# Global_infected

September 21, 2020

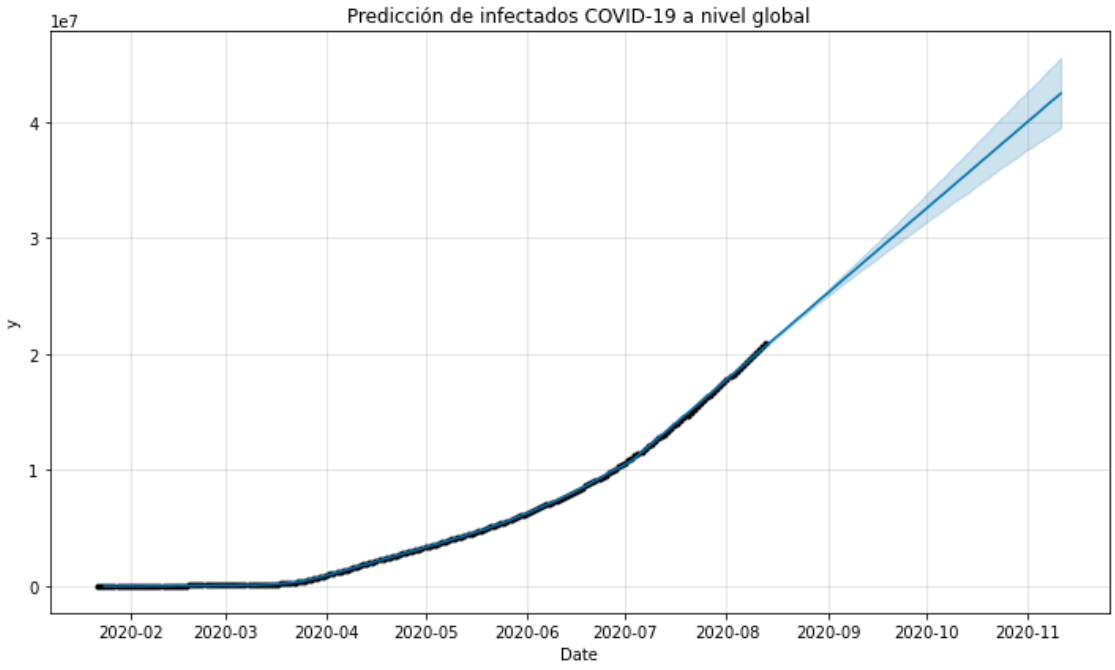
[23]:
```
import pandas as pd
import janitor

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()
```

[24]:
```
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: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>
```



[25]:
```
df = get_data()
```

[26]:
```
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
```

[26]:

| | 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]

[27]:
```
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
```

[27]:

| | Country/Region | infected last_day |
|---|---|---|
| 0 | Afghanistan | 79 |
| 1 | Albania | 154 |
| 2 | Algeria | 488 |
| 3 | Andorra | 4 |
| 4 | Angola | 53 |
| .. | … | … |
| 261 | West Bank and Gaza | 307 |
| 262 | Western Sahara | 0 |
| 263 | Yemen | 6 |
| 264 | Zambia | 162 |
| 265 | Zimbabwe | 97 |

[266 rows x 2 columns]

[28]:
```
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
```

[29]:
```
df_country.sort_values(by='infected last_day', ascending=False).head(10)
```

[29]:

| | Country/Region | infected last_day | PopTotal | Infected/Million |
|---|---|---|---|---|
| 136 | India | 64553 | 1380004385 | 46.777388 |
| 29 | Brazil | 60091 | 212559409 | 282.702141 |
| 225 | United States of America | 51443 | 331002647 | 155.415676 |
| 86 | Colombia | 11286 | 50882884 | 221.803465 |
| 189 | Peru | 8875 | 32971845 | 269.169044 |
| 212 | Spain | 7550 | 46754782 | 161.480809 |
| 6 | Argentina | 7498 | 45195777 | 165.900456 |
| 165 | Mexico | 7371 | 128932753 | 57.169337 |
| 210 | South Africa | 3946 | 59308690 | 66.533252 |
| 138 | Iraq | 3841 | 40222503 | 95.493809 |

[ ]:
```

```

[30]:
```
#df_country['Country/Region'].unique()
```

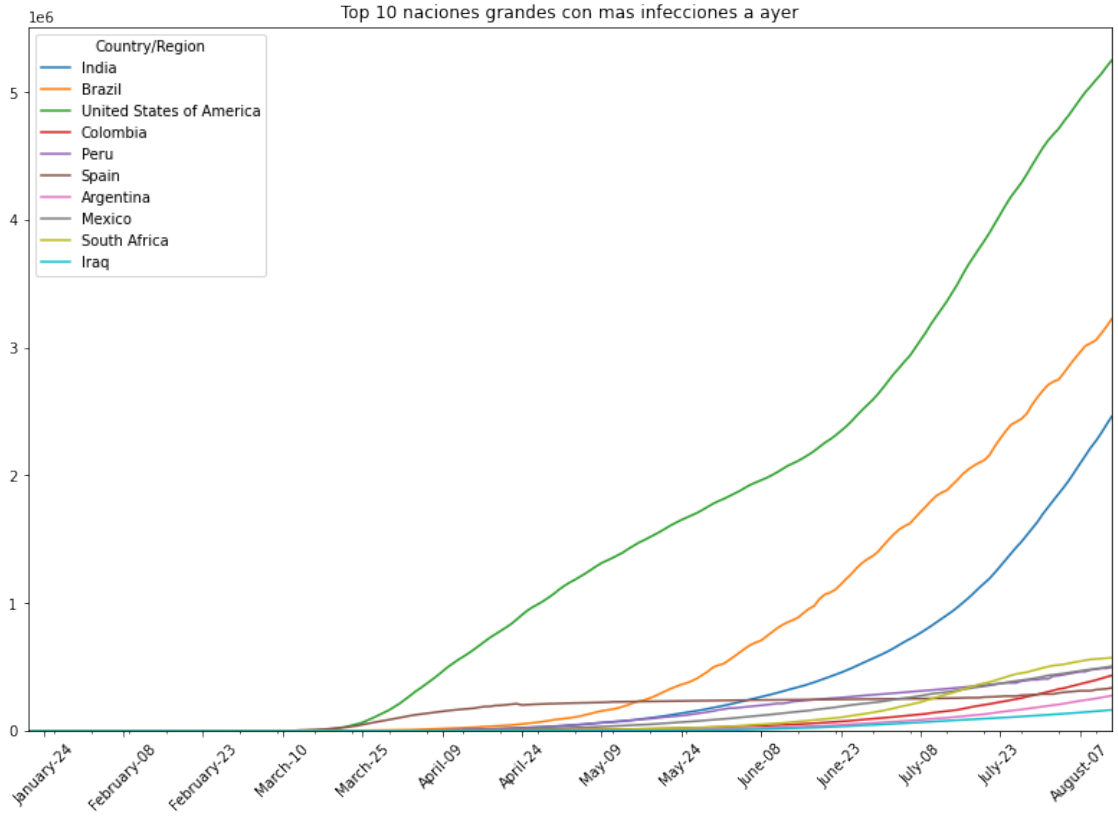
[19]:
```
#populations['Country/Region'].unique()
```

[31]:
```
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]
    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
```

[32]:
```
title="Top 10 naciones grandes con mas infecciones a ayer"
display(HTML(f"""<h1 id='{title}'>{title}</h1>"""))

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)
```

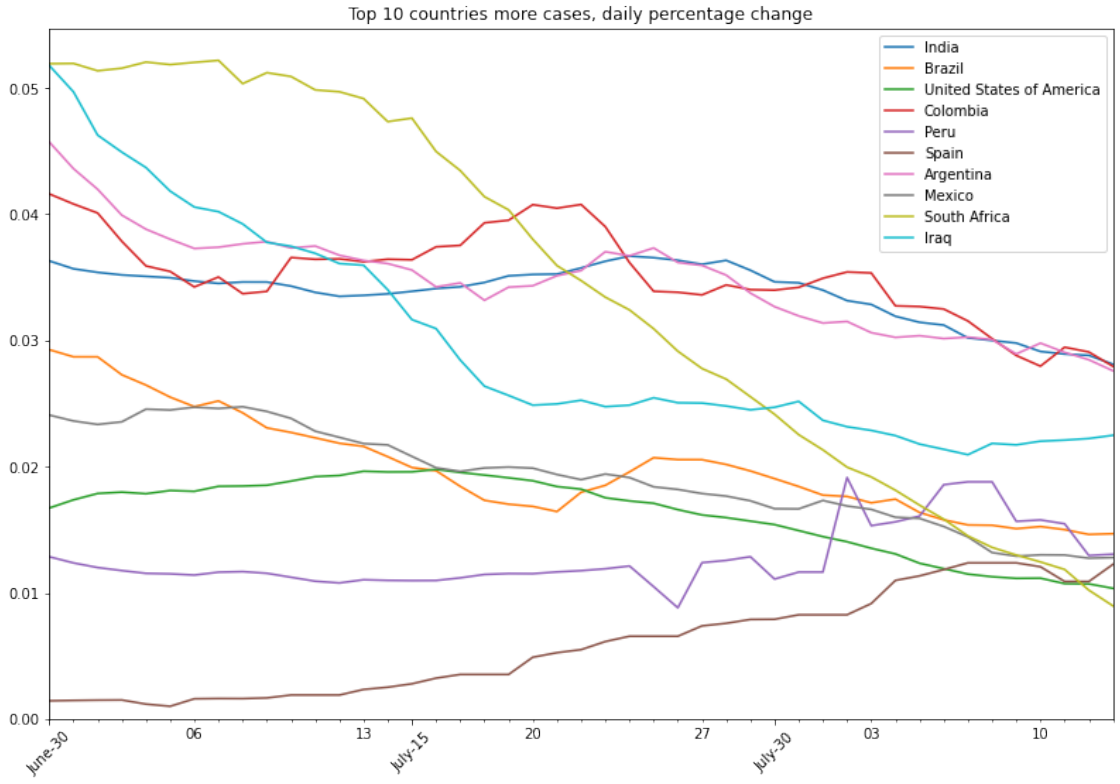
```
<IPython.core.display.HTML object>
```




[32]:
```
<module 'matplotlib.pyplot' from
'/root/anaconda2/envs/jupyter/lib/python3.6/site-packages/matplotlib/pyplot.py'>
```

[45]:
```
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")
```



[45]:

| | India | Brazil | United States of America | Colombia | Peru | \ |
|---|---|---|---|---|---|---|
| 2020-01-22 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-23 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-24 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-25 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-26 | NaN | NaN | NaN | NaN | NaN | |
| … | … | … | … | … | … | |
| 2020-08-09 | 0.029785 | 0.015084 | 0.011148 | 0.028803 | 0.015665 | |
| 2020-08-10 | 0.029120 | 0.015252 | 0.011163 | 0.027955 | 0.015776 | |
| 2020-08-11 | 0.028916 | 0.015009 | 0.010731 | 0.029458 | 0.015472 | |
| 2020-08-12 | 0.028811 | 0.014629 | 0.010712 | 0.029080 | 0.012960 | |
| 2020-08-13 | 0.028112 | 0.014686 | 0.010358 | 0.027938 | 0.013065 | |

| | Spain | Argentina | Mexico | South Africa | Iraq |
|---|---|---|---|---|---|
| 2020-01-22 | NaN | NaN | NaN | NaN | NaN |
| 2020-01-23 | NaN | NaN | NaN | NaN | NaN |
| 2020-01-24 | NaN | NaN | NaN | NaN | NaN |
| 2020-01-25 | NaN | NaN | NaN | NaN | NaN |
| 2020-01-26 | NaN | NaN | NaN | NaN | NaN |
| … | … | … | … | … | … |
| 2020-08-09 | 0.012376 | 0.028923 | 0.012907 | 0.012997 | 0.021723 |
| 2020-08-10 | 0.012067 | 0.029780 | 0.013009 | 0.012449 | 0.022013 |
| 2020-08-11 | 0.010904 | 0.029051 | 0.012996 | 0.011854 | 0.022099 |
| 2020-08-12 | 0.010898 | 0.028465 | 0.012747 | 0.010217 | 0.022225 |
| 2020-08-13 | 0.012259 | 0.027590 | 0.012795 | 0.008969 | 0.022481 |

[205 rows x 10 columns]

[43]:
```
country='India'
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
```

[43]:

| | India | Brazil | United States of America | Colombia | Peru | \ |
|---|---|---|---|---|---|---|
| 2020-01-22 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-23 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-24 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-25 | NaN | NaN | NaN | NaN | NaN | |
| 2020-01-26 | NaN | NaN | NaN | NaN | NaN | |
| … | … | … | … | … | … | |
| 2020-08-09 | 0.029785 | 0.015084 | 0.011148 | 0.028803 | 0.015665 | |
| 2020-08-10 | 0.029120 | 0.015252 | 0.011163 | 0.027955 | 0.015776 | |

```
2020-08-11  0.028916  0.015009                  0.010731  0.029458  0.015472
2020-08-12  0.028811  0.014629                  0.010712  0.029080  0.012960
2020-08-13  0.028112  0.014686                  0.010358  0.027938  0.013065

               Spain  Argentina    Mexico  South Africa      Iraq
2020-01-22       NaN        NaN       NaN           NaN       NaN
2020-01-23       NaN        NaN       NaN           NaN       NaN
2020-01-24       NaN        NaN       NaN           NaN       NaN
2020-01-25       NaN        NaN       NaN           NaN       NaN
2020-01-26       NaN        NaN       NaN           NaN       NaN
…                …          …         …             …         …
2020-08-09  0.012376   0.028923  0.012907      0.012997  0.021723
2020-08-10  0.012067   0.029780  0.013009      0.012449  0.022013
2020-08-11  0.010904   0.029051  0.012996      0.011854  0.022099
2020-08-12  0.010898   0.028465  0.012747      0.010217  0.022225
2020-08-13  0.012259   0.027590  0.012795      0.008969  0.022481

[205 rows x 10 columns]
```

[12]:
```
#title="Top 10 naciones grandes con mas infeccionesa ayer en infectados/millon"
#display(HTML(f"""<h1 id='{title}'>{title}</h1>"""))

#naciones_pintar = df_country.filter_on("PopTotal > 25000000").
 ↪sort_values(by='Infected/Million', ascending=False).head(10)['Country/
 ↪Region'].values
#df_country.sort_values(by='infected last_day', ascending=False).head(10)

#pintar_grafico(df_country,naciones_pintar,title)
```

[ ]:
```

```