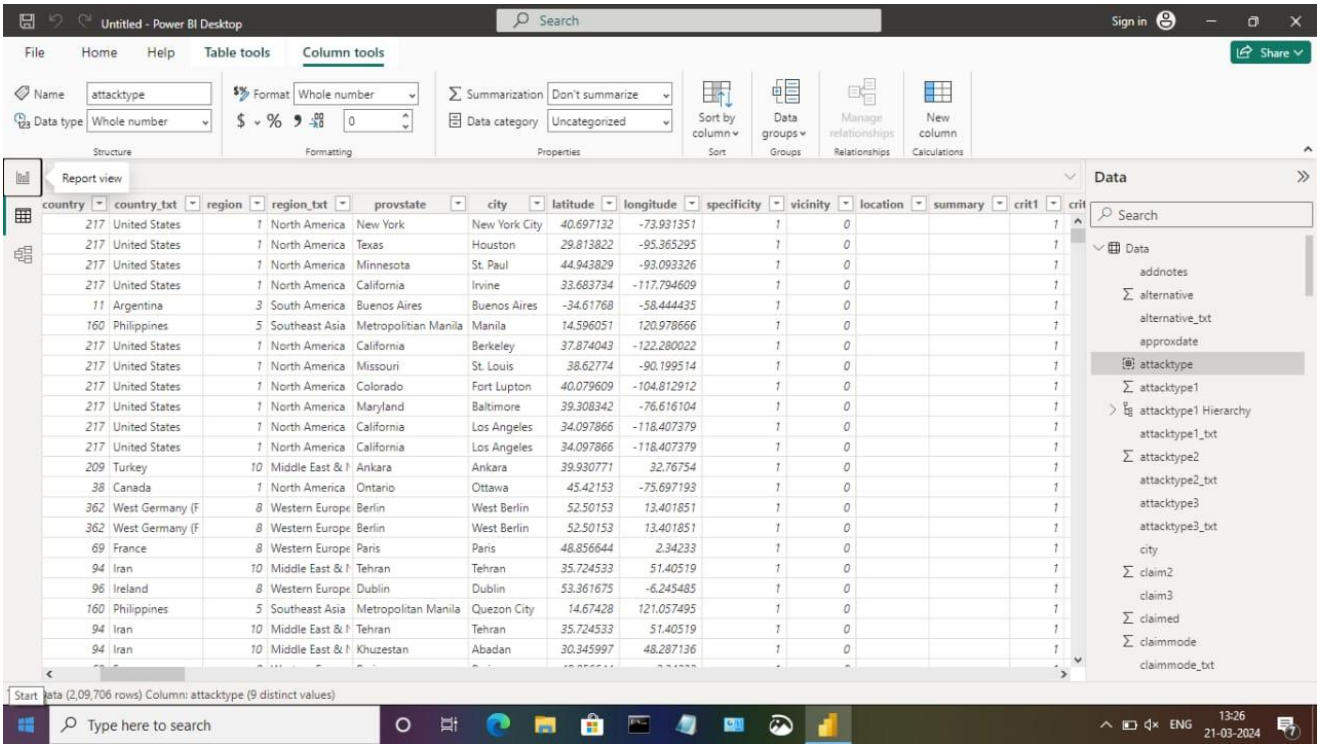
7. ***Data Model Documentation:*** *Documenting the data model, including relationships, cardinality, and cross-filtering direction, is essential for collaboration and ensuring that other users understand the structure of the dataset.*

8. ***Regular Review and Maintenance:*** *As the analysis evolves or new data is incorporated into the GTD, it's crucial to regularly review and update relationships to reflect changes accurately.*

By effectively managing relationships in Power BI, analysts can create a robust data model that facilitates comprehensive analysis of the Global Terrorism Dataset, enabling stakeholders to derive meaningful insights and make informed decisions in counterterrorism efforts.

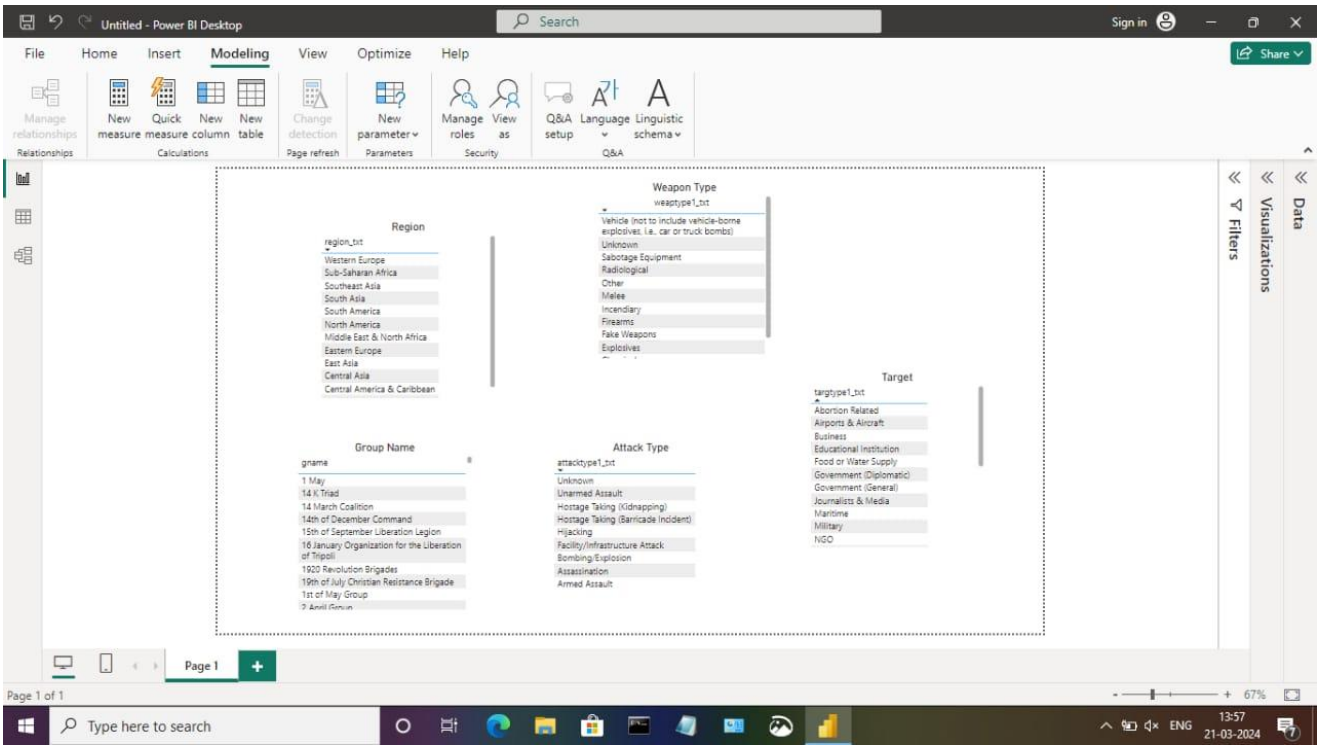


Sum of attacktype1	city	gname	Sum of country	Sum of weaptype1	Sum of success	target1
3		Al-Qaida in Iraq	95	6	1	The Ehsan tourist restaurant
2		Al-Qaida in the Islamic Maghreb (AQIM)	6	5	1	A civilian delivery truck driver, Hamid N.,
2		Al-Qaida in the Islamic Maghreb (AQIM)	6	5	1	Algerian soldiers
3		Baloch Republican Army (BRA)	153	6	1	A passenger train
3		Bersatu	205	6	1	Unknown
3		Free Papua Movement (OPM-Organisasi Papua Merdeka)	93	6	1	A security post on the road leading to the Freeport-McMoRan Co
1		Haqqani Network	4	6	0	A meeting of tribal elders was the intended target.
8		Karen National Union	205	9	1	One target was a Thai Civilian villager.
2		Muslim Militants	205	5	1	An off duty police officer
3		Muslim Separatists	205	6	1	A restaurant was targeted in the attack.
2		Muslim Separatists	205	5	1	A suspected Muslim police informant
2		Muslim Separatists	205	5	1	One civilian was targeted in the attack.
2		Muslim Separatists	205	5	1	The target of the attack was a Muslim civilian.
2		Muslim Separatists	205	5	1	Two Muslims and one Buddhist civilian
1		National United Front of Democracy Against Dictatorship (UDD)	205	6	0	The Deputy Prime Minister Suthep Thaugsuban
3		Salafist Group for Preaching and Fighting (GSPC)	6	6	1	Algerian Military Convoy
2		South Ossetian Separatists	74	5	1	A police patrol was targeted.
2		Taliban	4	5	1	A civilian was targeted in the attack.
2		Taliban	4	5	1	A district mayor
1		Taliban	4	5	1	A district police chief was targeted in the attack.
2		Taliban	4	5	1	A female American International Rescue Committee aid worker
2		Taliban	4	5	1	A female provincial council member was targeted in the attack.
3		Taliban	4	6	1	A girl's school was targeted in the attack.
1		Taliban	4	6	0	A governor
6		Taliban	4	13	1	A Japanese freelance journalist
2		Taliban	4	5	1	A local religious leader was targeted in the attack.
9		Taliban	4	13	1	A man accused of spying for U.S. forces
3		Taliban	4	6	1	A money exchange facility
1		Taliban	4	5	1	A police commander was targeted in the attack.
3		Taliban	4	6	1	A polling center
7		Taliban	4	13	0	A polling station was targeted in the attack.
9		Taliban	4	13	0	A Provincial Public Works convoy was targeted in the attack.
8		Taliban	4	9	1	A resident of Haji Sultan village
702790			27322878	1372119	185302	



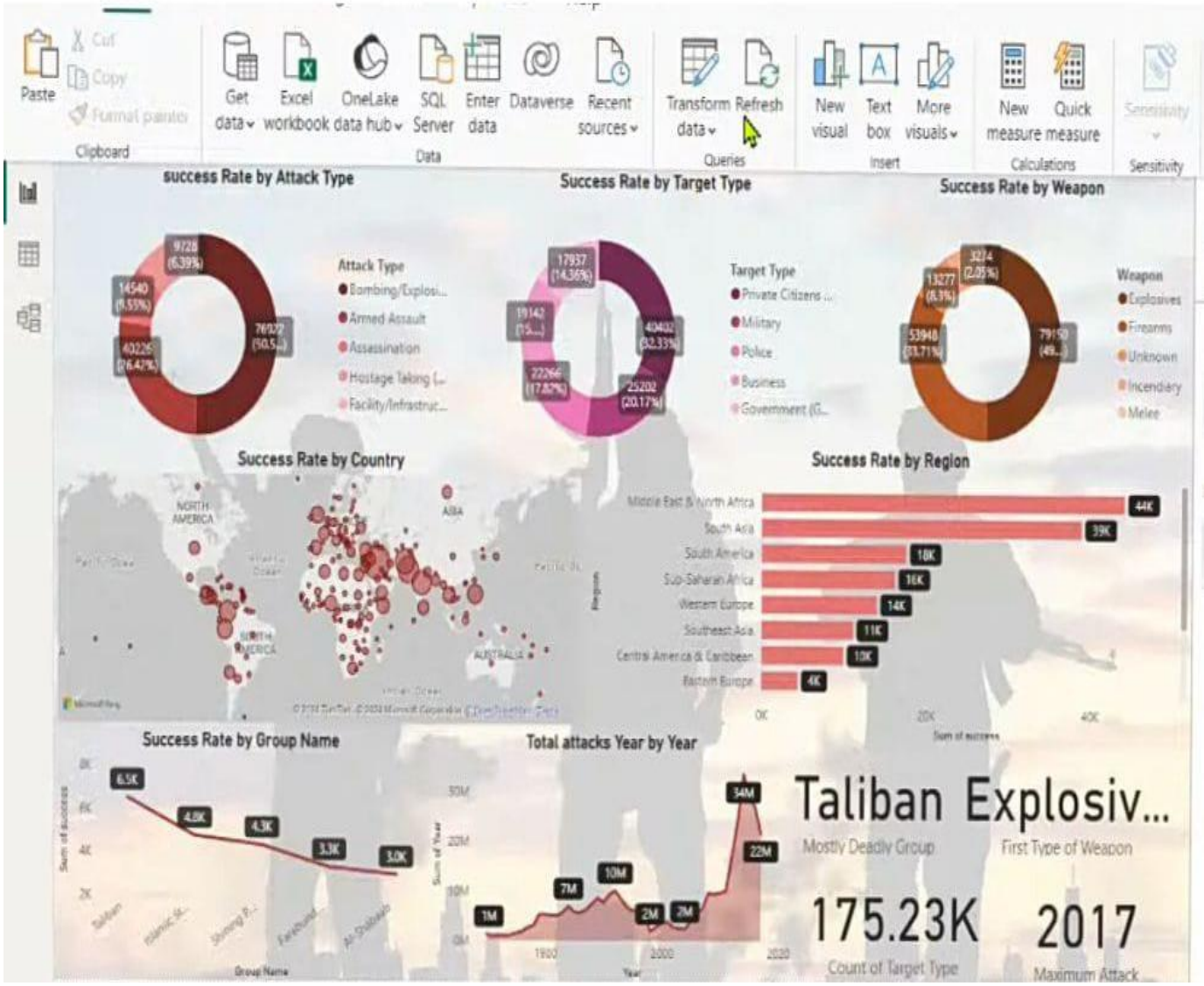
country	country_txt	region	region_txt	provstate	city	latitude	longitude	specificity	vicinity	location	summary	crit1
217	United States	1	North America	New York	New York City	40.697132	-73.931351	1	0			1
217	United States	1	North America	Texas	Houston	29.813822	-95.365295	1	0			1
217	United States	1	North America	Minnesota	St. Paul	44.943829	-93.093326	1	0			1
217	United States	1	North America	California	Irvine	33.683734	-117.794609	1	0			1
11	Argentina	3	South America	Buenos Aires	Buenos Aires	-34.61768	-58.444435	1	0			1
160	Philippines	5	Southeast Asia	Metropolitan Manila	Manila	14.596051	120.978666	1	0			1
217	United States	1	North America	California	Berkeley	37.874043	-122.280022	1	0			1
217	United States	1	North America	Missouri	St. Louis	38.62774	-90.199514	1	0			1
217	United States	1	North America	Colorado	Fort Lupton	40.079609	-104.812912	1	0			1
217	United States	1	North America	Maryland	Baltimore	39.308342	-76.616104	1	0			1
217	United States	1	North America	California	Los Angeles	34.097866	-118.407379	1	0			1
217	United States	1	North America	California	Los Angeles	34.097866	-118.407379	1	0			1
209	Turkey	10	Middle East & I	Ankara	Ankara	39.930771	32.76754	1	0			1
38	Canada	1	North America	Ontario	Ottawa	45.42153	-75.697193	1	0			1
362	West Germany (F	8	Western Europe	Berlin	West Berlin	52.50153	13.401851	1	0			1
362	West Germany (F	8	Western Europe	Berlin	West Berlin	52.50153	13.401851	1	0			1
69	France	8	Western Europe	Paris	Paris	48.856644	2.34233	1	0			1
94	Iran	10	Middle East & I	Tehran	Tehran	35.724533	51.40519	1	0			1
96	Ireland	8	Western Europe	Dublin	Dublin	53.361675	-6.245485	1	0			1
160	Philippines	5	Southeast Asia	Metropolitan Manila	Quezon City	14.67428	121.057495	1	0			1
94	Iran	10	Middle East & I	Tehran	Tehran	35.724533	51.40519	1	0			1
94	Iran	10	Middle East & I	Khuzestan	Abadan	30.345997	48.287136	1	0			1

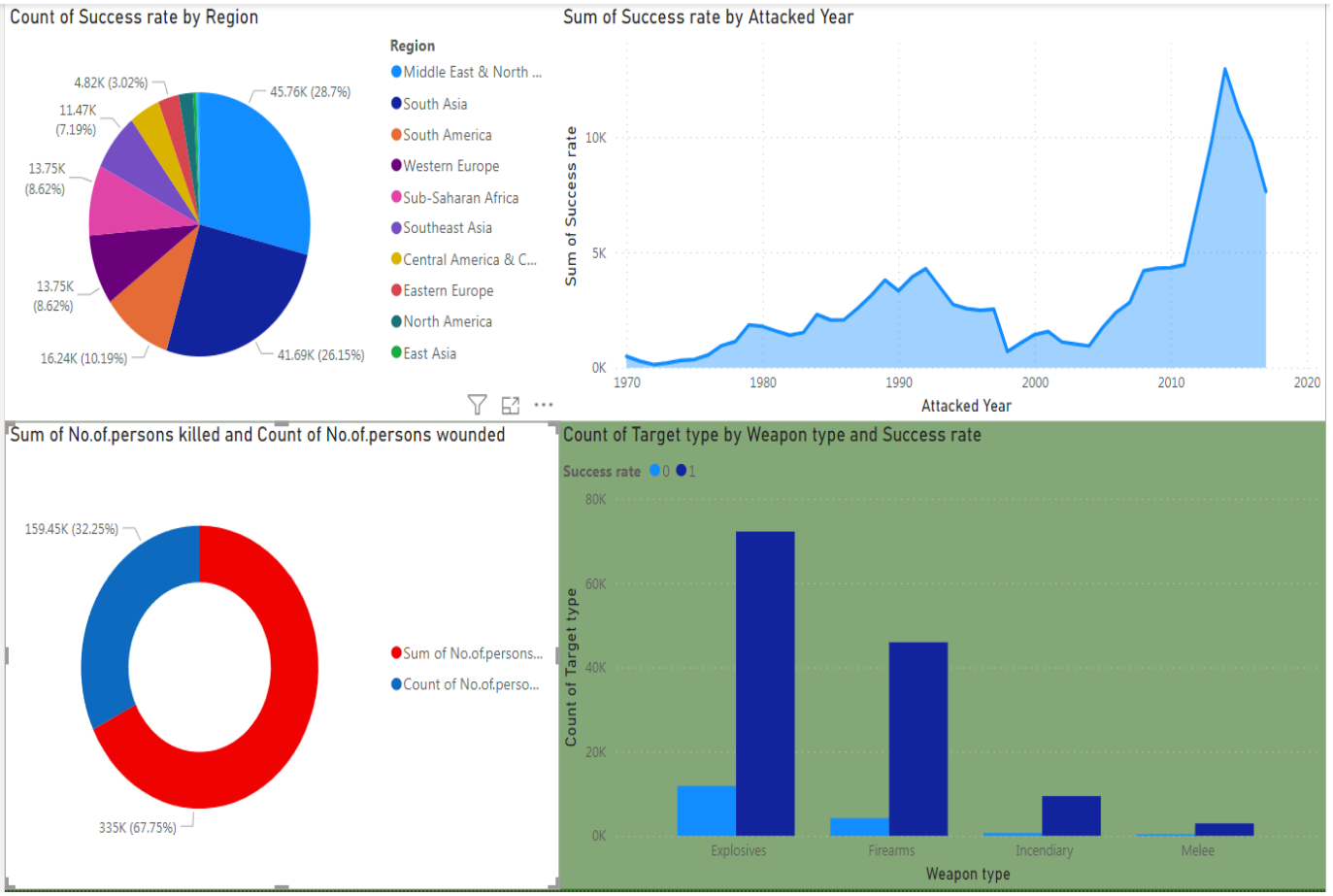
ata (2,09,706 rows) Column: attacktype (9 distinct values)


Untitled - Power BI Desktop
Search
Sign in
File
Home
Insert
Modeling
View
Optimize
Help
Share
Manage relationships
New measure
Quick measure
New column
New table
Change detection
New parameter
Manage roles
View as
Q&A setup
Language
Linguistic schema
Relationships
Calculations
Page refresh
Parameters
Security
Q&A
Region
region_txt
Western Europe
Sub-Saharan Africa
Southeast Asia
South Asia
South America
North America
Middle East & North Africa
Eastern Europe
East Asia
Central Asia
Central America & Caribbean
Weapon Type
weaptype1_txt
Vehicle (not to include vehicle-borne explosives, i.e., car or truck bombs)
Unknown
Sabotage Equipment
Radiological
Other
Melee
Incendiary
Firearms
Fake Weapons
Explosives
Target
targtype1_txt
Abortion Related
Airports & Aircraft
Business
Educational Institution
Food or Water Supply
Government (Diplomatic)
Government (General)
Journalists & Media
Maritime
Military
NGO
Group Name
gname
1 May
14 K Triad
14 March Coalition
14th of December Command
15th of September Liberation Legion
16 January Organization for the Liberation of Tripoli
1920 Revolution Brigades
19th of July Christian Resistance Brigade
1st of May Group
Attack Type
attacktype1_txt
Unknown
Unarmed Assault
Hostage Taking (Kidnapping)
Hostage Taking (Barricade Incident)
Hijacking
Facility/Infrastructure Attack
Bombing/Explosion
Assassination
Armed Assault
Filters
Visualizations
Data
Page 1
Page 1 of 1
67%
Type here to search
ENG
13:57
21-03-2024

Dash board

POWER BI POWERED GLOBAL TERRORISM DATASET ANALYSIS




Count of Success rate by Region
Region
Middle East & North ...
South Asia
South America
Western Europe
Sub-Saharan Africa
Southeast Asia
Central America & C...
Eastern Europe
North America
East Asia
4.82K (3.02%)
45.76K (28.7%)
11.47K (7.19%)
13.75K (8.62%)
13.75K (8.62%)
16.24K (10.19%)
41.69K (26.15%)
Sum of Success rate by Attacked Year
Sum of Success rate
10K
5K
0K
1970
1980
1990
2000
2010
2020
Attacked Year
Sum of No.of.persons killed and Count of No.of.persons wounded
159.45K (32.25%)
335K (67.75%)
Sum of No.of.persons...
Count of No.of.perso...
Count of Target type by Weapon type and Success rate
Success rate 0 1
Count of Target type
80K
60K
40K
20K
0K
Explosives
Firearms
Incendiary
Melee
Weapon type

5. CONCLUSION

"The project 'Global Terrorism Analysis' leveraging Power BI has effectively showcased the transformative potential of data analytics in understanding and combating terrorism worldwide. By analyzing the dataset in real-time, we have gained invaluable insights into the intricate dynamics of terrorist activities, enabling proactive decision-making and strategic planning. The interactive dashboards and reports have provided a holistic view of terrorism trends, facilitating the identification of key patterns and risk factors. This enhanced analytical capability not only bolsters security measures but also empowers stakeholders to devise targeted interventions and policies. Moreover, the project underscores the significance of data visualization in simplifying complex information and fostering actionable insights. Through the intuitive interface of Power BI, we have successfully translated raw data into visually compelling narratives, empowering stakeholders to navigate and comprehend critical information effectively. Ultimately, this project signifies the pivotal role of data analytics in safeguarding global security and fostering informed responses to emerging threats."

6. FUTURE SCOPE

"The future scope of analyzing global terrorism datasets using Power BI is expansive. With advancements in analytics and machine learning, Power BI can predict future trends in terrorist activities based on historical data. By incorporating predictive analytics, stakeholders can anticipate emerging threats and proactively implement counterterrorism measures. Moreover, Power BI's ability to integrate with diverse data sources opens avenues for incorporating additional datasets, offering a comprehensive understanding of terrorist activities worldwide. As data privacy and security are paramount, future iterations of this project should prioritize robust data governance strategies to ensure the secure handling of sensitive information while adhering to regulatory requirements. Additionally, exploring the integration of real-time data streams can provide timely insights, revolutionizing how stakeholders respond to terrorist threats and potentially enhancing global security measures."

7. REFERENCES

1. ***https://www.youtube.com/live/kbe61N-qQ-s?si=sKebIm3unvQEsnkd***

2. ***National Consortium for the Study of Terrorism and Responses to Terrorism (START). (n.d.). Global Terrorism Database (GTD). Retrieved from https://www.start.umd.edu/gtd/***

8. Link

https://github.com/Vengadeshrupa/Power-BI-Powered-Global-Terrorism-Dataset-Analysis-.git