

TASK 3 LGMVIP - Jupyter Notebook +

localhost:8888/notebooks/TASK%203%20LGMVIP.ipynb

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DEC BATCH TASK 3

ANURAG JADHAV

TASK 3 - Image to Pencil Sketch with Python

Importing Libraries

```
In [15]: import cv2
import matplotlib.pyplot as plt
```

Uploading the image

```
In [22]: image = cv2.imread(r"C:\Users\anura\Downloads\IMG_20211003_110625.jpg")
```

Converting the image to RGB format

```
In [23]: image2 = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
plt.imshow(image2)
plt.axis(False)
plt.show()
```



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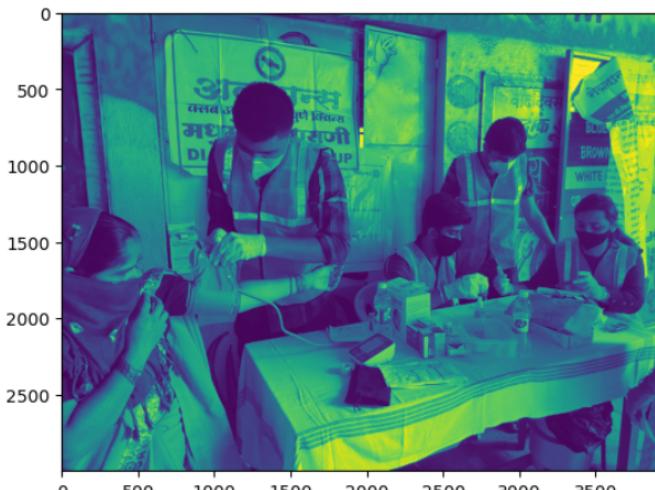
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In [24]: `grey_scale_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
plt.imshow(grey_scale_image)`

Out[24]: <matplotlib.image.AxesImage at 0x28c822d6550>

Converting the image to greyscale image

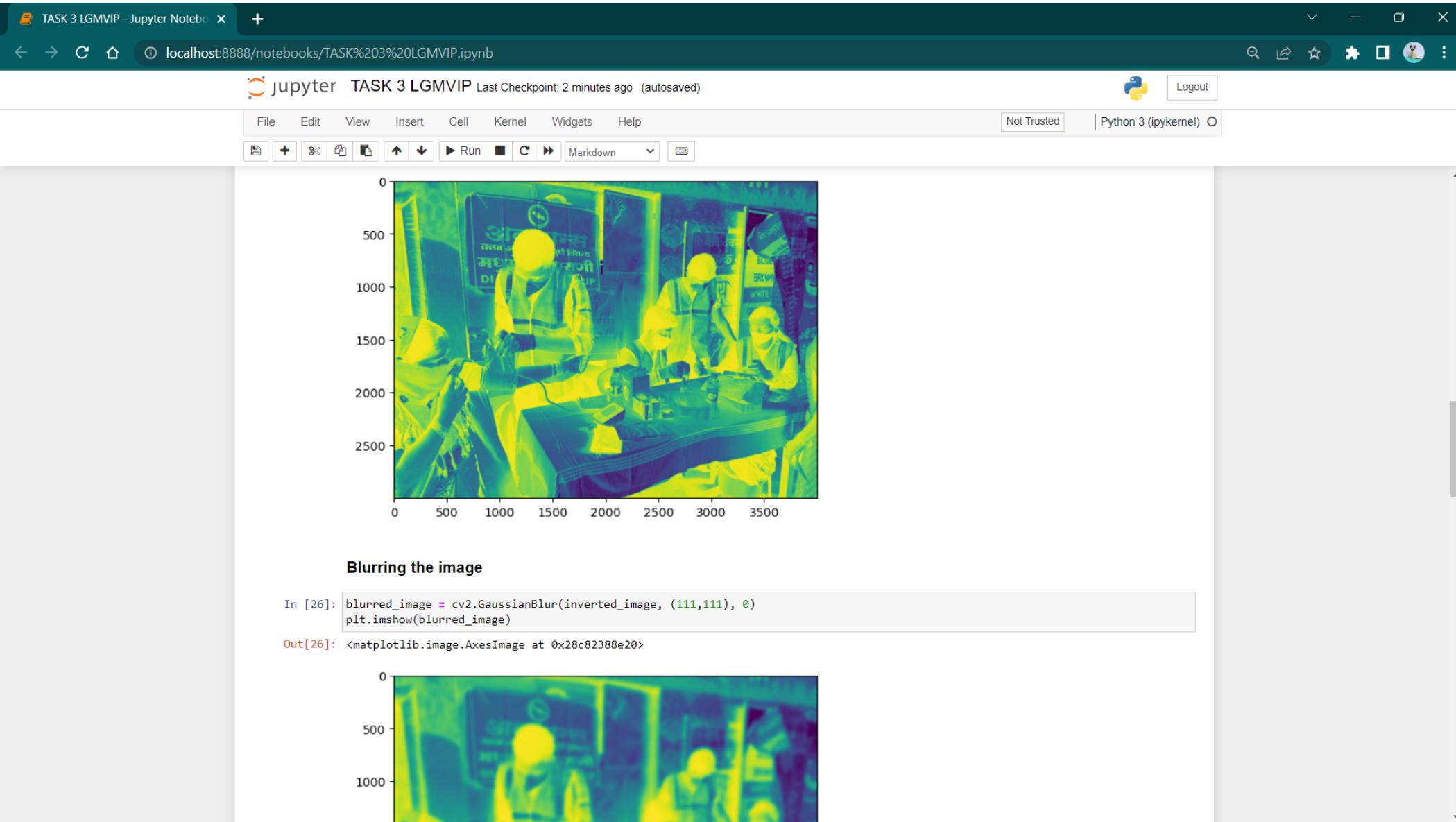


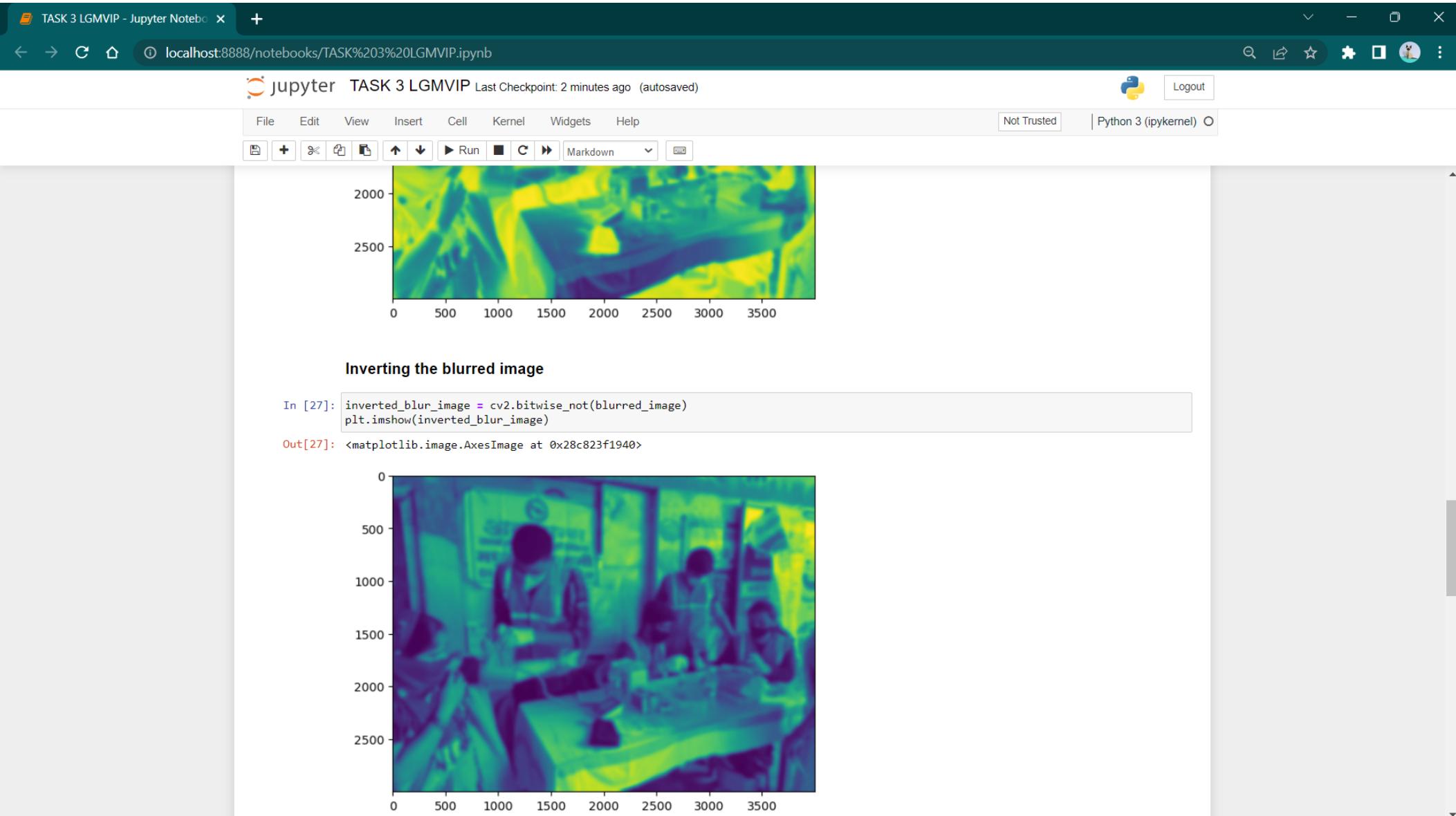
A grayscale heatmap visualization of a scene. The image shows several people in what appears to be a room or a hallway. The heatmap uses a color gradient where darker shades represent higher values, and lighter shades represent lower values. The x-axis is labeled from 0 to 3500 with increments of 500, and the y-axis is labeled from 0 to 2500 with increments of 500. The scene includes a table with various items on it and some text on the wall in the background.

In [25]: `inverted_image = cv2.bitwise_not(grey_scale_image)
plt.imshow(inverted_image)`

Out[25]: <matplotlib.image.AxesImage at 0x28c823169a0>

Inverting the image





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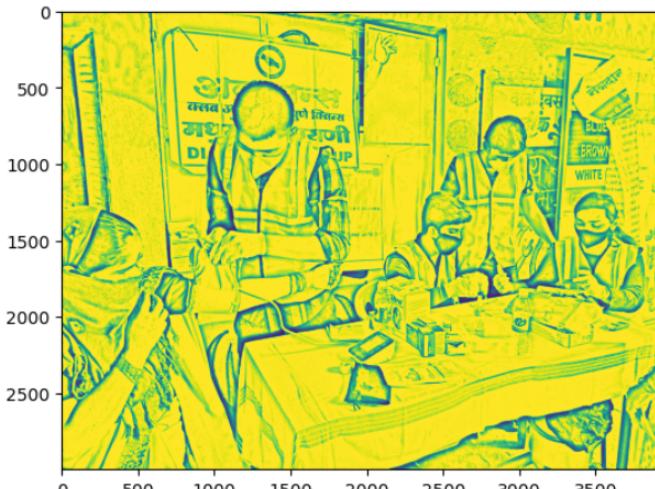
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In [28]: `sketch_image = cv2.divide(grey_scale_image, inverted.blur_image, scale=256.0)`
plt.imshow(sketch_image)

Out[28]: <matplotlib.image.AxesImage at 0x28c825df5e0>



Saving the image

In [29]: `cv2.imwrite("sketch.png", sketch_image)`

Out[29]: True

Converting the image back to BRG format

In [30]: `plt.figure(figsize = (10,10))
image3 = cv2.cvtColor(sketch_image, cv2.COLOR_RGB2BGR)
plt.imshow(image3)`

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Run

```
plt.axis(False)  
plt.show()
```



In []:

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DEC BATCH TASK 4

ANURAG JADHAV

TASK 4 - Exploratory Data Analysis on Dataset - Terrorism

Importing Libraries

```
In [6]: import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import pandas as pd
import warnings
warnings.filterwarnings("ignore")
%matplotlib inline
```

Upload dataset

```
In [16]: data = pd.read_csv(r"C:\Users\anura\Downloads\globalterrorismdb_0718dist.csv",encoding = 'ISO-8859-1')
```

Displaying the first five rows of the dataset

```
In [37]: data.head()
```

```
Out[37]:
```

	eventid	iyear	imonth	iday	approxdate	extended	resolution	country	country_txt	region	...	addnotes	scite1	scite2	scite3	dbsource	INT_LOG
0	197000000001	1970	7	2	NaN	0	NaN	58	Dominican Republic	2	...	NaN	NaN	NaN	NaN	PGIS	0
1	197000000002	1970	0	0	NaN	0	NaN	130	Mexico	1	...	NaN	NaN	NaN	NaN	PGIS	0

LGMVIP Task 4 - Jupyter Notebook

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3 197001000002 1970 1 0 NaN 0 NaN 78 Greece 8 ... NaN NaN NaN NaN NaN PGIS -9

4 197001000003 1970 1 0 NaN 0 NaN 101 Japan 4 ... NaN NaN NaN NaN NaN PGIS -9

5 rows × 135 columns

Displaying the last five rows of the dataset

```
In [18]: data.tail()
```

```
Out[18]:
```

	eventid	iyear	imonth	iday	approxdate	extended	resolution	country	country_txt	region	...	addnotes	scite1	scite2	scite3
181686	201712310022	2017	12	31	NaN	0	NaN	182	Somalia	11	...	NaN	"Somalia: Al-Shabaab Militants Attack Army Che...	"Highlights: Somalia Daily Media Highlights 2 ...	"Highlights: Somalia Daily Media Highlights 1 ...
181687	201712310029	2017	12	31	NaN	0	NaN	200	Syria	10	...	NaN	"Putin's 'victory' in Syria has turned into a ...	"Two Russian soldiers killed at Hmeimim base l...	"Two Russian servicemen killed in Syria mortar...
181688	201712310030	2017	12	31	NaN	0	NaN	160	Philippines	5	...	NaN	"Maguindanao clashes trap tribe members," Phil...	NaN	NaN
181689	201712310031	2017	12	31	NaN	0	NaN	92	India	6	...	NaN	"Trader escapes grenade attack in Imphal," Bus...	NaN	NaN
181690	201712310032	2017	12	31	NaN	0	NaN	160	Philippines	5	...	NaN	"Security tightened in Cotabato following IED ...	"Security tightened in Cotabato City," Manila ...	NaN

5 rows × 135 columns



Displaying all the features present in the dataset

```
In [19]: for column in data.columns:  
    print(column)
```

```
eventid  
iyear  
imonth  
iday  
approxdate  
extended  
resolution  
country  
country_txt  
region  
region_txt  
provstate  
city  
latitude  
longitude  
specificity  
vicinity  
location  
summary  
crit1  
crit2  
crit3  
doubtterr  
alternative  
alternative_txt  
multiple  
success  
suicide  
attacktype1  
attacktype1_txt  
attacktype2  
attacktype2_txt  
attacktype3  
attacktype3_txt  
targtype1  
targtype1_txt  
targsubtype1  
targsubtype1_txt  
corp1  
target1
```

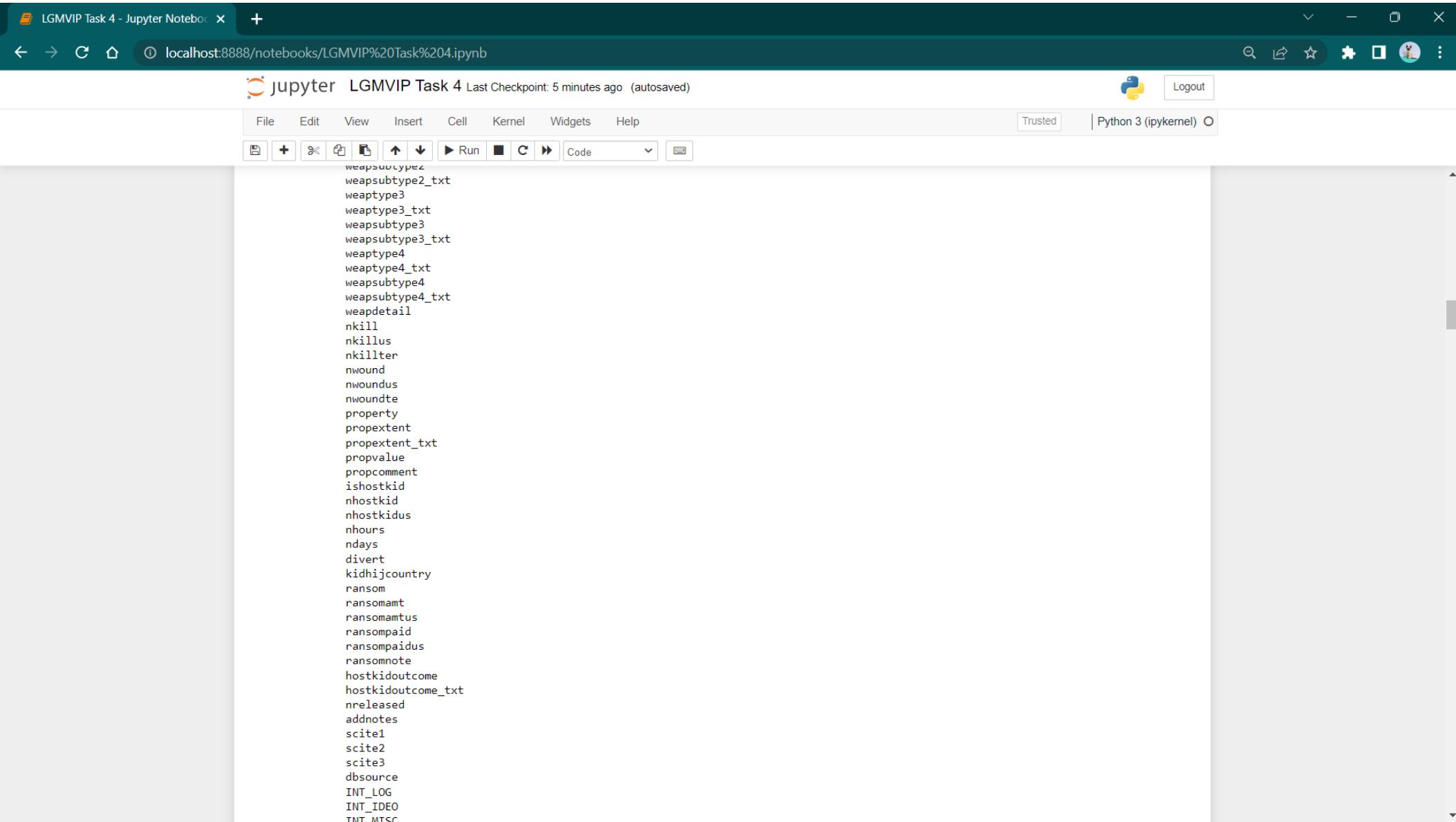
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natlty1
natlty1_txt
targtype2
targtype2_txt
targsubtype2
targsubtype2_txt
corp2
target2
natlty2
natlty2_txt
targtype3
targtype3_txt
targsubtype3
targsubtype3_txt
corp3
target3
natlty3
natlty3_txt
gname
gsubname
gname2
gsubname2
gname3
gsubname3
motive
guncertain1
guncertain2
guncertain3
individual
nperps
nperpcap
claimed
claimmode
claimmode_txt
claim2
claimmode2
claimmode2_txt
claim3
claimmode3
claimmode3_txt
compclaim
weaptype1
weaptype1_txt
weapsubtype1
weapsubtype1_txt





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```
INT_MISC  
INT_ANY  
related
```

Displaying the shape and features of the dataset

In [20]: `data.shape`

Out[20]: (181691, 135)

Note:

Here I have selected the most relevant features of the Dataset instead of working on all the features these are:

```
In [24]: df = data[["iyear", "imonth", "iday", "country_txt", "provstate", "region_txt",  
           "longitude", "latitude", "attacktype1_txt", "target1", "nkill", "nwound",  
           "summary", "gname", "targtype1_txt", "weaptype1_txt", "motive"]]
```

In [25]: `df.head()`

Out[25]:

	iyear	imonth	iday	country_txt	provstate	region_txt	longitude	latitude	attacktype1_txt	target1	nkill	nwound	summary	gname	targtype1
0	1970	7	2	Dominican Republic	NaN	Central America & Caribbean	-69.951164	18.456792	Assassination	Julio Guzman	1.0	0.0	NaN	MANO-D	Priv Citizen Prop
1	1970	0	0	Mexico	Federal	North America	-99.086624	19.371887	Hostage Taking (Kidnapping)	Nadine Chaval, daughter	0.0	0.0	NaN	23rd September Communist League	Governm (Diploma
2	1970	1	0	Philippines	Tarlac	Southeast Asia	120.599741	15.478598	Assassination	Employee	1.0	0.0	NaN	Unknown	Journalist Me
3	1970	1	0	Greece	Attica	Western Europe	23.762728	37.997490	Bombing/Explosion	U.S. Embassy	NaN	NaN	NaN	Unknown	Governm (Diploma
4	1970	1	0	Japan	Fukouka	East Asia	130.396361	33.580412	Facility/Infrastructure Attack	U.S. Consulate	NaN	NaN	NaN	Unknown	Governm (Diploma

Renaming the columns of the dataset

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Renaming the columns of the dataset

In [26]:

```
df.rename(columns={'iyear':'Year','imonth':'Month','iday':'Day','country_txt':'Country','provstate':'State','region_txt':'Region','longitude':'Longitude','latitude':'Latitude','attacktype1_txt':'AttackType','target1':'Target','nkill':'Killed','nwound':'Wounded','summary':'Summary','gname':'Group','targtype1_txt':'Target_type','weaptype1_txt':'Weapon_type','motive':'Motive'},inplace=True)  
df.head()
```

Out[26]:

	Year	Month	Day	Country	State	Region	Longitude	Latitude	AttackType	Target	Killed	Wounded	Summary	Group	Target_type
0	1970	7	2	Dominican Republic	NaN	Central America & Caribbean	-69.951164	18.456792	Assassination	Julio Guzman	1.0	0.0	NaN	MANO-D	Private Citizens & Property
1	1970	0	0	Mexico	Federal	North America	-99.086624	19.371887	Hostage Taking (Kidnapping)	Nadine Chaval, daughter	0.0	0.0	NaN	23rd of September Communist League	Government (Diplomatic)
2	1970	1	0	Philippines	Tarlac	Southeast Asia	120.599741	15.478598	Assassination	Employee	1.0	0.0	NaN	Unknown	Journalists & Media
3	1970	1	0	Greece	Attica	Western Europe	23.762728	37.997490	Bombing/Explosion	U.S. Embassy	NaN	NaN	NaN	Unknown	Government (Diplomatic)
4	1970	1	0	Japan	Fukuoka	East Asia	130.396361	33.580412	Facility/Infrastructure Attack	U.S. Consulate	NaN	NaN	NaN	Unknown	Government (Diplomatic)

Displaying the shape and info of the data

In [27]:

```
df.shape
```

Out[27]:

```
(181691, 17)
```

In [28]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>  
RangeIndex: 181691 entries, 0 to 181690  
Data columns (total 17 columns):  
 #   Column      Non-Null Count  Dtype     
---    
 0   Year        181691 non-null  int64    
 1   Month       181691 non-null  int64    
 2   Day         181691 non-null  int64    
   ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
```



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```
3   Country      181691 non-null  object
4   State        181270 non-null  object
5   Region       181691 non-null  object
6   Longitude    177134 non-null  float64
7   Latitude     177135 non-null  float64
8   AttackType   181691 non-null  object
9   Target        181055 non-null  object
10  Killed       171378 non-null  float64
11  Wounded      165380 non-null  float64
12  Summary      115562 non-null  object
13  Group        181691 non-null  object
14  Target_type  181691 non-null  object
15  Weapon_type  181691 non-null  object
16  Motive        50561 non-null  object
dtypes: float64(4), int64(3), object(10)
memory usage: 23.6+ MB
```

Checking for the duplicate values

```
In [29]: duplicate_values = data.duplicated()
duplicate_values.value_counts()
```

```
Out[29]: False    181691
          dtype: int64
```

```
In [30]: df.drop_duplicates(subset =None, keep='first', inplace = True)
df
```

...

Finding out the number of unique values

```
In [31]: df.unique()
```

```
Out[31]: Year          47
          Month         13
          Day           32
          Country       205
          State          2855
          Region         12
          Longitude     48039
          Latitude       48322
          ...
```



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```
Longitude      48039
Latitude       48322
AttackType      9
Target         86006
Killed          205
Wounded          238
Summary        112492
Group           3537
Target_type      22
Weapon_type      12
Motive          14490
dtype: int64
```

Checking for null values

In [40]: `df.isnull().sum()`

```
Out[40]: Year          0
Month         0
Day           0
Country        0
State          421
Region          0
Longitude      3977
Latitude       3976
AttackType      0
Target          544
Killed          9412
Wounded         15246
Summary        59038
Group           0
Target_type      0
Weapon_type      0
Motive          122224
dtype: int64
```

In [41]: `df['Killed'].fillna(0, inplace = True)`
`df['Wounded'].fillna(0, inplace = True)`In [42]: `df.isnull().sum()`

```
Out[42]: Year          0
Month         0
```



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```
Day          0
Country      0
State         421
Region        0
Longitude    3977
Latitude     3976
AttackType    0
Target        544
Killed        0
Wounded       0
Summary       59038
Group         0
Target_type   0
Weapon_type   0
Motive        122224
dtype: int64
```

Insights Found

```
In [45]: print("Country with the most attacks:",df['Country'].value_counts().idxmax())
print("City with the most attacks:",df['State'].value_counts().idxmax())
print("Region with the most attacks:",df['Region'].value_counts().idxmax())
print("Year with the most attacks:",df['Year'].value_counts().idxmax())
print("Month with the most attacks:",df['Month'].value_counts().idxmax())
print("Group with the most attacks:",df['Group'].value_counts().index[1])
print("Most Attack Types:",df['AttackType'].value_counts().idxmax())
```

```
Country with the most attacks: Iraq
City with the most attacks: Baghdad
Region with the most attacks: Middle East & North Africa
Year with the most attacks: 2014
Month with the most attacks: 5
Group with the most attacks: Taliban
Most Attack Types: Bombing/Explosion
```

Description of the data

```
In [46]: df.describe(include = 'all')
```

```
Out[46]:
```

	Year	Month	Day	Country	State	Region	Longitude	Latitude	AttackType	Target	Killed
count	172129.000000	172129.000000	172129.000000	172129	171708	172129	16815200e+05	168152.000000	172129	171585	172129.000000



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Description of the data

In [46]: `df.describe(include = 'all')`

Out[46]:

	Year	Month	Day	Country	State	Region	Longitude	Latitude	AttackType	Target	Killed
count	172129.000000	172129.000000	172129.000000	172129	171708	172129	1.681520e+05	168153.000000		172129	171585
unique	NaN	NaN	NaN		205	2855	12	NaN	NaN	9	86006
top	NaN	NaN	NaN	Iraq	Baghdad	Middle East & North Africa	NaN	NaN	Bombing/Explosion	Civilians	NaN
freq	NaN	NaN	NaN		23456	7625	48714	NaN	NaN	82126	6369
mean	2003.056051	6.470060	15.518431	NaN	NaN	NaN	-4.830590e+02	23.779955	NaN	NaN	2.371553
std	13.189553	3.391747	8.814150	NaN	NaN	NaN	2.101771e+05	18.295387	NaN	NaN	11.512104
min	1970.000000	0.000000	0.000000	NaN	NaN	NaN	-8.618590e+07	-53.154613	NaN	NaN	0.000000
25%	1991.000000	4.000000	8.000000	NaN	NaN	NaN	7.417291e+00	11.840929	NaN	NaN	0.000000
50%	2009.000000	6.000000	15.000000	NaN	NaN	NaN	4.352619e+01	31.528200	NaN	NaN	0.000000
75%	2014.000000	9.000000	23.000000	NaN	NaN	NaN	6.896761e+01	34.666667	NaN	NaN	2.000000
max	2017.000000	12.000000	31.000000	NaN	NaN	NaN	1.793667e+02	74.633553	NaN	NaN	1570.000000

Data Visualisation

In [47]: `x_year = df['Year'].unique()
y_count_years = df['Year'].value_counts(dropna = False).sort_index()
plt.figure(figsize = (18,8))
sns.barplot(x = x_year, y = y_count_years, palette = 'rocket_r')
plt.xticks(rotation = 45)
plt.xlabel('Attack Year')
plt.ylabel('Number of Attacks each year')
plt.title('Number of attacks year wise')
plt.show()`

Number of attacks year wise

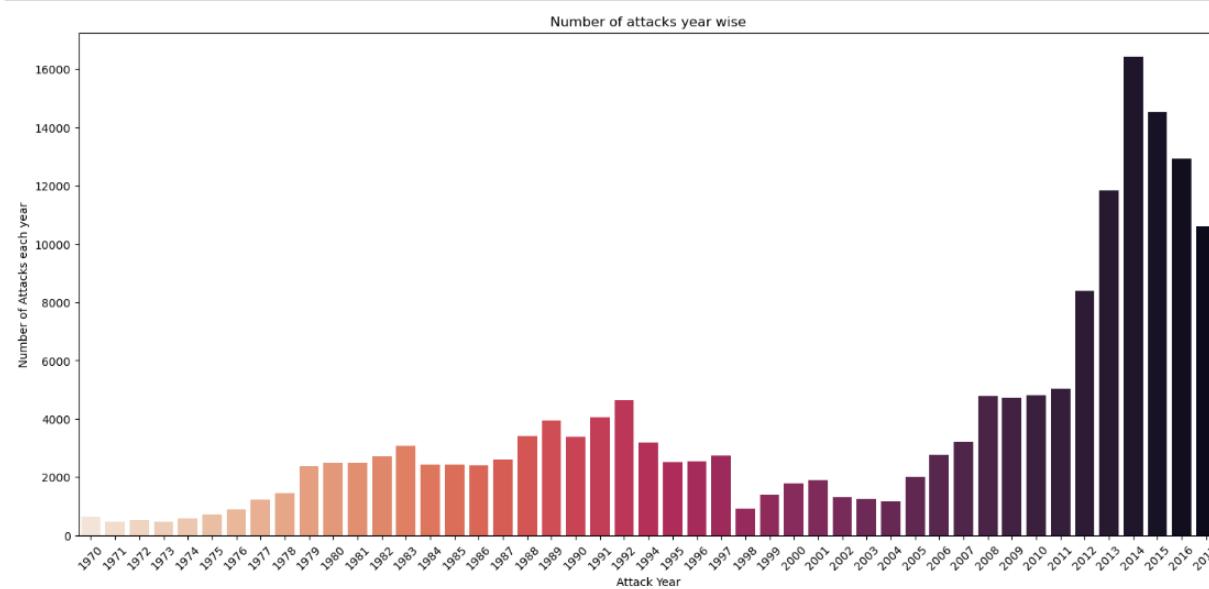


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```
In [47]: x_year = df['Year'].unique()
y_count_years = df['Year'].value_counts(dropna = False).sort_index()
plt.figure(figsize = (18,8))
sns.barplot(x = x_year, y = y_count_years, palette = 'rocket_r')
plt.xticks(rotation = 45)
plt.xlabel('Attack Year')
plt.ylabel('Number of Attacks each year')
plt.title('Number of attacks year wise')
plt.show()
```

**Observations:**

Maximum number of attacks took place in the year 2014 and The number of attacks have been gradually decreasing since 2014

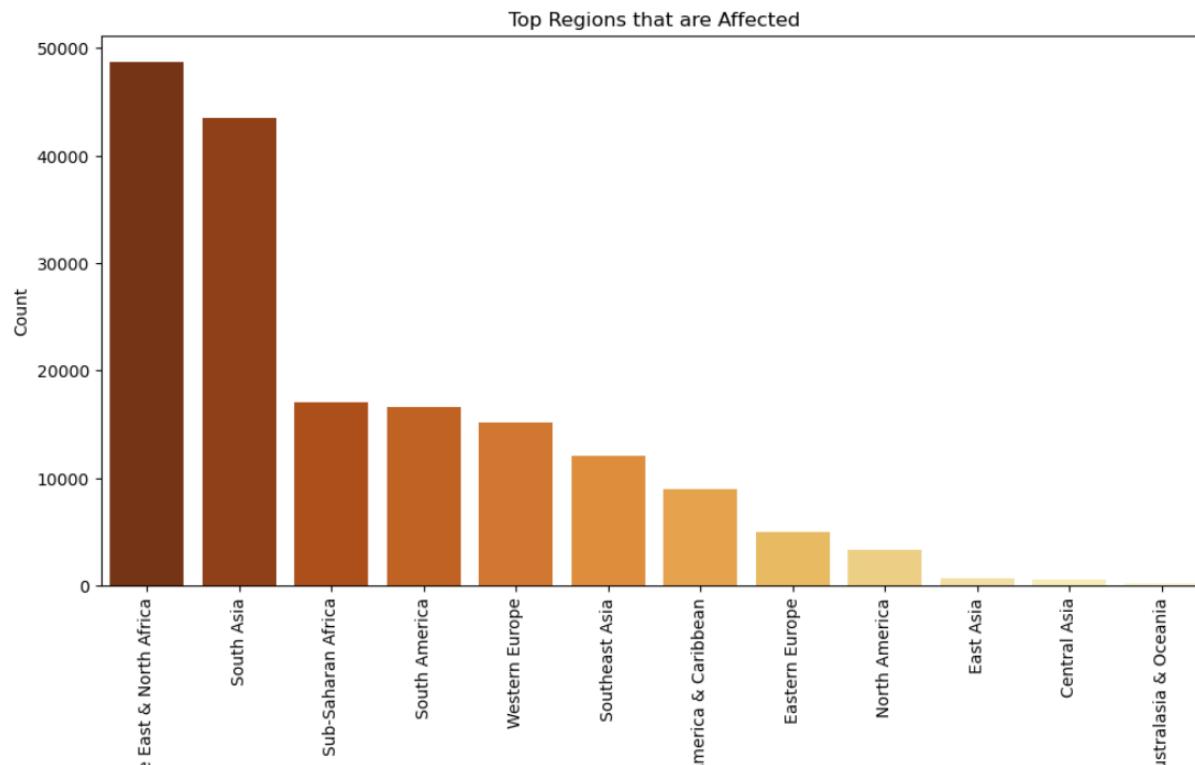


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Python 3 (ipykernel)

```
In [49]: plt.subplots(figsize=(12,6))
sns.barplot(df['Region'].value_counts().index,df['Region'].value_counts().values,palette='YlOrBr_r')
plt.title('Top Regions that are Affected')
plt.xlabel('Regions')
plt.ylabel('Count')
plt.xticks(rotation= 90)
plt.show()
```

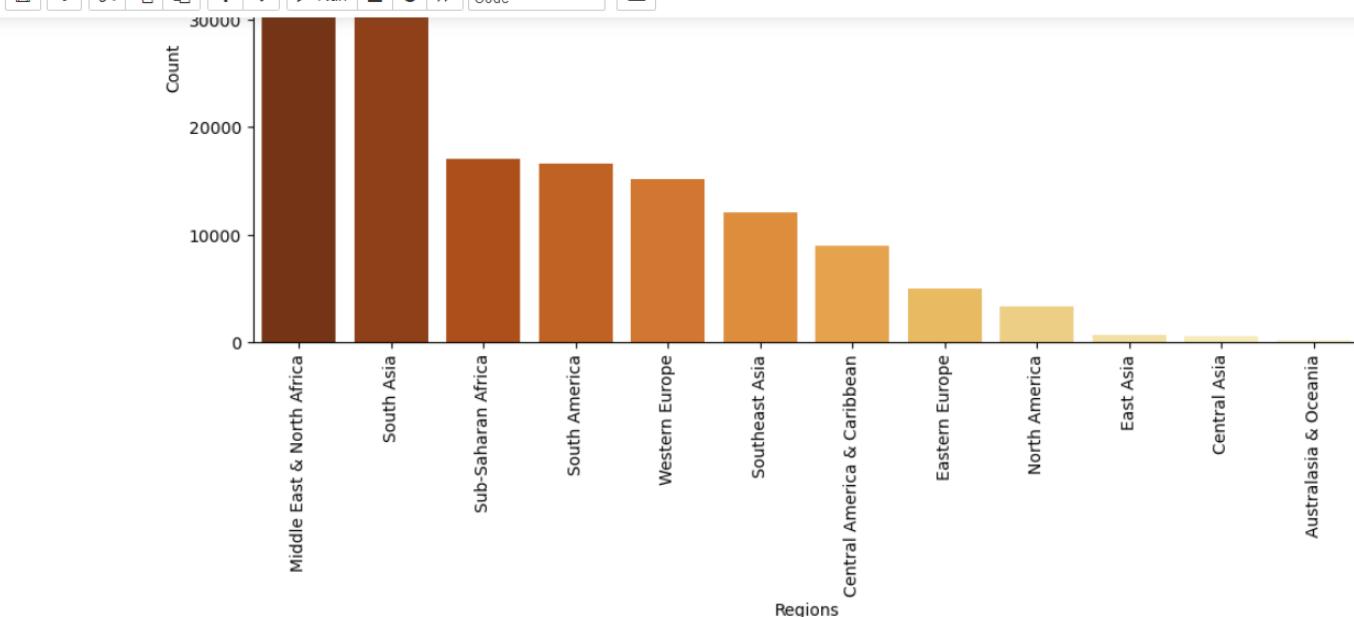


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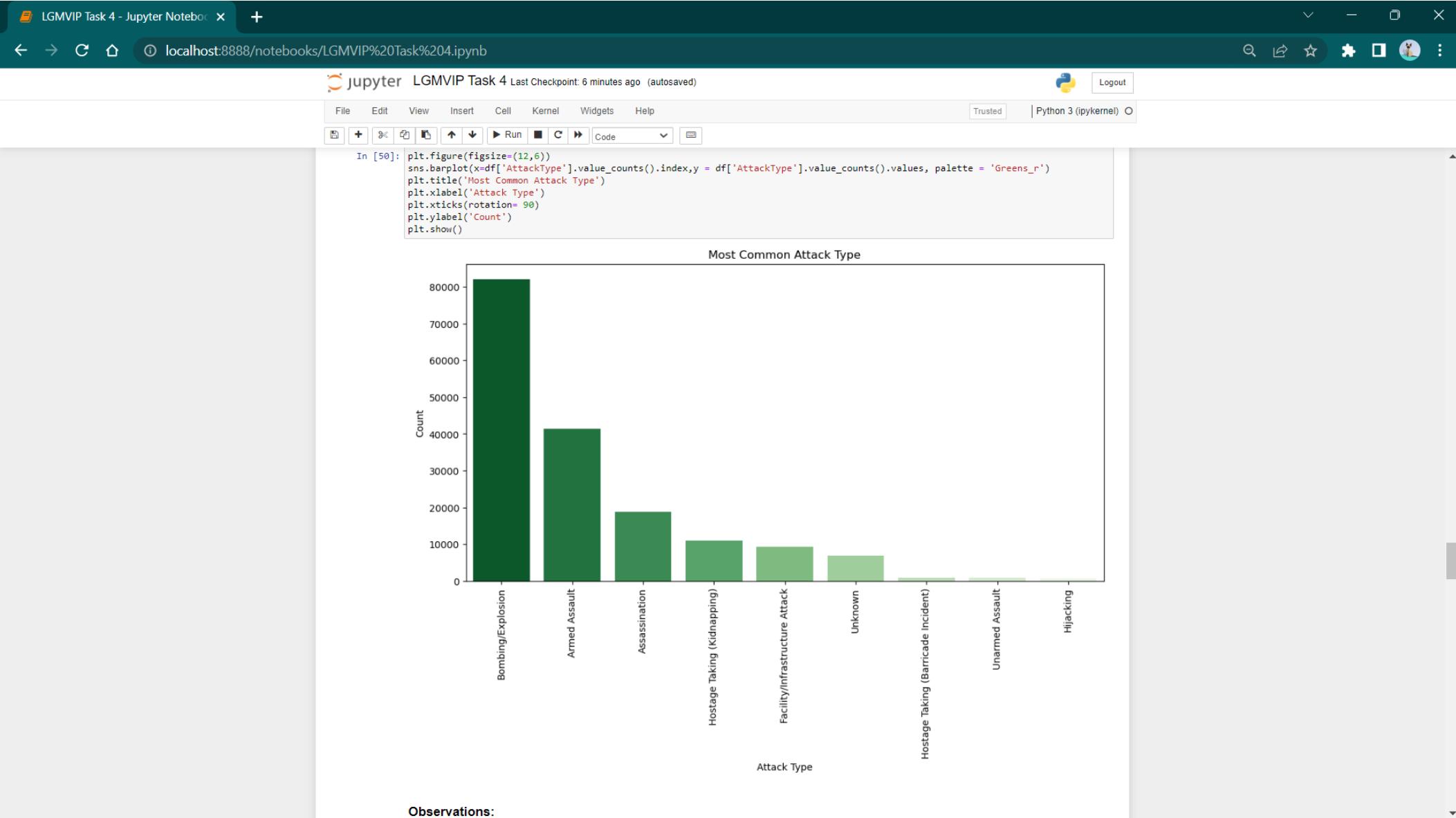


Observations:

Middle East & North America is the most affected region. The most peaceful region is Australia & Oceania with minimum number of terrorist attacks.

```
In [50]: plt.figure(figsize=(12,6))
sns.barplot(x=df['AttackType'].value_counts().index,y = df['AttackType'].value_counts().values, palette = 'Greens_r')
plt.title('Most Common Attack Type')
plt.xlabel('Attack Type')
plt.xticks(rotation= 90)
plt.ylabel('Count')
plt.show()
```

Most Common Attack Type





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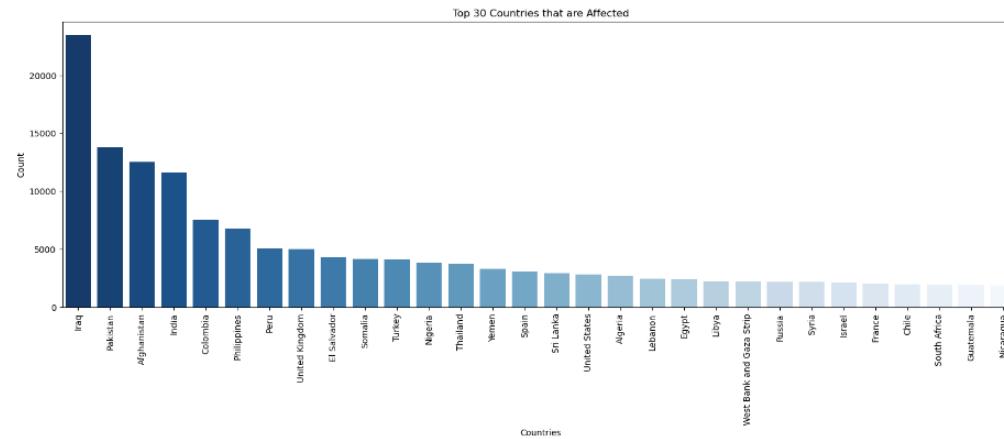
Run Cell Code

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Observations:

The most common attack type is Bombing/Explosion. The least common is hijacking.

```
In [51]: plt.subplots(figsize=(20,6))
sns.barplot(df['Country'].value_counts()[:30].index,df['Country'].value_counts()[:30].values,palette='Blues_r')
plt.title('Top 30 Countries that are Affected')
plt.xlabel('Countries')
plt.ylabel('Count')
plt.xticks(rotation= 90)
plt.show()
```



Observations:

The country that is most affected by these attacks is Iraq, followed by Pakistan and Afghanistan.

```
In [52]: plt.subplots(figsize=(20,6))
sns.barplot(df['State'].value_counts()[:25].index,df['State'].value_counts()[:25].values,palette='viridis')
plt.title('Top States that are Affected')
plt.xlabel('States')
plt.ylabel('Count')
plt.xticks(rotation= 90)
plt.show()
```

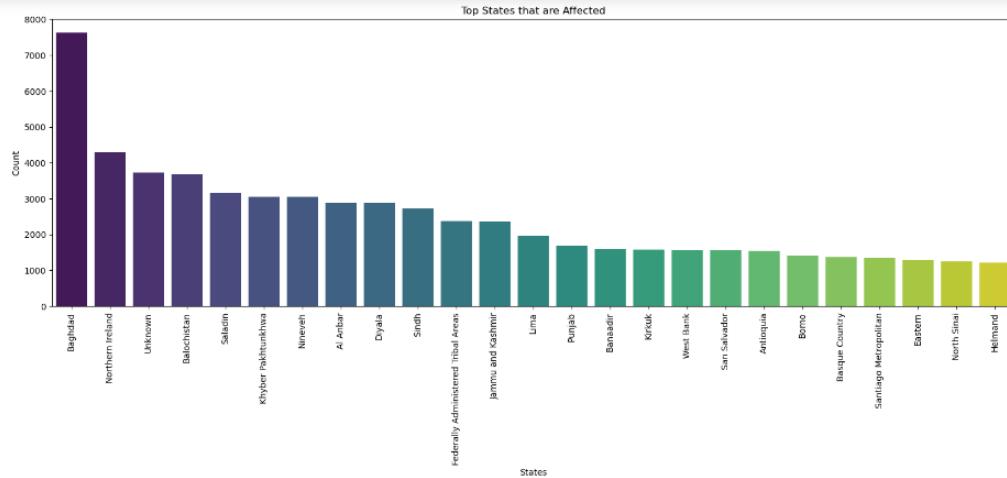




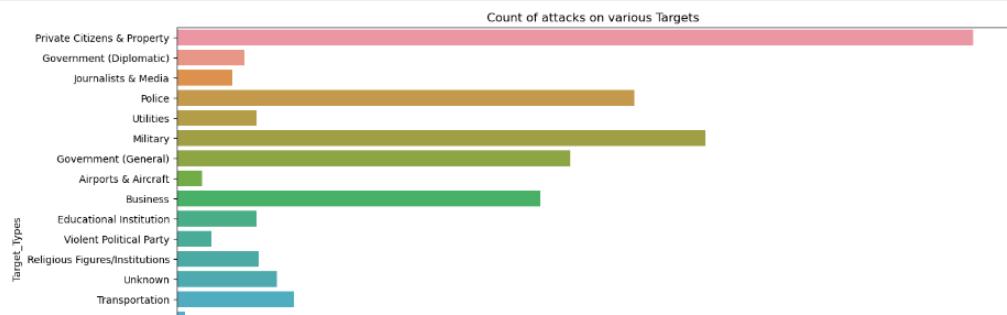
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Python 3 (ipykernel)



```
In [53]: plt.figure(figsize=(15,8))
sns.countplot(y=df['Target_type'])
plt.title('Count of attacks on various Targets ')
plt.xlabel('Counts')
plt.ylabel('Target_Types')
plt.show()
```





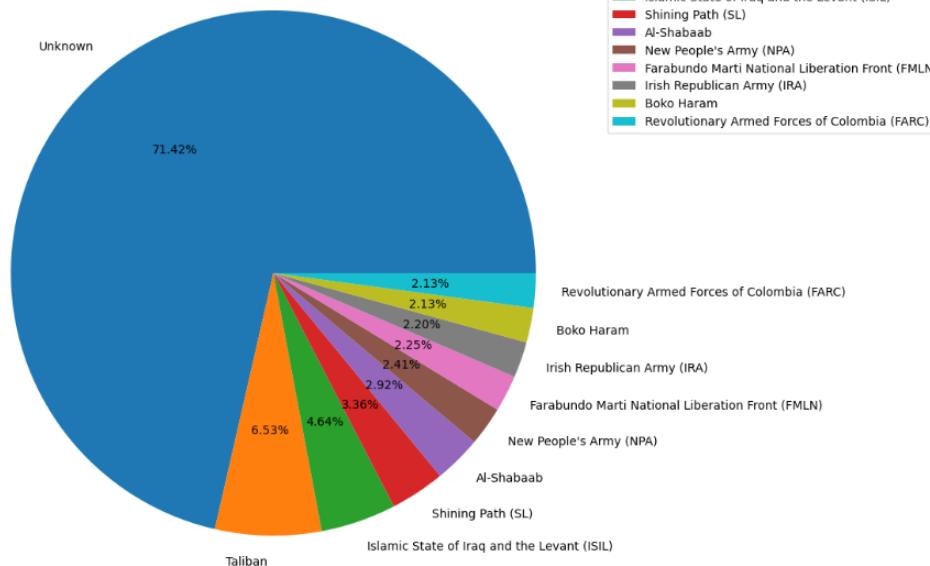
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Code

```
In [54]: plt.figure(figsize = (10, 10))
plt.pie(df['Group'].value_counts()[:10].values, labels=df['Group'].value_counts()[:10].index, autopct='%.1f%%')
plt.title('Top 10 Terrorist Organisations')
plt.legend(bbox_to_anchor=(1.0, 1.0))
plt.show()
```

Top 10 Terrorist Organisations



```
In [55]: Casualties = df.groupby(['Country'], dropna = False)[['Killed', 'Wounded']].sum()
Casualties['Casualties'] = Casualties.Killed + Casualties.Wounded
Casualties_sorted = Casualties.sort_values('Casualties', ascending = False)
Casualties_sorted['Country'] = Casualties_sorted.index
```

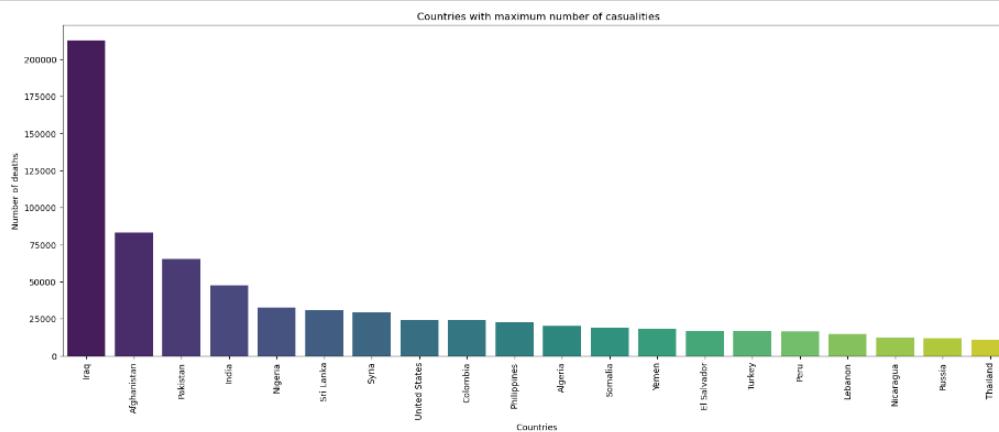
```
In [56]: fig=plt.figure(figsize=(20,7))
sns.barplot(x = Casualties_sorted['Country'][:20], y = Casualties_sorted['Casualties'][:20], palette='viridis')
plt.xlabel("Countries")
```



```
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```

```
In [55]: Casualties = df.groupby(['Country'], dropna = False)[['Killed', 'Wounded']].sum()  
Casualties['Casualties'] = Casualties.Killed + Casualties.Wounded  
Casualties_sorted = Casualties.sort_values('Casualties', ascending = False)  
Casualties_sorted['Country'] = Casualties_sorted.index
```

```
In [56]: fig=plt.figure(figsize=(20,7))  
sns.barplot(x = Casualties_sorted['Country'][:20], y = Casualties_sorted['Casualties'][:20], palette='viridis')  
plt.xlabel("Countries")  
plt.ylabel("Number of deaths")  
plt.xticks(rotation = 90)  
plt.title("Countries with maximum number of casualties")  
plt.show()
```



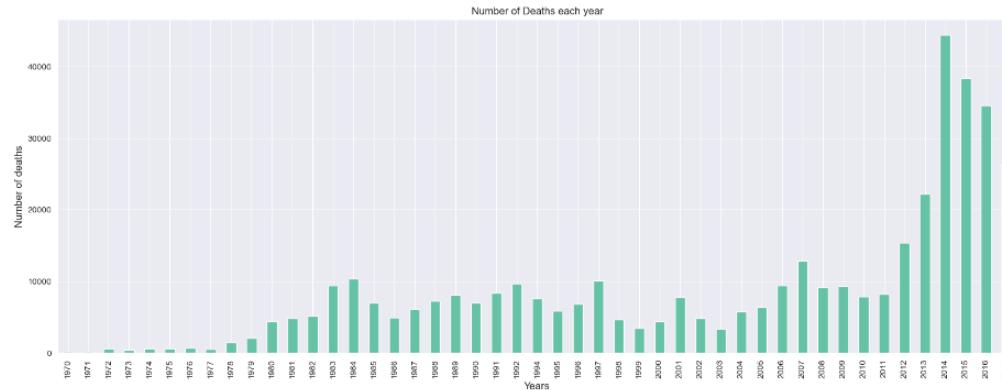
```
In [57]: Death_each_year = df.groupby(['Year'], dropna = False)[['Killed']].sum()  
fig=plt.figure(figsize=(20,7))  
sns.set_style("darkgrid")  
Death_each_year.plot(kind = 'bar', colormap = "Set2")  
plt.xlabel("Years", fontsize = 12)  
plt.ylabel("Number of deaths", fontsize = 12)  
plt.xticks(rotation = 90)  
plt.title("Number of Deaths each year")  
plt.show()
```



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```
In [57]: Death_each_year = df.groupby(['Year'], dropna = False) ['Killed'].sum()
fig=plt.figure(figsize=(20,7))
sns.set_style("darkgrid")
Death_each_year.plot(kind = 'bar', colormap = "Set2")
plt.xlabel("Years", fontsize = 12)
plt.ylabel("Number of deaths", fontsize = 12)
plt.xticks(rotation = 90)
plt.title("Number of Deaths each year")
plt.show()
```



Observations:

The maximum number of casualties were in the year of 2014 after which the deaths have increased significantly.

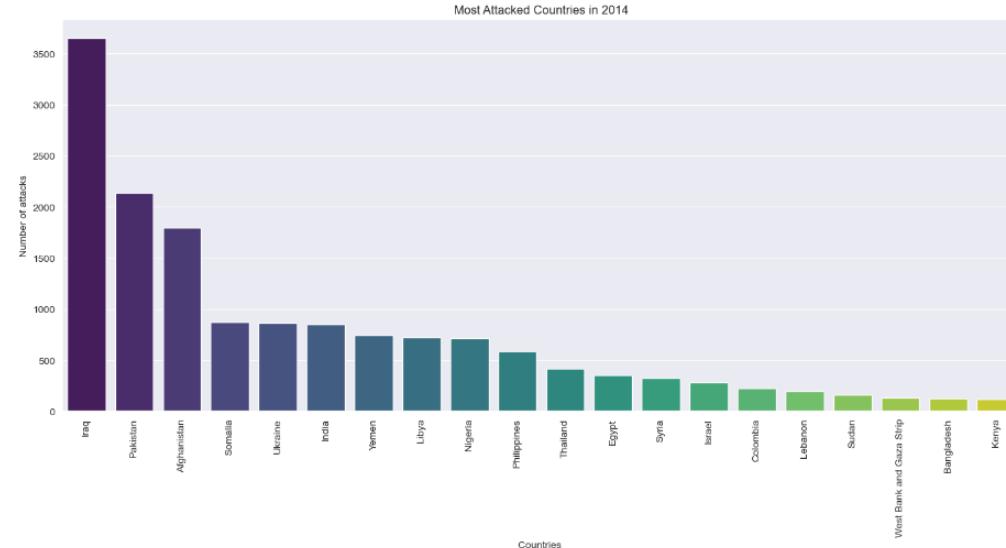
```
In [59]: Attacks_2014 = df[df.Year == 2014]
fig=plt.figure(figsize=(17,7))
sns.barplot(x = Attacks_2014['Country'].value_counts()[:20].index, y = Attacks_2014['Country'].value_counts()[:20].values, palette="Blues")
plt.xlabel("Countries ")
plt.ylabel("Number of attacks")
plt.xticks(rotation = 90)
plt.title("Most Attacked Countries in 2014")
plt.show()
```

Most Attacked Countries in 2014



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```
In [61]: fig=plt.figure(figsize=(17,7))
sns.set_style("darkgrid")
sns.kdeplot(df['Year'], hue = df['Region'])
plt.xlabel("Years")
plt.ylabel("Number of attacks")
plt.title("Number of Terrorist Attacks by Region in each year")
```

```
Out[61]: Text(0.5, 1.0, 'Number of Terrorist Attacks by Region in each year')
```



11

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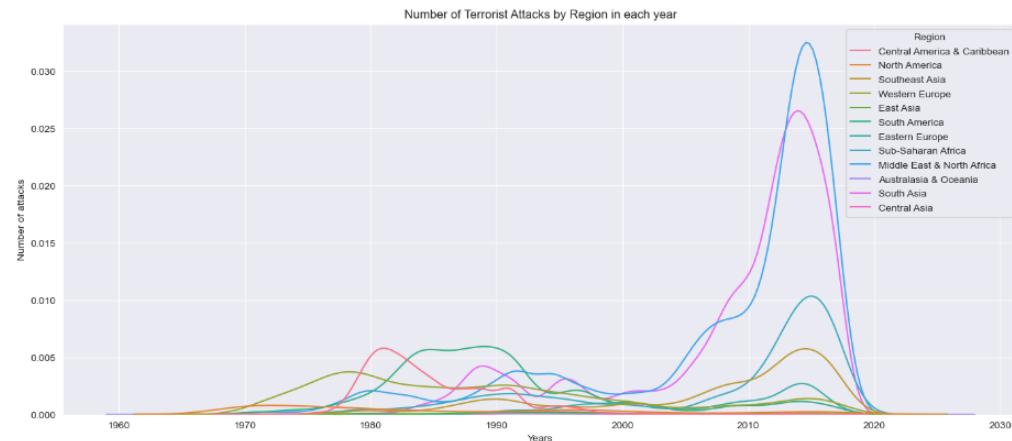
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```
In [61]: fig=plt.figure(figsize=(17,7))
sns.set_style("darkgrid")
sns.kdeplot(df['Year'], hue = df['Region'])
plt.xlabel("Years")
plt.ylabel("Number of attacks")
plt.title("Number of Terrorist Attacks by Region in each year")

Out[61]: Text(0.5, 1.0, 'Number of Terrorist Attacks by Region in each year')
```



CONCLUSION/RESULTS

The insights derived from the Data Analysis on Global Terrorism are:
1.Taliban is the most active terrorist organisation after 2012.

2. There are 205 Countries from 12 Regions covered in the dataset terrorist attack data in 3 years from 1970 to 2017. Overall 181691 terrorist attacks are recorded here which caused about 935737.0 Casualties Consisted of 411868.0 Kills and 523869.0 Wounded.

3. The most peaceful region is Australia & Oceania with minimum number of terrorist attacks.

In []: