Terrorism Analysis
and
Finding Insights

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PROJECT OVERVIEW

This project is a web based application which can be used for the terrorism analysis with insights that can show visualization of data according to needs of the client.

A "Terrorism Analysis with Insights Application" will let the client perform predictive analysis to discover the pattern of every sort of Attacks that has happened during a specific time. Visualization has been used to its degree to give clear pattern about the information and also to make it easy and simple for analysis.

Protective vehicles are less in numbers with the Army and are distributed uniformly across the area. Similarly, Explosive Detection Dogs (ED Dogs) are only less in the entire country. This project can be used as a Predictive Analysis tool to find the trend line of each kind of Attack (Bombing, Assassination, Etc.). This tool helps in finding the concentration of Attack type - Bombing in the area which would help in allocation of the resources. Visualizing the data gives clear patterns about the data and makes it easy for the analysis. Data Visualization is the graphical portrayal of data and information. By utilizing visual components like diagrams, charts, and guides. This application gives an efficient way /method to see and get patterns, anomalies, and insights in information.

This project is based on Time series records which commonly consist of a series of records taken at successive equally spaced time periods. Time collection analysis accommodates techniques for studying time collection data that allows you to extract meaningful information and different traits of the data.

Data visualization is an essential step and need to be step one before beginning with time collection modelling. It could be used as a model to predict future values primarily based on previously found values. It's far crucial to recognize earlier than modelling how the variables within the dataset are correlated, what the cost ranges are and how it's miles affected by the time period.

Data analysis is a cycle of inspecting,cleansing, transforming and demonstrating information with the objective of finding helpful data, illuminating ends and supporting decisions. Data analysis is firmly connected to data visualization and data dissemination.

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INTRODUCTION

"Terrorism Analysis and Finding Insights Application" is web application which will be used for predicting and analysing terrorism patterns and insights. This will be utilized by the client to discover the patterns of every sort of attack(such as: Assassination, Kidnapping, Bombing, Hijacking, etc.).

This application will likewise help in finding and analyzing by visualizing the map or chart by applying following filters:

- ➢ Map Tool :
  - Month Multi-select Dropdown
  - Date Multi-select Dropdown
  - Region Multi-select Dropdown
  - Country Multi-select Dropdown
  - State Multi-select Dropdown
  - City Multi-select Dropdown
  - Attack Type Multi-select Dropdown
  - Year Slider
- ➢ Chart Tool :
  - Terrorist Group
  - Type of Attack
  - Region
  - Target Nationality
  - Target Type
  - Country Attacked
  - Weapon Type
  - Year Slider

This project works in a following way:

- ➢ User can run the Python content from a terminal or a CMD and it opens application in a default Web Browser.

the blend of Month, Day, Attack Type, Region,Country, State, City.

- ➢ User can see the visualizations and based on that he/she can analyse and predict the forthcomings.
- ➢ Hovering and clicking on the graph shows the detailed data.
- ➢ Application has a Chart Tool and Map Tool for visualization of data.
- ➢ Map Tool to generate a scatter Geo Map with markers for attacks happened.
- ➢ Chart Tool to show stacked line graph pictures of the frequency of attacks in every year.
- ➢ User can change data dependent on year slider in both Map and Chart Tool.

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RELATED WORK

Time Series data projects are used for the prediction and analysis of information in effective and efficient manner possible.

Coronavirus Outbreak: In this project, real-time time series methods are used to predict the forthcoming situations in different countries due to the Coronavirus Outbreak. The application takes certain parameters such as Active cases, Recovered cases, Number of death cases, etc., to perform the predictive analysis

Forecasting Methods: In this project, open-source datasets have been taken into account that is publicly available and various methods/techniques of performing time series forecasting such as holt-winters method, Autoregressive integrated moving average method, exponential smoothing methods, have been discussed, and comparative study of the modern methods of performing forecasting using neural network-based models has also been highlighted.

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MY WORK

My Project is Terrorism Analysis with Insights web application, which can be used to analyse and predict the incidents of terrorism across the Globe & India specifically. It uses "global terrorism database"(GTD) which is a dataset of nearly 1,91,464 records and 135 attributes maintained by
The "National Consortium for the study of terrorism and Responses to terrorism" from year 1970 to 2018.

User Interface of Application is created using Dash (Plotly), HTML and CSS.
Visualization of data is done and represented in the below two ways:
- Map tool
  - World map tool
  - India map tool
- Chart tool
  - World chart tool
  - India chart tool

Map Tool User Interface:
- There are following dropdown for filtering the data as per user :
  - Months
  - Date
  - Region
  - Country
  - province/state
  - City
  - Attack type
- There is a year range slider for changing year.
- Note: India map tool: the region and country are fixed and set to south Asia and India respectively.

Chart Tool User Interface:

  The chart tool has a world chart tool and India chart tool
- The grouping can be changed to any using the following dropdowns :
  - terrorist organization

> - target nationality
> - target type
> - type of attack
> - weapon type
> - region
> - Country attacked.

- There is a Search box filter where user can enter specific keyword to search.
- There is a year slider same as year slider in map tool.
- Note: In India chart tool, the region and country are fixed and set to South Asia and India respectively.

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SYSTEM REQUIREMENTS:

Hardware requirements:

- Processor Type: Pentium Dual-core or above.
- RAM: 2 GB or above
- Disc Space: 250 GB

Software requirements:

- Operating system: windows 7 or higher, Mac OS, Linux any version.
- Language: Python 3 any version.
- Python Modules: Pandas, web browser
- Python Framework: Dash
- Python IDE or Command Prompt
- Browser like Google Chrome, Mozilla Firefox, Microsoft Edge, Safari.

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IMPLEMENTATION

Data Analysis:

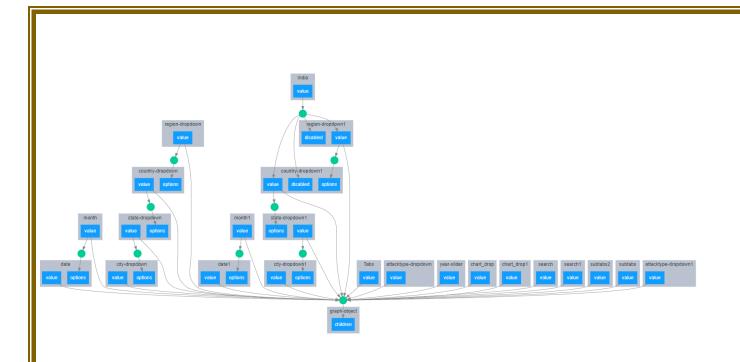**Performing Exploratory Data Analysis (EDA):**
The dataset provided is an unstructured dataset with the extension .xlsx which is an excel file, containing 1,90,000 records. To make the dataset structured, EDA is performed and then CSV file is created with the cleaned and structured data.

EDA includes following:
- Removing anomalies.
- Removing the unnecessary variables/data.
- Filling empty places.
- Maximize insight into a data set.
- Uncover underlying structure.
- Extract important variables.
- Detect outliers and anomalies.
- Test underlying assumptions.
- Develop parsimonious models.
- Determine optimal factor settings.

Creating User Interface:

- Creating Tabs and Sub tabs:
  Creating the "Map Tool" and "Chart Tool" section along with the sub-tabs such as India and World for each section.
- Creating Dropdowns:
  Dropdowns for the purpose of filtering out the data according to the user.
- Creating Range Slider:
  Year slider is placed to filter according to time period.
- Adding Graph:
  For visualization of data graph is added.
- Creating call backs to make our elements work.

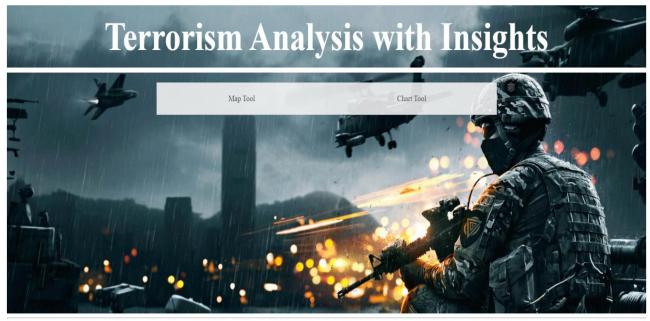## Creating Function to open application in web Browser:

```python
def open_browser():
    # To open web browser with the specified URL
    webbrowser.open_new('http://127.0.0.1:8050/')
```
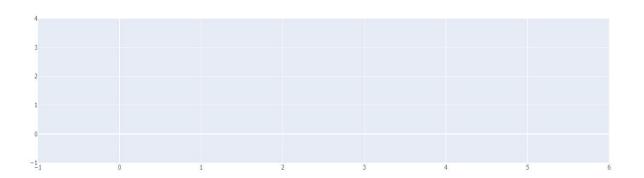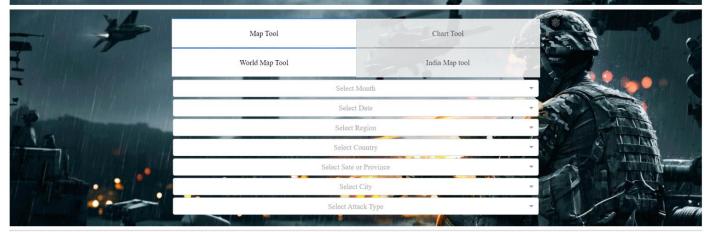
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RESULTS

The project has been successfully implemented and working fine. A glimpse of the UI of the project has been attached to have a better understanding of how the project looks when running on a live server.

Terrorism Analysis with Insights

Map Tool	Chart Tool
World Map Tool	India Map tool

Select Month ▾

Select Date ▾

Select Region ▾

Select Country ▾

Select Sate or Province ▾

Select City ▾

Select Attack Type ▾

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

attacktype1_txt
- Assassination
- Hostage Taking (Kidnapping)
- Bombing/Explosion
- Facility/Infrastructure Attack
- Armed Assault
- Hijacking
- Unknown
- Unarmed Assault
- Hostage Taking (Barricade Incident)

Terrorism Analysis with Insights

Map Tool	Chart Tool

World Map Tool	India Map tool

Select Month ▼

Select Date ▼

South Asia ▼

India ▼

Select Sate or Province ▼

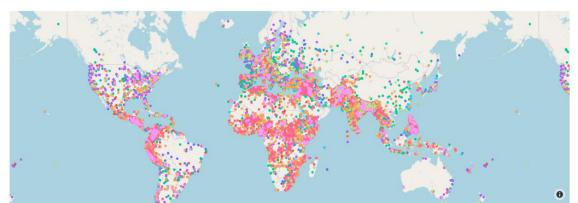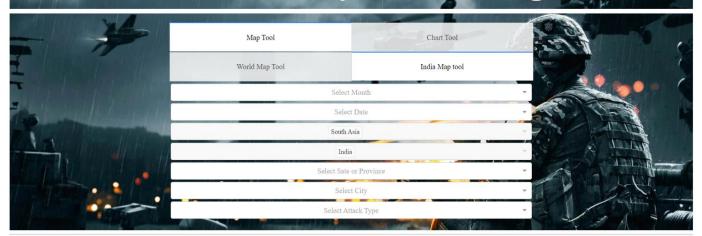Select City ▼

Select Attack Type ▼

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

attacktype1_txt
- Hijacking
- Bombing/Explosion
- Armed Assault
- Assassination
- Facility/Infrastructure Attack
- Unknown
- Hostage Taking (Kidnapping)
- Unarmed Assault
- Hostage Taking (Barricade Incident)

Terrorism Analysis with Insights

Map Tool	Chart Tool

World Chart tool	India Chart tool

Region   × ▾

Search Filter

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
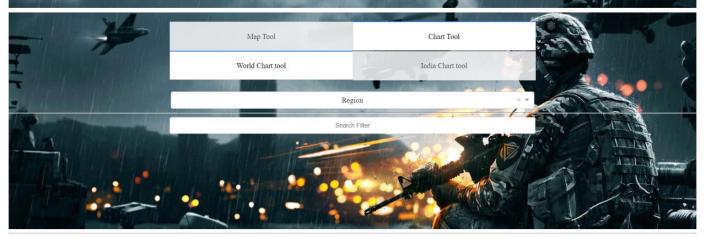

region_txt
- North America
- South America
- Western Europe
- Middle East & North Africa
- Eastern Europe
- Southeast Asia
- Central America & Caribbean
- Sub-Saharan Africa
- East Asia
- Australasia & Oceania
- South Asia
- Central Asia

Terrorism Analysis with Insights

Map Tool	Chart Tool
World Chart tool	India Chart tool

Region	× ▾

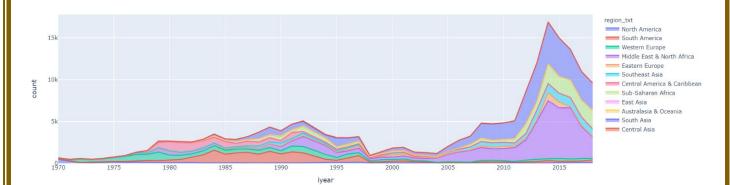| Search Filter |
|---------------|

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
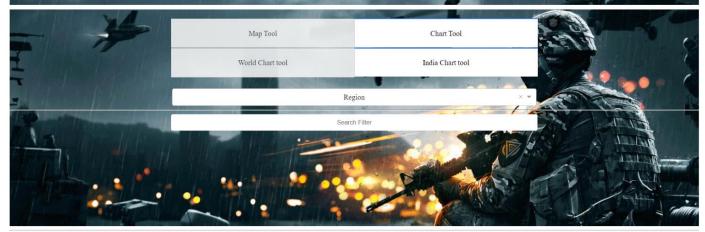

region_txt
South Asia

Terrorism Analysis with Insights

Map Tool	Chart Tool

World Chart tool	India Chart tool

Target Type

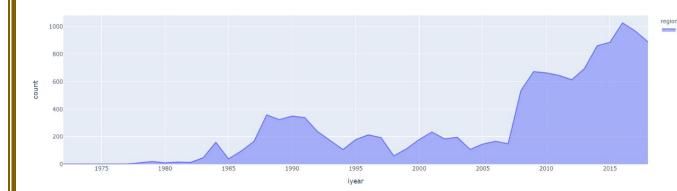Search Filter

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

Terrorism Analysis with Insights

Map Tool	Chart Tool
World Chart tool	India Chart tool

Country Attacked

Search Filter

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
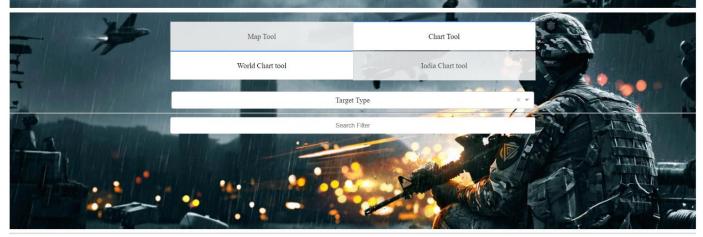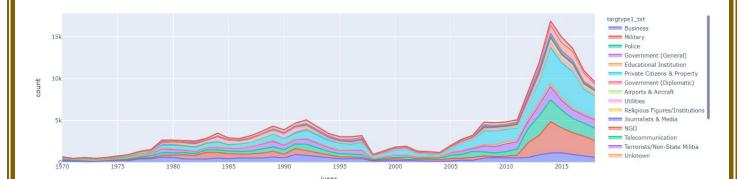
Terrorism Analysis with Insights

Map Tool	Chart Tool

World Chart tool	India Chart tool

Target Type   × ▾

Search Filter

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
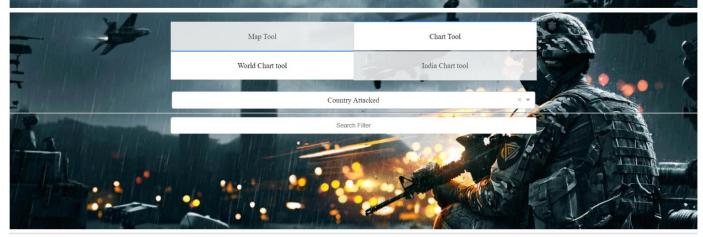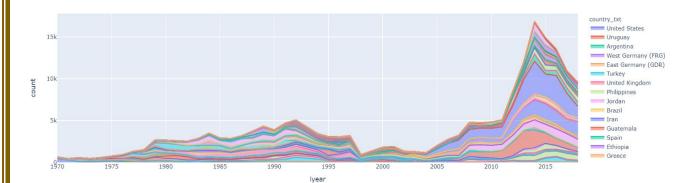

targtype1_txt
- Business
- Military
- Police
- Government (General)
- Educational Institution
- Private Citizens & Property
- Government (Diplomatic)
- Airports & Aircraft
- Utilities
- Religious Figures/Institutions
- Journalists & Media
- NGO
- Telecommunication
- Terrorists/Non-State Militia
- Unknown

Terrorism Analysis with Insights

Map Tool	Chart Tool

World Chart tool	India Chart tool

Type of Attack

Search Filter

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
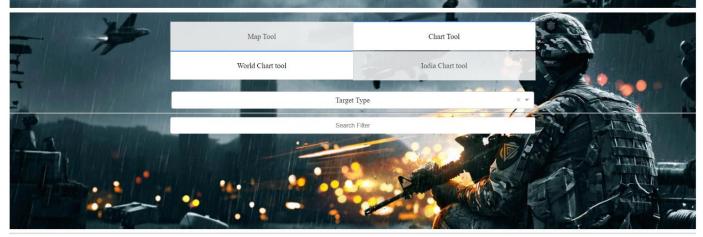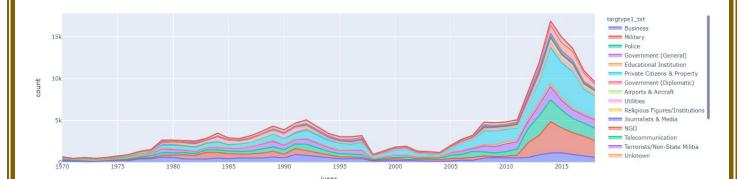

attacktype1_txt
- Bombing/Explosion
- Facility/Infrastructure Attack
- Armed Assault
- Hostage Taking (Kidnapping)
- Assassination
- Hijacking
- Unknown
- Hostage Taking (Barricade Incident)
- Unarmed Assault

Terrorism Analysis with Insights

Map Tool	Chart Tool
World Map Tool	India Map tool

× March × May   × ▾

Select Date   ▾

× Central Asia × Middle East & North Africa × South America   × ▾

Select Country   ▾

Select Sate or Province   ▾

Select City   ▾

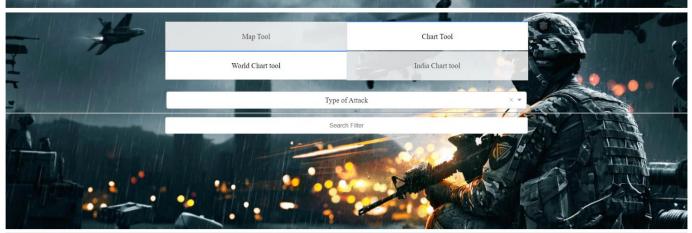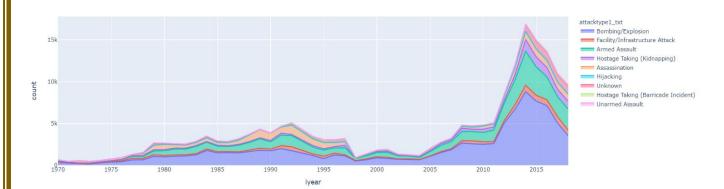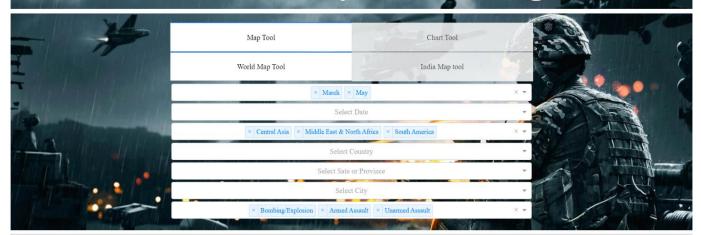× Bombing/Explosion × Armed Assault × Unarmed Assault   × ▾

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
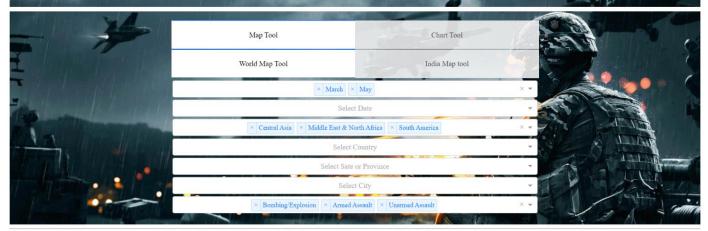
Terrorism Analysis with Insights

Map Tool	Chart Tool
World Map Tool	India Map tool

× March   × May   × ▼

Select Date   ▼

× Central Asia   × Middle East & North Africa   × South America   × ▼

Select Country   ▼

Select Sate or Province   ▼

Select City   ▼

× Bombing/Explosion   × Armed Assault   × Unarmed Assault   × ▼

Select Year

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992   1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
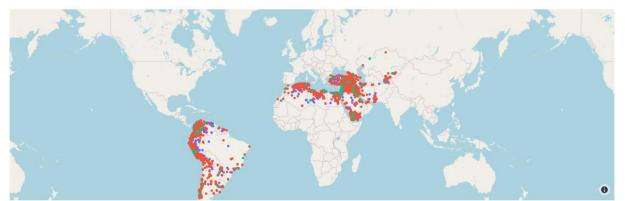
attacktype1_txt
- Armed Assault
- Bombing/Explosion
- Unarmed Assault

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CONCLUSION

In conclusion, I may say that the project required a lot of effort and time to get completed. The project meets the client's expectations and performs well enough to fulfil the task for what it has been developed. As the requirements vary, future enhancement and improvement can be carried out accordingly.

The application helps the user to collect insights of the data.

Using multiple filters and dropdowns, the data is filtered as per user requirements and the data is shown in terms of maps and charts efficiently.

It helps in identifying different types of attacks in map tool and progression of attacks in chart tools with respect to year.

Each event data is shown on the mouse hover on a particular event.

I really enjoyed working on this project and looking forward to work on more cool and exciting projects.

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FUTURE ENHANCEMENT

- ➢ The project can be further improved by adding future predictions.
- ➢ The dataset can be updated with information about all the terrorist attacks that happened in 2019 as well as 2020 (till date) so that the application is well versed with the recent information as well.
- ➢ The map can be further modified to accommodate and demarcate the exact location of attacks within the cities along with the time/ time duration of the attack upon zooming and filtration to increase preciseness in analysis, if data for the same is included in the existing dataset.
- ➢ Data Visualizations can be animated to hold more and more interest of the user(s).
- ➢ This easy to use application can be further accommodated with several other sub-bifurcations with inclusions of various other HTML/Dash Core Components like
- ➢ Buttons, Radio Buttons, Checkboxes, etc. and several other types of time series charts other than stacked area chart like Line Graphs, Bar Charts, Stream Graphs, etc. can be displayed as well.

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ACKNOWLEDGEMENT

Working on Terror analysis and Insights was very informative and beneficial to me. However, it would not have been possible without the kind support and help of many individuals and Forsk Technologies.

I would like to extend my sincere thanks to all of them.

I am highly indebted to Dr. Sylvester Fernandes for his guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

I would like to express my gratitude towards Dr.Yogesh Gupta for his kind co-operation and encouragement.

This project would not have been successful without the guidance of Dr.Sylvester and Dr.Yogesh Gupta.

I would like to express my special gratitude and thanks to Forsk Technologies for giving me such attention and time.

My thanks and appreciations also go to my fellow interns in developing the project and people who have willingly helped me out with their abilities.

Thanks
Saman Siddiqui

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REFERENCES

1. Plotly (Dash) - https://dash.plotly.com/

2. PyPi - https://pypi.org/project/dash/

3. Medium - https://medium.com/plotly/introducing-dash-5ecf7191b503

4. Datacamp - https://www.datacamp.com/community/tutorials/learn-build-dash-python

5. Data Science Tutorials (YouTube) - https://www.youtube.com/watch?v=Ma8tS4p27JI&list=PLH6mU1kedUy8fCzkTTJlwsf2EnV_UvOV-

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BIOGRAPHY

My name is SAMAN SIDDIQUI and Currently, I am a student in Govt. Geetanjali PG Girls College, Bhopal (M.P) and I have just completed my final semester examination of MCA.

I am a data science enthusiast. I have great abilities and aptitude in Data Science and Machine Learning. I do programming utilizing Python.

I have been working on following modules/areas :-

- Web/ Data Scraping
- Data mining (EDA)
- Using Data Base (Mysql, MySqli, MongoDB and Firebase) in projects.
- I am good at Web Designing as well using HTML5, CSS and JavaScript.
- I have recently made scrappers for BigBasket, Facebook, Linkedin, Naukri.com,
  Exams Book, Shine.com, Drishti, IndiaBix, etc using Requests, Beautiful Soup, Selenium, Scrapy and URLlib.
- I have been working recently on a web app PredictorLance: - predicting height, weight, age, gender, emotion and
  BMI of a person from his/her single face photo. In this project I have used Flask (with HTML, CSS and JavaScript), MongoDB, OpenCV, Machine Learning and Deep Learning.

I am a hard worker, always ready to accept challenges.

My research interests include Machine Learning, Deep Learning, Data Mining, Data Analytics, and Data Visualization.

And I am looking to do more projects in data science.