Coursera capstone

IBM Applied Data science capstone

Data Analysis Covid-19 pandemic

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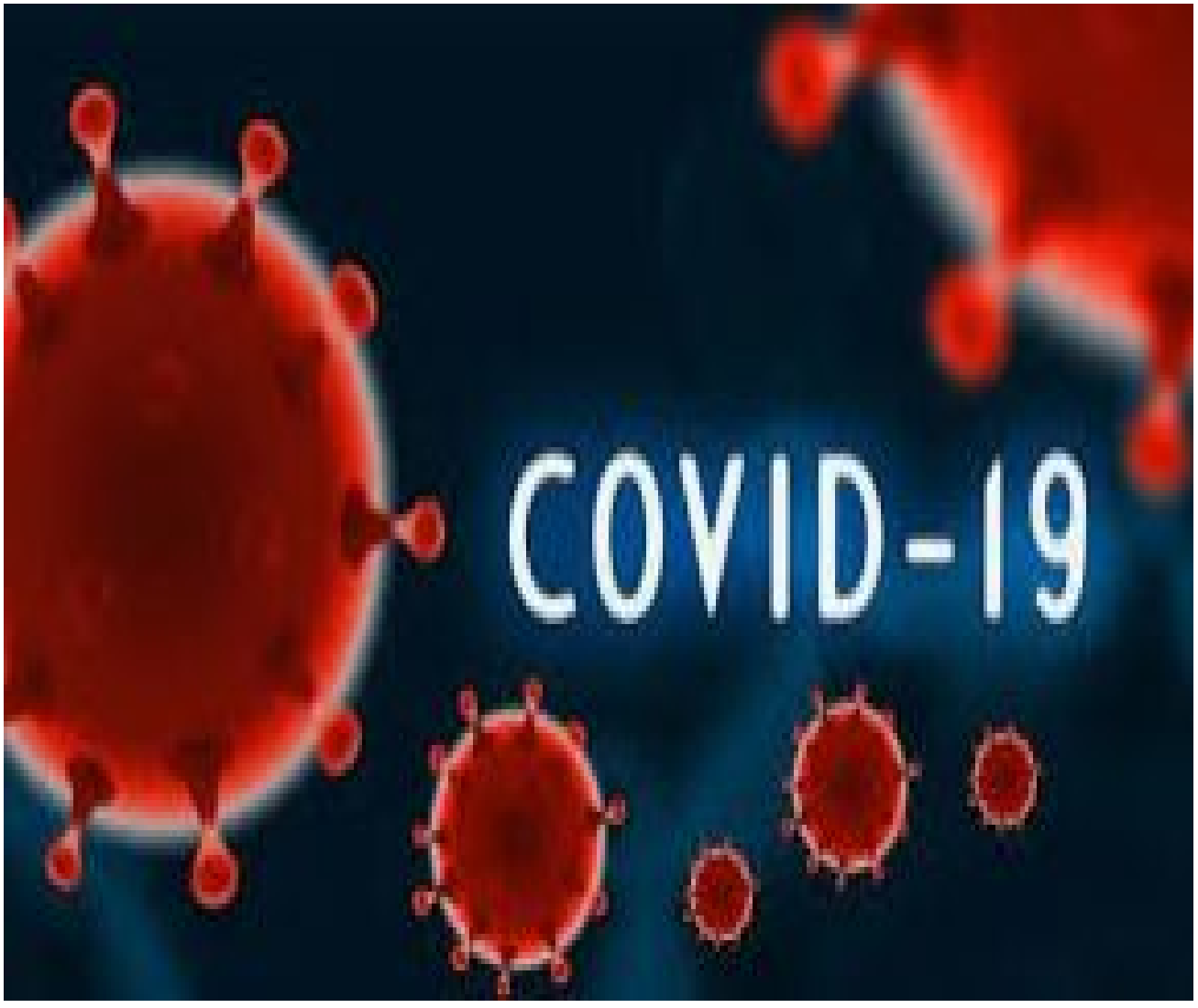


INTRODUCTION

Coronavirus(COVID-19) has become the most buzzed topic these days. COVID-19 is the disease caused by the new coronavirus that emerged in China in December 2019. The source of this virus is believed to be a 'wet market' in Wuhan which sold both dead and live animals including fishes and birds.novel coronavirus has inflicted havoc across the globe for lives and livelihoods. The impact of the pandemic on human lives is severe, but the effects on the global economy and on sustainable development's future are also a concern. The International Monetary Fund already declared that the world is into a recession. The full economic impact of the crisis is still difficult to predict but preliminary estimates are US$2 trillion.

COVID-19 symptoms include cough, fever, shortness of breath,dry cough, headache, pneumonia. COVID-19 can be severe and some cases have caused death.

We will analyze the outbreak of coronavirus across various regions,visualize them using charts and graphs and predict the number of upcoming cases for the next 10 days using linear regression and polynomial regression models in python.The data has information from 31th December 2019 to till .

Collecting data from kaggle

Kaggle is a platform for predictive modelling and analytics competitions in which statisticians and data miners compete to produce the best models for predicting and describing the datasets uploaded by companies and users. This crowdsourcing approach relies on the fact that there are countless strategies that can be applied to any predictive modelling task and it is impossible to know beforehand which technique or analyst will be most effective. On 8 March 2017.Google announced that they were acquiring Kaggle. They will join the Google Cloud team and continue to be a distinct brand. In January 2018, Booz Allen and Kaggle launched Data Science Bowl, a machine learning competition to analyze cell images and identify nuclei.

Methodology

Implementing Polynomial Regression With scikit-learn

Implementing polynomial regression with scikit-learn is very similar to linear regression. There is only one extra step: you need to transform the array of inputs to include non-linear terms such as x^2.

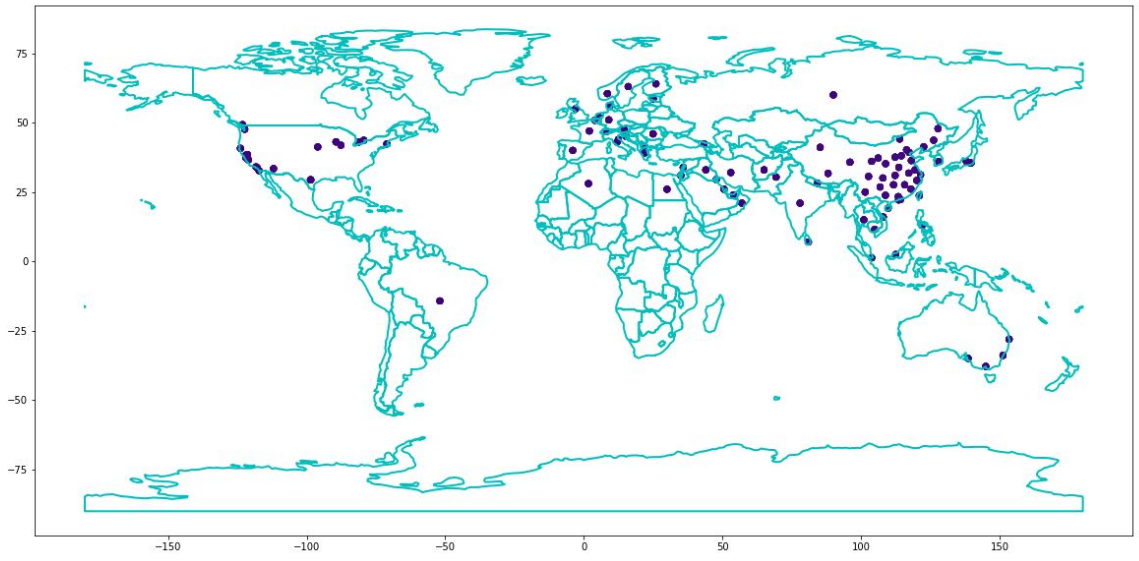
Degree is an integer (2 by default) that represents the degree of the polynomial regression function. In our project, we have taken the degree 3 of polynomial regression for better accuracy.

The result came out through this model is very good and has very good accuracy of

98.7

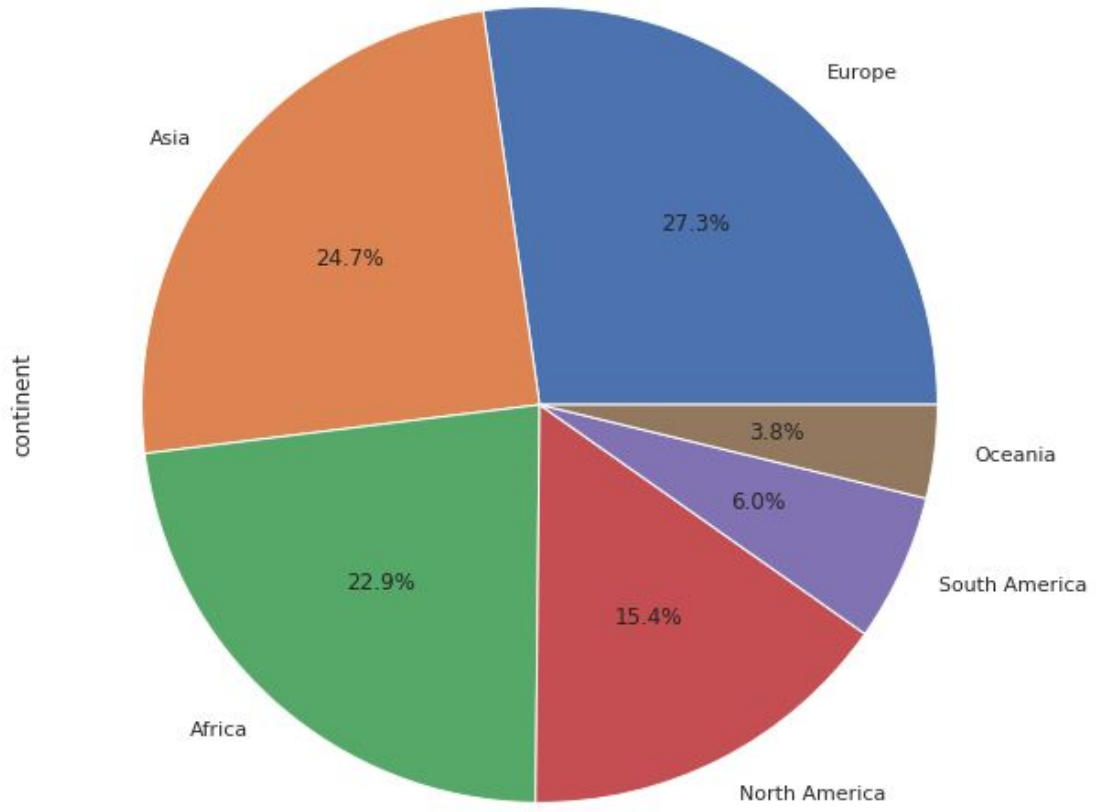
Countries affected by covid-19

```
]: fig, ax = plt.subplots( figsize=(20, 10) )
   gdf01.plot(cmap = 'Purples', ax = ax)
   world.geometry.boundary.plot(color = None, edgecolor = 'c', linewidth = 2, ax = ax) #here edgecolor = 'k' in the tutorial
   plt.show()
```



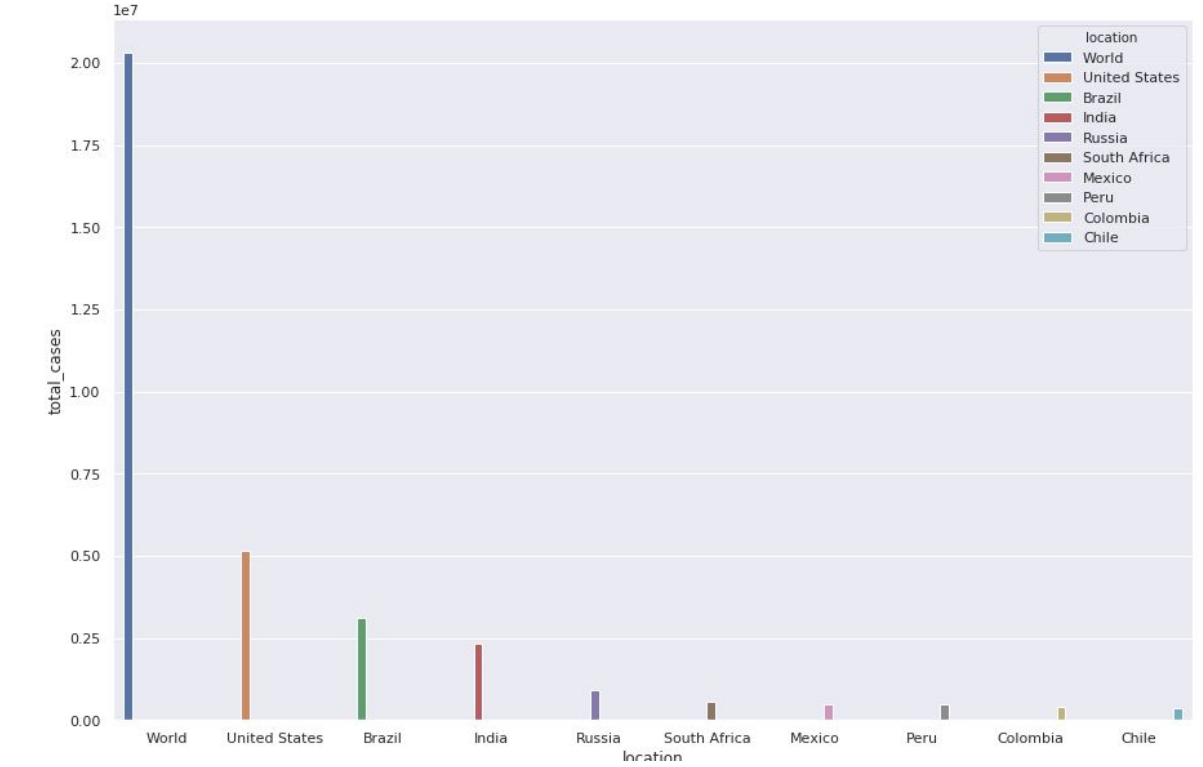
Viewing Percentages per Continent

```
plt.figure(figsize=(15,10))
df['continent'].value_counts().plot.pie(autopct='%1.1f%%')
plt.show()
```



Visualization of top 10 countries having maximum no of cases

```
max_case_countries.loc[:,['location','total_cases']].head(10)
sb.barplot(x='location',y='total_cases',data=max_case_countries[:10],hue='location')
plt.show()
```



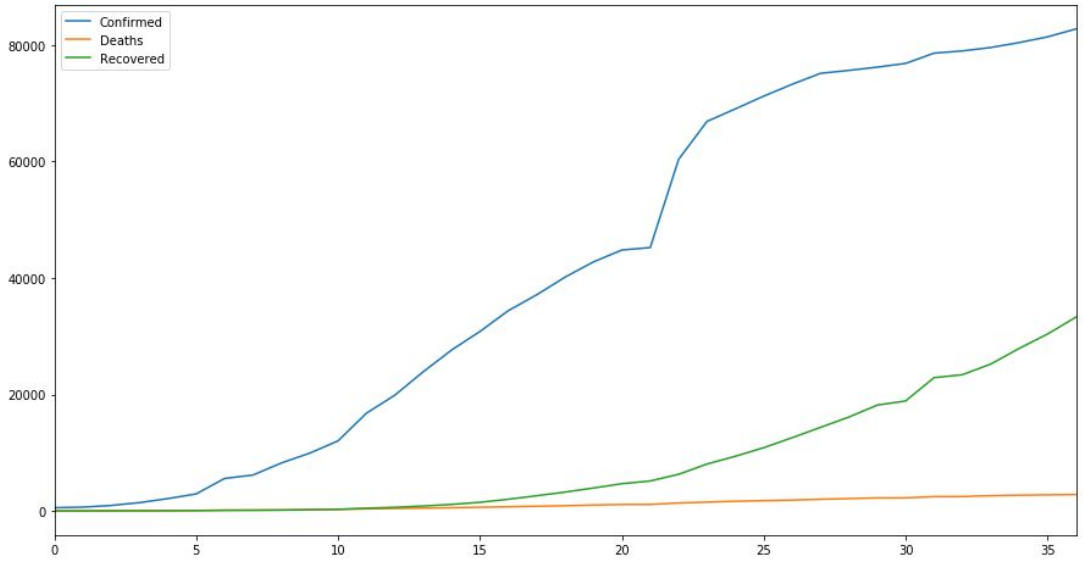
Matplotlib

Matplotlib is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Matplotlib can be used in Python scripts, the Python and IPython shell, the jupyter notebook, web application servers, and four graphical user interface toolkits.

Matplotlib tries to make easy things easy and hard things possible. You can generate plots, histograms, power spectra, bar charts, error charts, scatterplots, etc., with just a few lines of code. For simple plotting the pyplot module provides a MATLAB-like interface, particularly when combined with IPython. For the power user, you have full control of line styles, font properties, axes properties, etc, via an object oriented interface or via a set of functions familiar to MATLAB users.

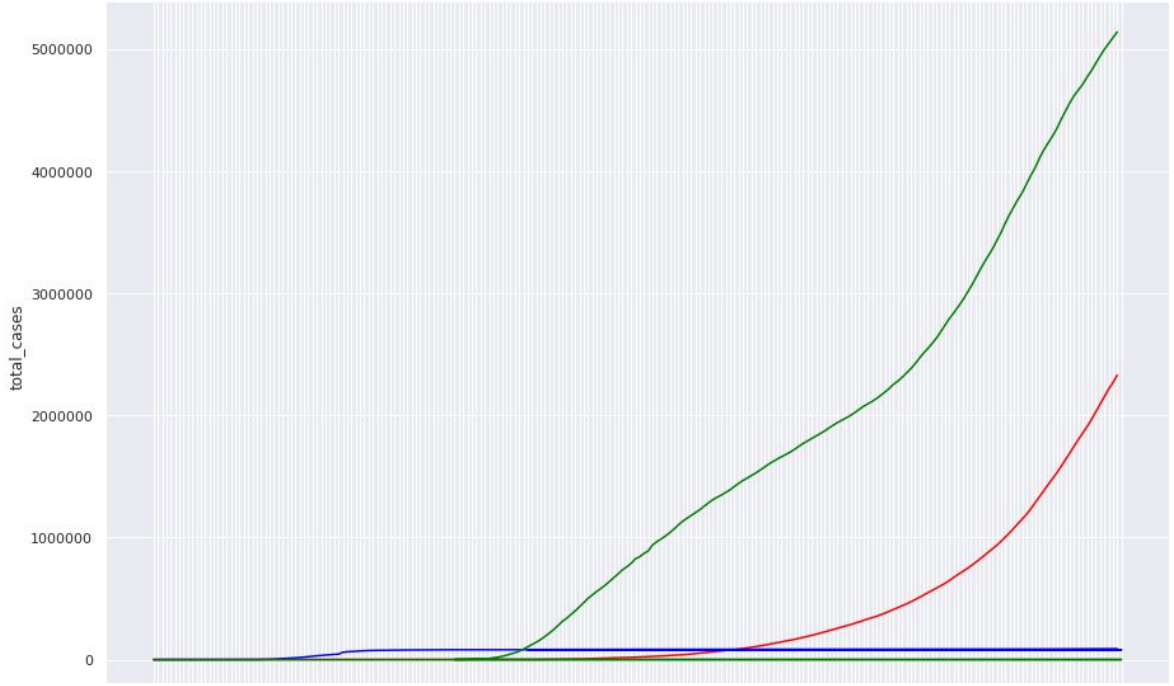
Visualization Confirmed,Deaths,Recovered Cases

```
[58]: df2_by_date[ ['Confirmed', 'Deaths', 'Recovered'] ].plot(kind = 'line', figsize = (15, 8))
Out[58]: <matplotlib.axes._subplots.AxesSubplot at 0x7f65ec65ee10>
```



Comparison of cases between India,China and US

```
sb.lineplot(x='date',y='total_cases',data=india_case,color='red')
sb.lineplot(x='date',y='total_cases',data=china_case,color='blue')
sb.lineplot(x='date',y='total_cases',data=USA_case,color='green')
plt.show()
```



Scikit-learn

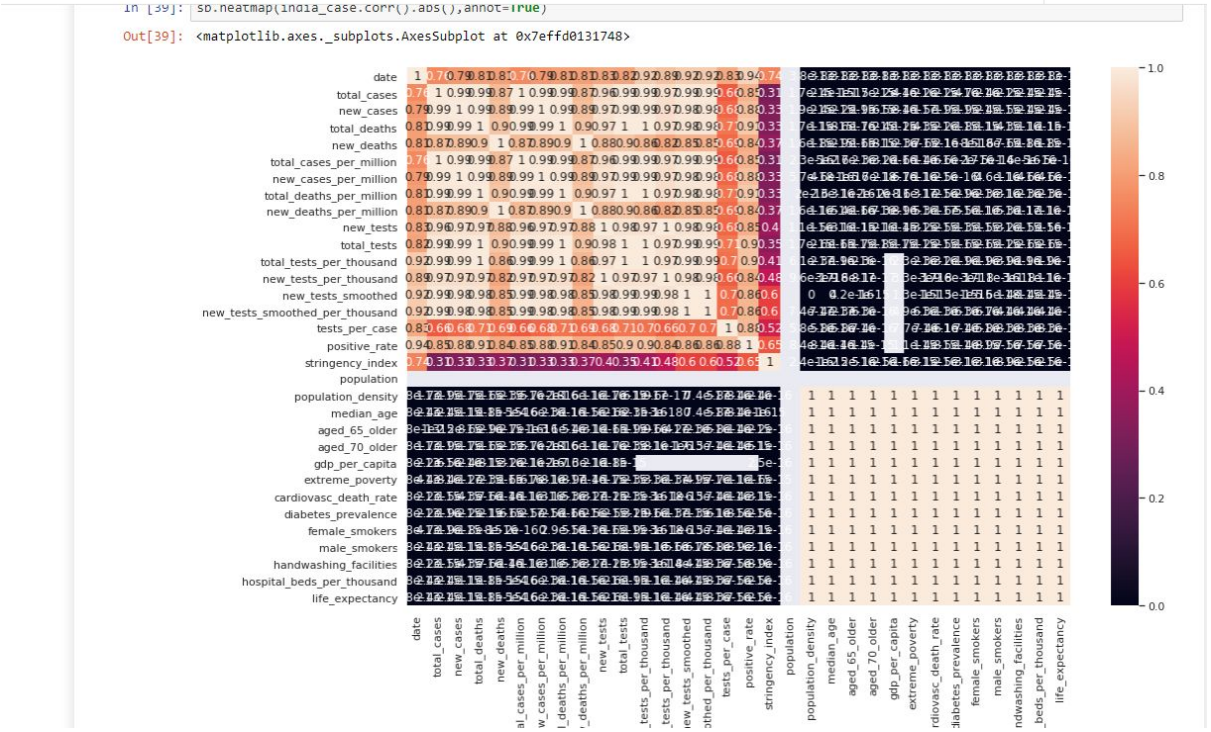
Scikit-learn provides machine learning libraries for python.Some of the features of Scikit-learn includes:

- Simple and efficient tools for data mining and data analysis
- Accessible to everybody, and reusable in various contexts
- Built on NumPy, SciPy, and matplotlib
- Open source, commercially usable - BSD license

Seaborn

Seaborn is a Python visualization library based on matplotlib. It provides a high-level interface for drawing attractive statistical graphics.
Eg:- Heatmap

Heatmap representation (checking correlation)



RESULT

Accuracy achieved with using polynomial regression =98.7%
Error comes out = 0.010

CONCLUSION

COVID-19 is increasing rapidly throughout the world. So we have made this project that is predicting the number of corona cases in upcoming days so that one can take safety measures and precautions in advance.
In this project we have applied a linear regression model first but didn't get good accuracy. So we applied polynomial regression model having 3rd degree to achieve good accuracy