# University of Colima.

# Faculty of Mechanical and Electrical Engineering.

# Intelligent Computing Engineering.

UNIVERSIDAD DE COLIMA


# Data Analysis and Visualization.

# Exploring Climate Data with Plotly.

# 6°D.

# Date: 14/05/2024.

# Place: Mexico, Colima, Coquimatlan.

# CRISTIAN ARMANDO LARIOS BRAVO.

# PLOTLY LIBRARY

In [ ]:
```
# Include libraries
import plotly.express as px
import seaborn as sns
import pandas as pd
```

In [ ]:
```
# We load intern dataset which contains parameters of wind
wind = px.data.wind()
wind.head()
```

Out[ ]:

| | direction | strength | frequency |
|---|---|---|---|
| **0** | N | 0-1 | 0.5 |
| **1** | NNE | 0-1 | 0.6 |
| **2** | NE | 0-1 | 0.5 |
| **3** | ENE | 0-1 | 0.4 |
| **4** | E | 0-1 | 0.4 |

In [ ]:
```
wind.shape
```

Out[ ]:
```
(128, 3)
```

In [ ]:
```
# Create a scatter plot on a polar graphic
px.scatter_polar(data_frame=wind, r="strength", theta="direction")
```

In [ ]:
```
# Create a scatter plot on a polar graphic
# Graphical parameters JSON
ax = px.scatter_polar(data_frame=wind, r="strength", theta="direction")
print(ax)
```

```
Figure({
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              'legendgroup': '',
              'marker': {'color': '#636efa', 'symbol': 'circle'},
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              'name': '',
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-6', '5-6',
                          '5-6', '5-6', '6+', '6+', '6+', '6+', '6+', '6+', '6+', '6
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                              'SE', 'SSE', 'S', 'SSW', 'SW', 'WSW', 'W', 'WNW', 'N
W', 'NNW', 'N',
                              'NNE', 'NE', 'ENE', 'E', 'ESE', 'SE', 'SSE', 'S', 'SS
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                              'W', 'WNW', 'NW', 'NNW', 'N', 'NNE', 'NE', 'ENE', 'E',
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                              'ENE', 'E', 'ESE', 'SE', 'SSE', 'S', 'SSW', 'SW', 'WS
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                              'NW', 'NNW', 'N', 'NNE', 'NE', 'ENE', 'E', 'ESE', 'S
E', 'SSE', 'S',
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```

```
ject),
              'type': 'scatterpolar'}],
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               'polar': {'angularaxis': {'direction': 'clockwise', 'rotation': 90},
                         'domain': {'x': [0.0, 1.0], 'y': [0.0, 1.0]}},
               'template': '...'}
})
```

In [ ]:
```
# Create a scatter plot on a polar graphic
# Add color
px.scatter_polar(data_frame=wind, r="strength", theta="direction", color="frequency
```

In [ ]:
```
# Create a scatter plot on a polar graphic
# Add size
bx = px.scatter_polar(data_frame=wind, r="strength", theta="direction", color="freq
```

In [ ]:
```
# Create a line plot on a polar graphic
px.line_polar(data_frame=wind, r="frequency", theta="direction",
              color="strength", line_close=True, title="Strength frequent wind")
```

In [ ]:
```
# Save the plot as a HTML file
bx.write_html("scatterBubble.html")
print("HTML file was created successfully!")
```

```
HTML file was created successfully!
```

In [ ]:
```
# Create a bar plot on a polar graphic
px.bar_polar(data_frame=wind, r="frequency", theta="direction", color="strength",
             color_discrete_sequence=px.colors.sequential.Plasma_r, template="plotl
```

In [ ]:
```
# Save the plot as a HTML file
ax.write_html("scatter.html")
print("HTML file was created successfully!")
```

```
HTML file was created successfully!
```

## Summary in English

Plotly offers a powerful toolkit for exploring climatological data, which is crucial in understanding and addressing climate change. With Plotly, I can create interactive visualizations that allow me to delve deep into the complexities of climate patterns and trends.

One of the key benefits of using Plotly is its ability to handle large datasets with ease. Whether I'm analyzing temperature fluctuations, precipitation levels, or atmospheric compositions, Plotly enables me to visualize these data points in a meaningful way, uncovering patterns and correlations that might otherwise go unnoticed.

Furthermore, Plotly's interactive features empower me to engage with the data dynamically. I can zoom in on specific time periods, overlay multiple variables for comparison, and even

animate the data to observe changes over time. This interactivity not only enhances my understanding of the data but also enables me to communicate my findings more effectively to others.

Plotly also offers a variety of chart types and customization options, allowing me to tailor my visualizations to suit the specific needs of my analysis. Whether I'm creating heatmaps, line graphs, or scatter plots, Plotly provides the flexibility and versatility I need to convey my insights accurately.

Overall, Plotly plays a crucial role in my exploration of climatological data, empowering me to uncover insights, communicate findings, and contribute to our understanding of climate change and its impacts.

Everything I learned helps me be a better data scientist, with this job I can know where the wind comes from and based on that, apply it to various sectors such as agriculture, architecture and prediction of weather anomalies.