Global_infected

September 30, 2020

```
[1]: import pandas as pd
     import janitor

     def get_data():
         URL_CSV="https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/
      ↪csse_covid_19_data/csse_covid_19_time_series/
      ↪time_series_covid19_confirmed_global.csv"
         df = pd.read_csv(URL_CSV)
         df['Country/Region'] = df['Country/Region'].replace({'US':'United States of␣
      ↪America'})
         return df
     df = get_data()
     df
```

```
[1]:     Province/State      Country/Region        Lat        Long  1/22/20  \
     0              NaN         Afghanistan  33.939110  67.709953        0
     1              NaN             Albania  41.153300  20.168300        0
     2              NaN             Algeria  28.033900   1.659600        0
     3              NaN             Andorra  42.506300   1.521800        0
     4              NaN              Angola -11.202700  17.873900        0
     ..             …                   …        …          …        …
     261            NaN  West Bank and Gaza  31.952200  35.233200        0
     262            NaN      Western Sahara  24.215500 -12.885800        0
     263            NaN               Yemen  15.552727  48.516388        0
     264            NaN              Zambia -13.133897  27.849332        0
     265            NaN            Zimbabwe -19.015438  29.154857        0

          1/23/20  1/24/20  1/25/20  1/26/20  1/27/20  …  9/20/20  9/21/20  \
     0          0        0        0        0        0  …    39044    39074
     1          0        0        0        0        0  …    12385    12535
     2          0        0        0        0        0  …    49826    50023
     3          0        0        0        0        0  …     1564     1681
     4          0        0        0        0        0  …     3991     4117
     ..       …      …      …      …      … …      …      …
     261        0        0        0        0        0  …    35686    36151
     262        0        0        0        0        0  …       10       10
     263        0        0        0        0        0  …     2026     2028
```

```
264        0        0        0        0        0  …      14131    14175
265        0        0        0        0        0  …       7683     7683

      9/22/20  9/23/20  9/24/20  9/25/20  9/26/20  9/27/20  9/28/20  9/29/20
0       39096    39145    39170    39186    39192    39227    39233    39254
1       12666    12787    12921    13045    13153    13259    13391    13518
2       50214    50400    50579    50754    50914    51067    51213    51368
3        1681     1753     1753     1836     1836     1836     1966     1966
4        4236     4363     4475     4590     4672     4718     4797     4905
..        …      …      …      …      …      …      …      …
261     36580    37083    37591    37963    38253    38703    39121    39541
262        10       10       10       10       10       10       10       10
263      2028     2029     2029     2029     2030     2030     2031     2031
264     14389    14443    14491    14515    14612    14641    14660    14715
265      7711     7725     7752     7787     7803     7812     7816     7837

[266 rows x 256 columns]
```

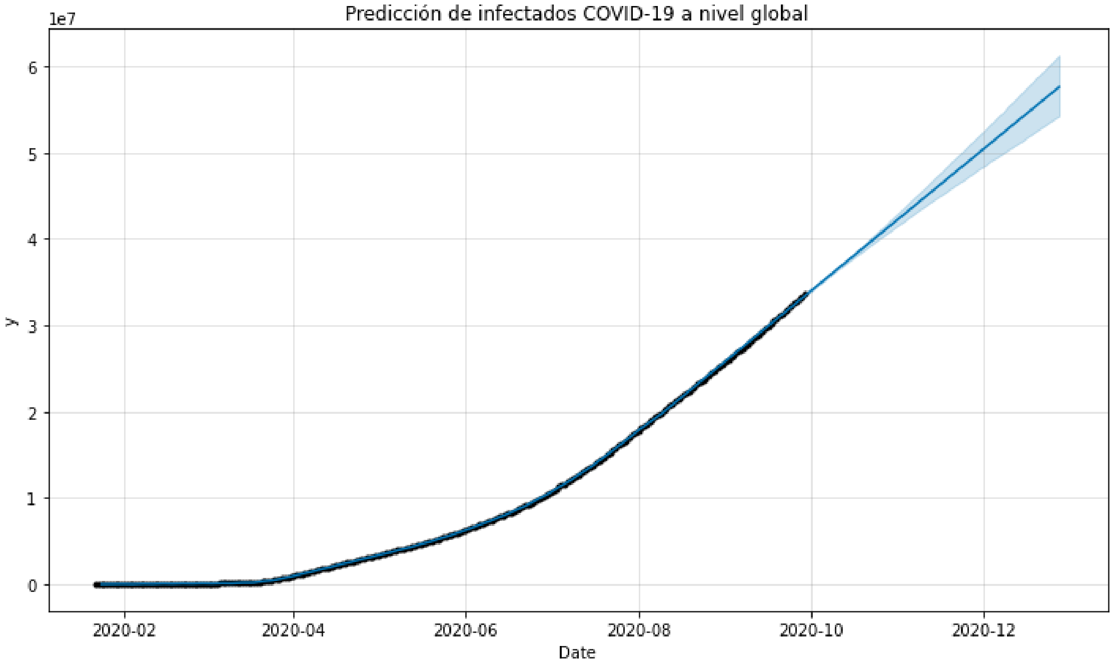
[2]:

```python
import janitor
import pandas as pd
import pandas_flavor as pf
import fbprophet
from matplotlib import pyplot as plt
from IPython.display import display, HTML



LISTA_COLUMNAS_A_BORRAR = ['Province/State', 'Country/Region', 'Lat', 'Long']



df = get_data()
df = df.remove_columns(LISTA_COLUMNAS_A_BORRAR)
df
df = pd.DataFrame( df.sum())
df.columns=['y']
df.index = pd.to_datetime(df.index)
df['ds'] = df.index
df = df.reset_index()


df = df.remove_columns(['index'])


df_prophet = fbprophet.Prophet(changepoint_prior_scale=0.15)
df_prophet.fit(df)
```

```
df_forecast = df_prophet.make_future_dataframe(periods=90, freq='D')
# Make predictions
df_forecast = df_prophet.predict(df_forecast)
df_forecast

df_forecast = df_forecast[df_forecast["yhat"] >= 0]
df_forecast.loc[df_forecast.yhat_lower < 0, 'yhat_lower'] = 0


df_prophet.plot(df_forecast, xlabel = 'Date' )
plt.title('Predicción de infectados COVID-19 a nivel global'    )

display(HTML(pd.DataFrame(df_forecast).to_html()))
```

```
INFO:numexpr.utils:NumExpr defaulting to 8 threads.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
```

```
<IPython.core.display.HTML object>
```



[3]:
```
df = get_data()
df
```

[3]:

```
    Province/State      Country/Region        Lat        Long  1/22/20  \
0              NaN         Afghanistan  33.939110  67.709953        0
1              NaN             Albania  41.153300  20.168300        0
2              NaN             Algeria  28.033900   1.659600        0
3              NaN             Andorra  42.506300   1.521800        0
4              NaN              Angola -11.202700  17.873900        0
..             …                    …        …          …       …
261            NaN  West Bank and Gaza  31.952200  35.233200        0
262            NaN      Western Sahara  24.215500 -12.885800        0
263            NaN               Yemen  15.552727  48.516388        0
264            NaN              Zambia -13.133897  27.849332        0
265            NaN            Zimbabwe -19.015438  29.154857        0

     1/23/20  1/24/20  1/25/20  1/26/20  1/27/20  …  9/20/20  9/21/20  \
0          0        0        0        0        0  …    39044    39074
1          0        0        0        0        0  …    12385    12535
2          0        0        0        0        0  …    49826    50023
3          0        0        0        0        0  …     1564     1681
4          0        0        0        0        0  …     3991     4117
..       …      …      …      …      …  …      …      …
261        0        0        0        0        0  …    35686    36151
262        0        0        0        0        0  …       10       10
263        0        0        0        0        0  …     2026     2028
264        0        0        0        0        0  …    14131    14175
265        0        0        0        0        0  …     7683     7683

     9/22/20  9/23/20  9/24/20  9/25/20  9/26/20  9/27/20  9/28/20  9/29/20
0      39096    39145    39170    39186    39192    39227    39233    39254
1      12666    12787    12921    13045    13153    13259    13391    13518
2      50214    50400    50579    50754    50914    51067    51213    51368
3       1681     1753     1753     1836     1836     1836     1966     1966
4       4236     4363     4475     4590     4672     4718     4797     4905
..     …      …      …      …      …      …      …      …
261    36580    37083    37591    37963    38253    38703    39121    39541
262       10       10       10       10       10       10       10       10
263     2028     2029     2029     2029     2030     2030     2031     2031
264    14389    14443    14491    14515    14612    14641    14660    14715
265     7711     7725     7752     7787     7803     7812     7816     7837

[266 rows x 256 columns]
```

[4]:

```python
import janitor
import datetime
import numpy as np

def pipeline_populations():
    """ Cogemos un dataframe de poblaciones"""
    URL="https://population.un.org/wpp/Download/Files/1_Indicators%20(Standard)/
↪CSV_FILES/WPP2019_TotalPopulationBySex.csv"
    THIS_YEAR = datetime.datetime.now().year

    return (
        pd.read_csv(URL)
        .filter_on( f""" Time  ==  {THIS_YEAR} & Variant == "Medium" """ )
        .select_columns(['Location','PopTotal'])
        .join_apply(lambda x: x['PopTotal'] * 1000 ,␣
↪new_column_name="PopMillions" )
        .remove_columns(['PopTotal'])
        .rename_column('PopMillions' , 'PopTotal')
        .transform_column('PopTotal',np.int64)
        .rename_column('Location' , 'Country/Region')
    )


populations = pipeline_populations()
populations
```

[4]:

```
                                     Country/Region    PopTotal
70                                      Afghanistan    38928341
954                                          Africa  1340598113
1838                                  African Group  1338826591
1989                                  African Union  1339423920
2140                   African Union: Central Africa   158619638
…                                                 …           …
277315                                        World  7794798728
278199  World Bank Regional Groups (developing only)  6528762227
278350                                        Yemen    29825967
279234                                       Zambia    18383956
280118                                     Zimbabwe    14862927

[477 rows x 2 columns]
```

[5]:

```
df = get_data()
df_country = pd.DataFrame()
df_country['Country/Region'] = df['Country/Region']
df_country['infected last_day'] = df.iloc[:,-1] - df.iloc[:,-2]
df_country.set_index('Country/Region')
df_country
```

[5]:

```
         Country/Region  infected last_day
0           Afghanistan                 21
1               Albania                127
2               Algeria                155
```

```
3               Andorra                   0
4                Angola                 108
..                  …                 …
261  West Bank and Gaza                 420
262      Western Sahara                   0
263               Yemen                   0
264              Zambia                  55
265            Zimbabwe                  21

[266 rows x 2 columns]
```

[6]:
```
df_country_enrich = pd.merge(df_country, populations, on="Country/Region")
df_country_enrich['Infected/Million'] =  1000000 * df_country_enrich['infected␣
↪last_day'] / df_country_enrich['PopTotal']
df_country = df_country_enrich
```

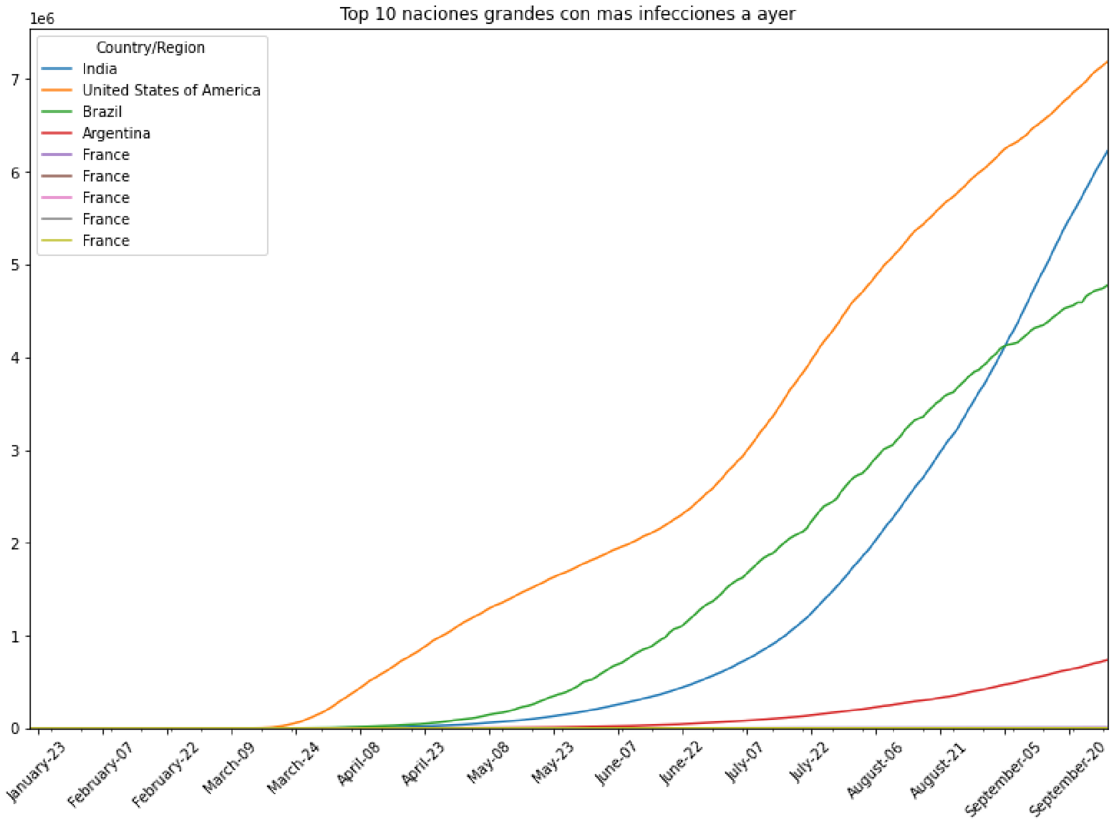
[7]:
```
df_country.sort_values(by='Infected/Million', ascending=False).head(10)
```

[7]:
```
    Country/Region  infected last_day  PopTotal  Infected/Million
140         Israel               3661   8655541        422.966051
177    Netherlands               6880  17134873        401.520338
19         Bahrain                574   1701582        337.333141
6        Argentina              13477  45195777        298.191577
168     Montenegro                134    628062        213.354732
92         Czechia               1960  10708982        183.023933
119         France              11858  65273512        181.666340
88      Costa Rica                890   5094114        174.711441
18         Bahamas                 65    393248        165.290097
150        Lebanon               1105   6825441        161.894301
```

[8]:
```
from datetime import datetime, timedelta
import seaborn as sns
from matplotlib import pyplot as plt
import matplotlib.dates as mdates


def pintar_grafico(df, array_naciones_pintar ,title):
    df = df.T
    df = df.iloc[1:]
    new_header = df.iloc[0] #grab the first row for the header
    df = df[1:] #take the data less the header row
    df.columns = new_header #set the header row as the df header
    df = df.iloc[2:]
    df.index = pd.to_datetime(df.index)
    df = df[array_naciones_pintar]
    df = df.iloc[:, : 9]
    chart_df = df
    pd.plotting.register_matplotlib_converters()
    chart_df.plot(legend=True,figsize=(13.5,9))

    plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%B-%d'))
    plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=15))
    plt.xticks(rotation=45)

    ax = plt.gca()

    ax.set_title(title)
    ax.set_ylim(ymin=0)

    plt.show()

    #df.tail(30).style.format ({ c : "{:20,.0f}" for c in df.columns }).
 ↪background_gradient(cmap='Wistia', )
    return plt
```

```
[9]: title="Top 10 naciones grandes con mas infecciones a ayer"
     display(HTML(f"""<h1 id='{title}'>{title}</h1>"""))
     df = get_data()

     naciones_pintar = df_country.sort_values(by='infected last_day',␣
      ↪ascending=False).head(10)['Country/Region'].values
     df_country.sort_values(by='infected last_day', ascending=False).head(10)

     pintar_grafico(df,naciones_pintar,title)
```

```
<IPython.core.display.HTML object>
```



```
[9]: <module 'matplotlib.pyplot' from
     '/root/anaconda2/envs/jupyter/lib/python3.6/site-packages/matplotlib/pyplot.py'>
```

```
[10]: def pintar_grafico_daily(df, array_naciones_pintar ,title):
          df = df.T
          df = df.iloc[1:]
          new_header = df.iloc[0] #grab the first row for the header
          df = df[1:] #take the data less the header row
          df.columns = new_header #set the header row as the df header
          df = df.iloc[2:]
          df.index = pd.to_datetime(df.index)
          df = df[array_naciones_pintar]
          chart_df = df

          pd.plotting.register_matplotlib_converters()

          df_daily_increments = pd.DataFrame()
          for country in chart_df.columns:
              df_daily_increments[country] = chart_df[country].pct_change().
       ↪rolling(window=7).mean()
```

```
    df_daily_increments

    chart_df = df_daily_increments
    chart_df.tail(45).plot(legend=True,figsize=(13.5,9))

    plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%B-%d'))
    plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=15))
    plt.xticks(rotation=45)

    ax = plt.gca()

    ax.set_title(title)
    ax.set_ylim(ymin=0)

    plt.show()

    chart_df.tail(30).style.format ({ c : "{:20,.2f}" for c in df.columns }).
 ↪background_gradient(cmap='Wistia', )


    return chart_df


#pintar_grafico_daily(df,naciones_pintar,"Top 10 countries more cases, daily␣
 ↪percentage change")
df_country
```

[10]:

```
      Country/Region  infected last_day  PopTotal  Infected/Million
0        Afghanistan                 21  38928341          0.539453
1            Albania                127   2877800         44.130933
2            Algeria                155  43851043          3.534694
3            Andorra                  0     77265          0.000000
4             Angola                108  32866267          3.286044
..               …                  …       …               …
241       Uzbekistan                578  33469199         17.269610
242   Western Sahara                  0    597330          0.000000
243            Yemen                  0  29825967          0.000000
244           Zambia                 55  18383956          2.991739
245         Zimbabwe                 21  14862927          1.412911

[246 rows x 4 columns]
```

[11]:

```
#pintar_grafico_daily(df,naciones_pintar,"Top 10 countries more cases, daily␣
 ↪percentage change")
```

[ ]: