DATA VISUALIZATION

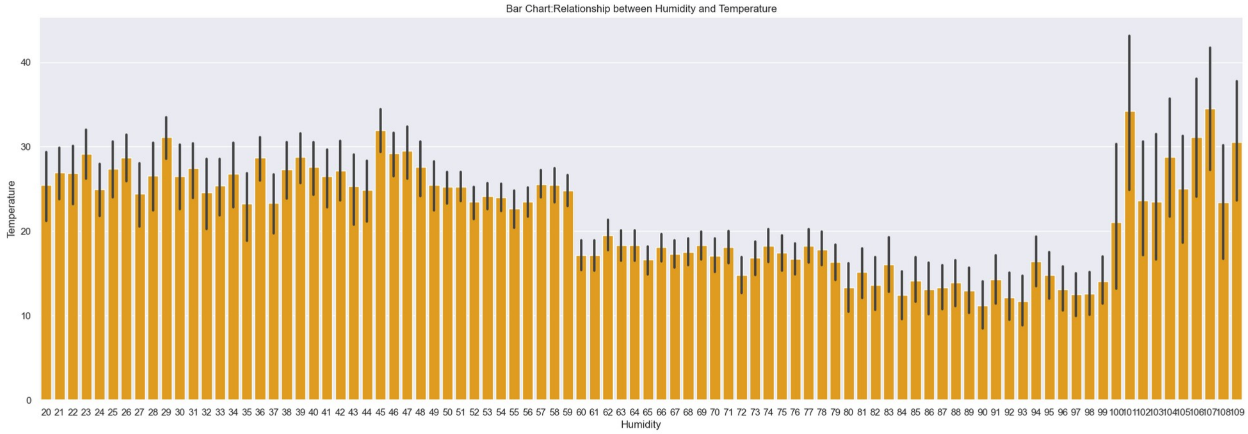
```
!pip install pandas matplotlib wordcloud
!pip install plotly
```

```
Requirement already satisfied: pandas in e:\users\d.sathiya pandi\
anaconda3\lib\site-packages (2.1.4)
Requirement already satisfied: matplotlib in e:\users\d.sathiya pandi\
anaconda3\lib\site-packages (3.8.0)
Requirement already satisfied: wordcloud in e:\users\d.sathiya pandi\
anaconda3\lib\site-packages (1.9.3)
Requirement already satisfied: numpy<2,>=1.23.2 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from pandas) (1.26.4)
Requirement already satisfied: python-dateutil>=2.8.2 in e:\users\
d.sathiya pandi\anaconda3\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from pandas) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from pandas) (2023.3)
Requirement already satisfied: contourpy>=1.0.1 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (1.2.0)
Requirement already satisfied: cycler>=0.10 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (4.25.0)
Requirement already satisfied: kiwisolver>=1.0.1 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (1.4.4)
Requirement already satisfied: packaging>=20.0 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (23.1)
Requirement already satisfied: pillow>=6.2.0 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (10.2.0)
Requirement already satisfied: pyparsing>=2.3.1 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from matplotlib) (3.0.9)
Requirement already satisfied: six>=1.5 in e:\users\d.sathiya pandi\
anaconda3\lib\site-packages (from python-dateutil>=2.8.2->pandas)
(1.16.0)
Requirement already satisfied: plotly in e:\users\d.sathiya pandi\
anaconda3\lib\site-packages (5.9.0)
Requirement already satisfied: tenacity>=6.2.0 in e:\users\d.sathiya
pandi\anaconda3\lib\site-packages (from plotly) (8.2.2)
```

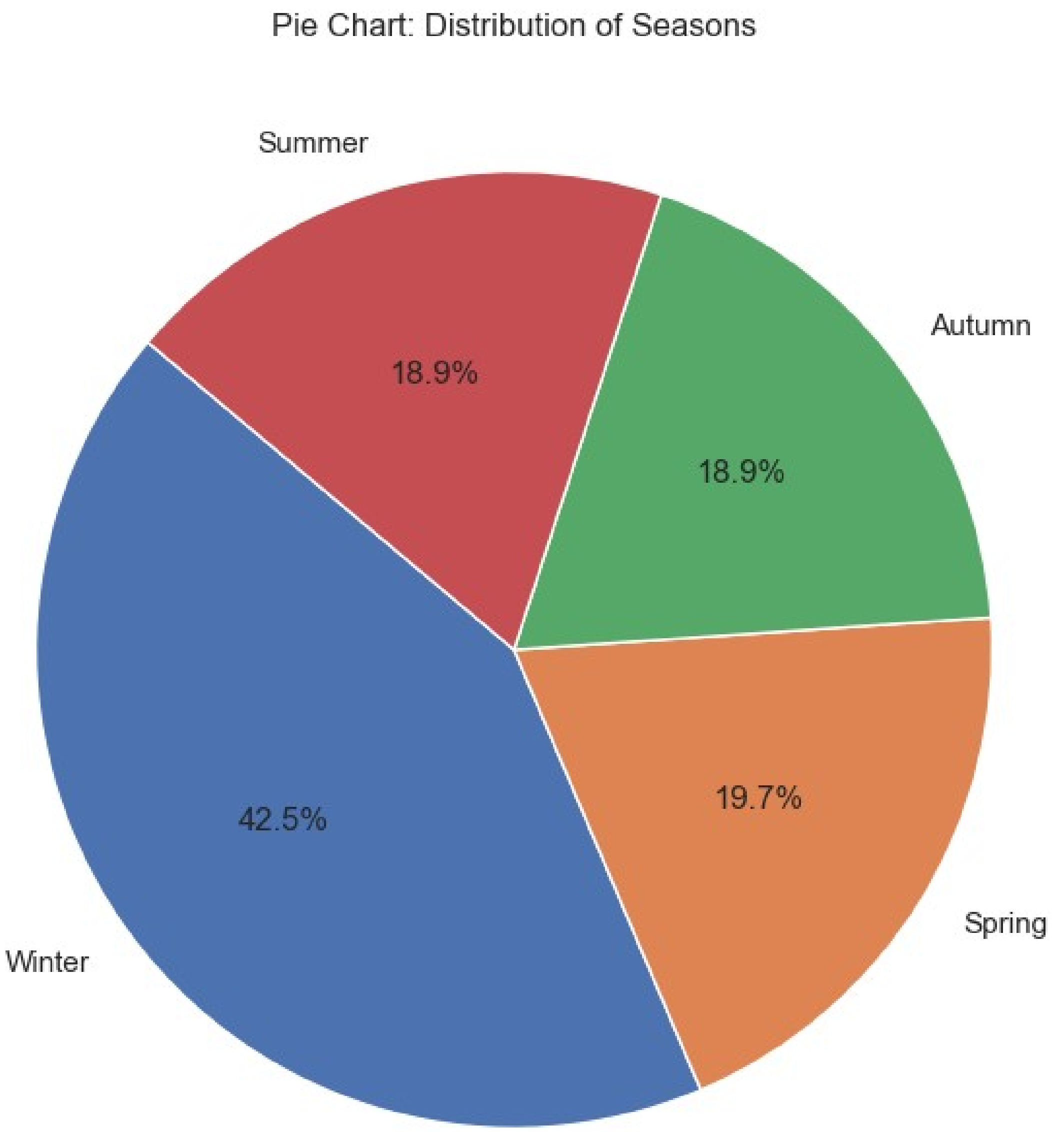
```python
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.graph_objects as go
import plotly.express as px
from wordcloud import WordCloud
sns.set(color_codes=True)
```

```
weather=pd.read_csv('weather_classification_data.csv')

weather.head()

   Temperature  Humidity  Wind Speed  Precipitation (%)    Cloud Cover
\
0           14        73         9.5                 82  partly cloudy

1           39        96         8.5                 71  partly cloudy

2           30        64         7.0                 16          clear

3           38        83         1.5                 82          clear

4           27        74        17.0                 66       overcast


   Atmospheric Pressure  UV Index  Season  Visibility (km)
Location  \
0               1010.82         2  Winter              3.5    inland

1               1011.43         7  Spring             10.0    inland

2               1018.72         5  Spring              5.5  mountain

3               1026.25         7  Spring              1.0   coastal

4                990.67         1  Winter              2.5  mountain


  Weather Type
0        Rainy
1       Cloudy
2        Sunny
3        Sunny
4        Rainy

weather.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 13200 entries, 0 to 13199
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Temperature           13200 non-null  int64  
 1   Humidity              13200 non-null  int64  
 2   Wind Speed            13200 non-null  float64
 3   Precipitation (%)     13200 non-null  int64  
 4   Cloud Cover           13200 non-null  object 
 5   Atmospheric Pressure  13200 non-null  float64
 6   UV Index              13200 non-null  int64  
 7   Season                   13200 non-null  object 
 8   Visibility (km)          13200 non-null  float64
 9   Location                 13200 non-null  object 
 10  Weather Type             13200 non-null  object 
dtypes: float64(3), int64(4), object(4)
memory usage: 1.1+ MB
```

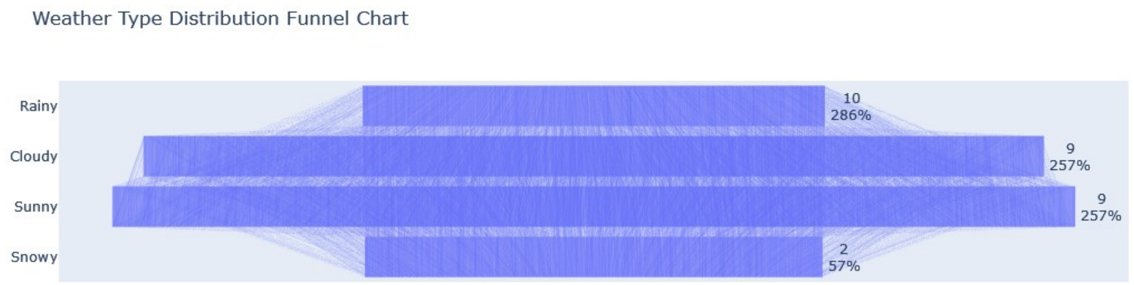
```
#bar chart
plt.figure(figsize=(25, 8))
sns.barplot(x='Humidity',y='Temperature', data=weather,
color='orange')
plt.xlabel('Humidity')
plt.ylabel('Temperature')
plt.title('Bar Chart:Relationship between Humidity and Temperature')
plt.show()
```



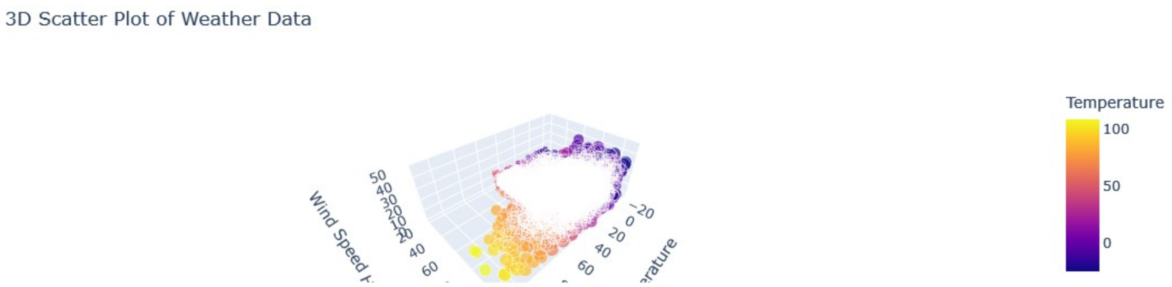
```
#piechart
weather_counts = weather['Season'].value_counts()
plt.figure(figsize=(10, 8))
plt.pie(weather_counts, labels=weather_counts.index, autopct='%1.1f%
%', startangle=140)
plt.title('Pie Chart: Distribution of Seasons')
plt.show()
```



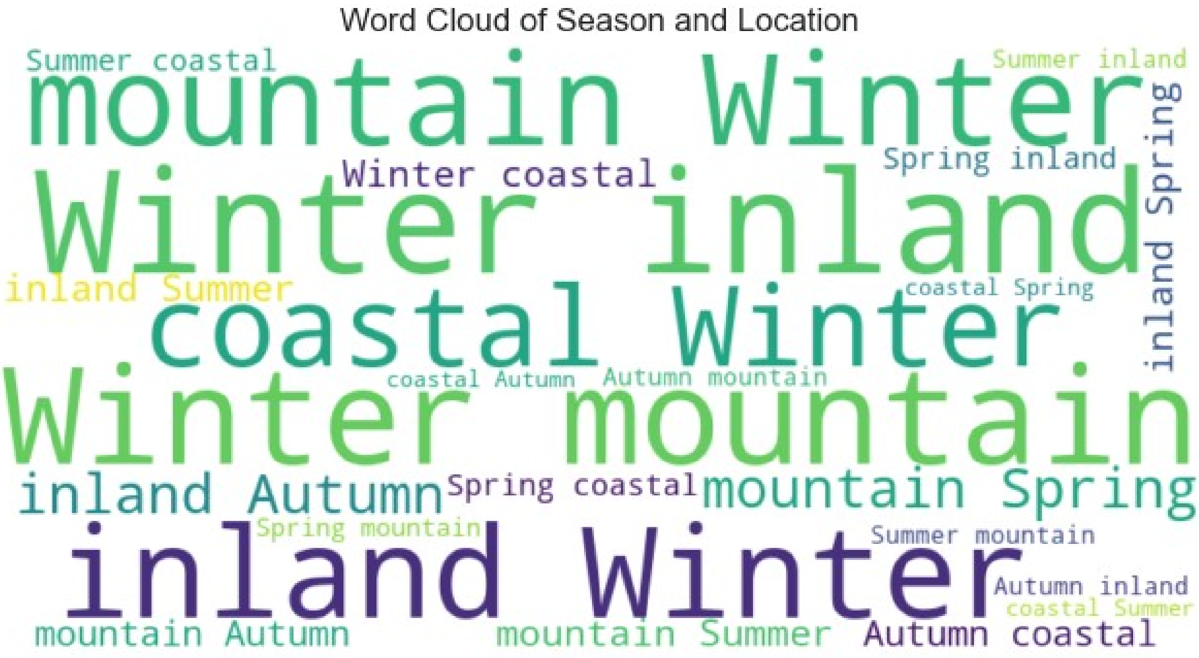
```
#funnel chart
weather=pd.read_csv('weather_classification_data.csv')
weather_counts = weather['Weather Type'].value_counts().reset_index()
weather_counts.columns = ['Weather Type', 'Count']
fig = go.Figure(go.Funnel(
    y=weather['Weather Type'],
    x=weather['Visibility (km)'],
    textinfo='value+percent initial'
))
fig.update_layout(title='Weather Type Distribution Funnel Chart')
fig.show()
```



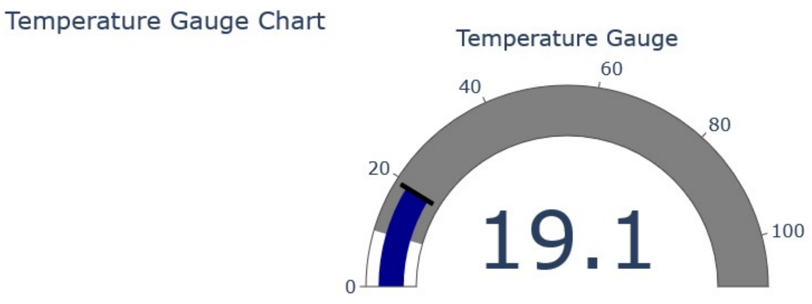
```
#3d scatterplot
fig = px.scatter_3d(weather,
                    x='Temperature',
                    y='Humidity',
                    z='Wind Speed',
                    color='Temperature',
                    size='Humidity',
                    hover_name='Location',  # Display location name on
hover
                    title='3D Scatter Plot of Weather Data')
fig.show()
```



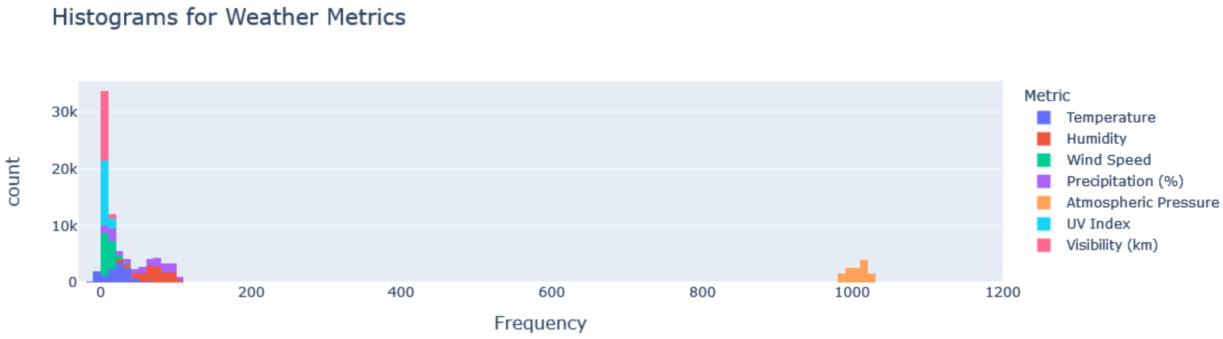
```
#wordcloud
df = pd.read_csv('weather_classification_data.csv')
text = '
'.join(df[['Season','Location']].astype(str).values.flatten())
#singlist .tolist()
wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(text)
plt.figure(figsize=(8, 5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.title('Word Cloud of Season and Location')
plt.axis('off')
plt.show()
```



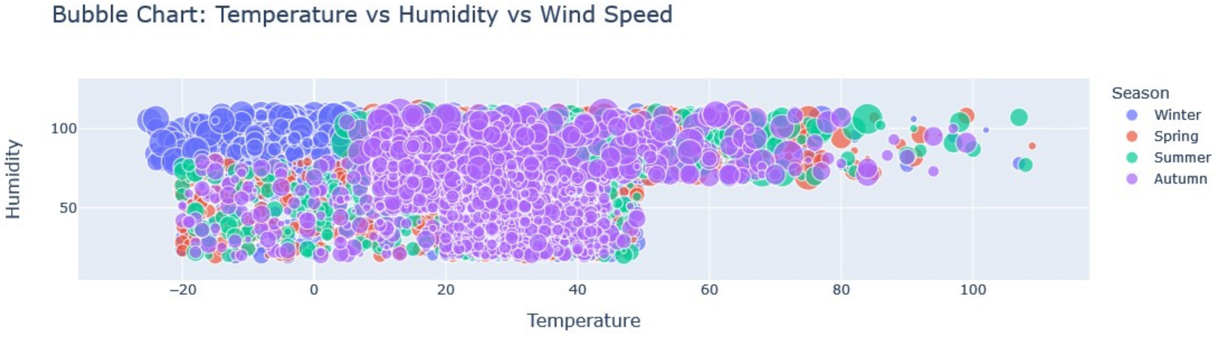
```
#gauge chart
df = pd.read_csv('weather_classification_data.csv')
column_name = 'Temperature'
value = weather[column_name].mean()  # Calculate mean temperature

fig = go.Figure(go.Indicator(
    mode = "gauge+number",
    value = value,
    domain = {'x': [0, 1], 'y': [0, 1]},
    title = {'text': f"{column_name} Gauge"},
    gauge = {
        'axis': {'range': [None, df['Humidity'].max()]},  # Adjust
range based on Humidity data
        'bar': {'color': "darkblue"},
        'steps' : [
            {'range': [df['Humidity'].min(), df['Wind Speed'].mean()],
'color': "lightgray"},
            {'range': [df['Wind Speed'].mean(), df['Humidity'].max()],
'color': "gray"}],
        'threshold': {
            'line': {'color': "black", 'width': 4},
            'thickness': 0.75,
            'value': value}
    }
))


fig.update_layout(
    title_text = f'{column_name} Gauge Chart',
    font_size = 16
)
fig.show()
```



```
#histogram
df = pd.read_csv('weather_classification_data.csv')

numeric_columns = ['Temperature', 'Humidity', 'Wind Speed',
'Precipitation (%)',
                   'Atmospheric Pressure', 'UV Index', 'Visibility
(km)']


fig = px.histogram(df, x=numeric_columns, title='Histograms for
Weather Metrics',
                   labels={'value': 'Frequency', 'variable':
'Metric'})


fig.update_layout(
    title_font_size=20,
    xaxis_title_font_size=16,
    yaxis_title_font_size=16
)

fig.show()
```

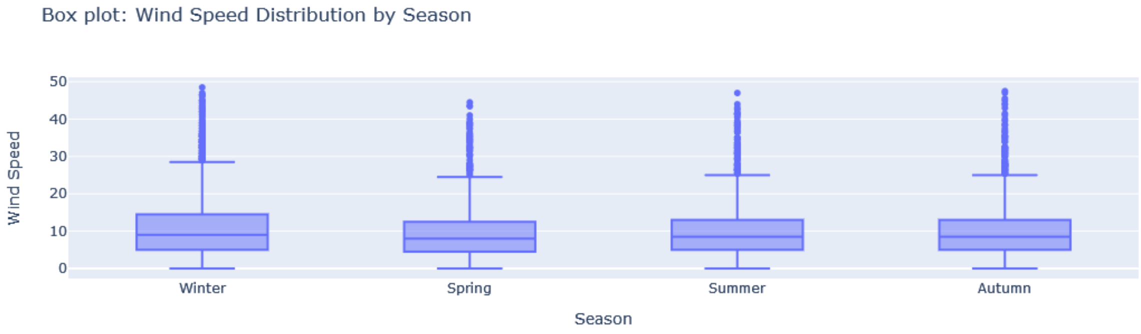


```
#bubble chart
df = pd.read_csv('weather_classification_data.csv')
x_variable = 'Temperature'
y_variable = 'Humidity'
size_variable = 'Wind Speed'
color_variable = 'Season'
fig = px.scatter(df, x=x_variable, y=y_variable, size=size_variable,
color=color_variable,
                 hover_name=color_variable, log_x=False, size_max=30,
                 title=f'Bubble Chart: {x_variable} vs {y_variable} vs
{size_variable}')
fig.update_layout(
    xaxis_title=x_variable,
    yaxis_title=y_variable,
    title_font_size=20,
    xaxis_title_font_size=16,
    yaxis_title_font_size=16
)
fig.show()
```

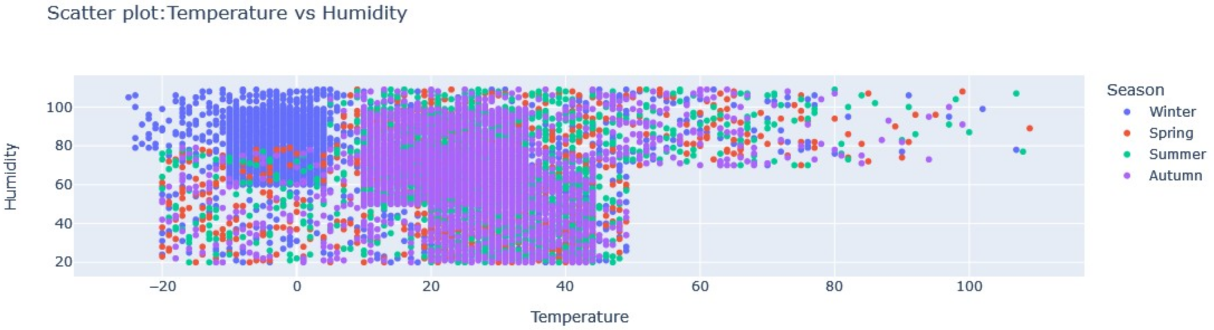


```
#boxplot
fig = px.box(weather, x='Season', y='Wind Speed', title='Box plot:
Wind Speed Distribution by Season', labels={'Season': 'Season', 'Wind
Speed': 'Wind Speed'})
```

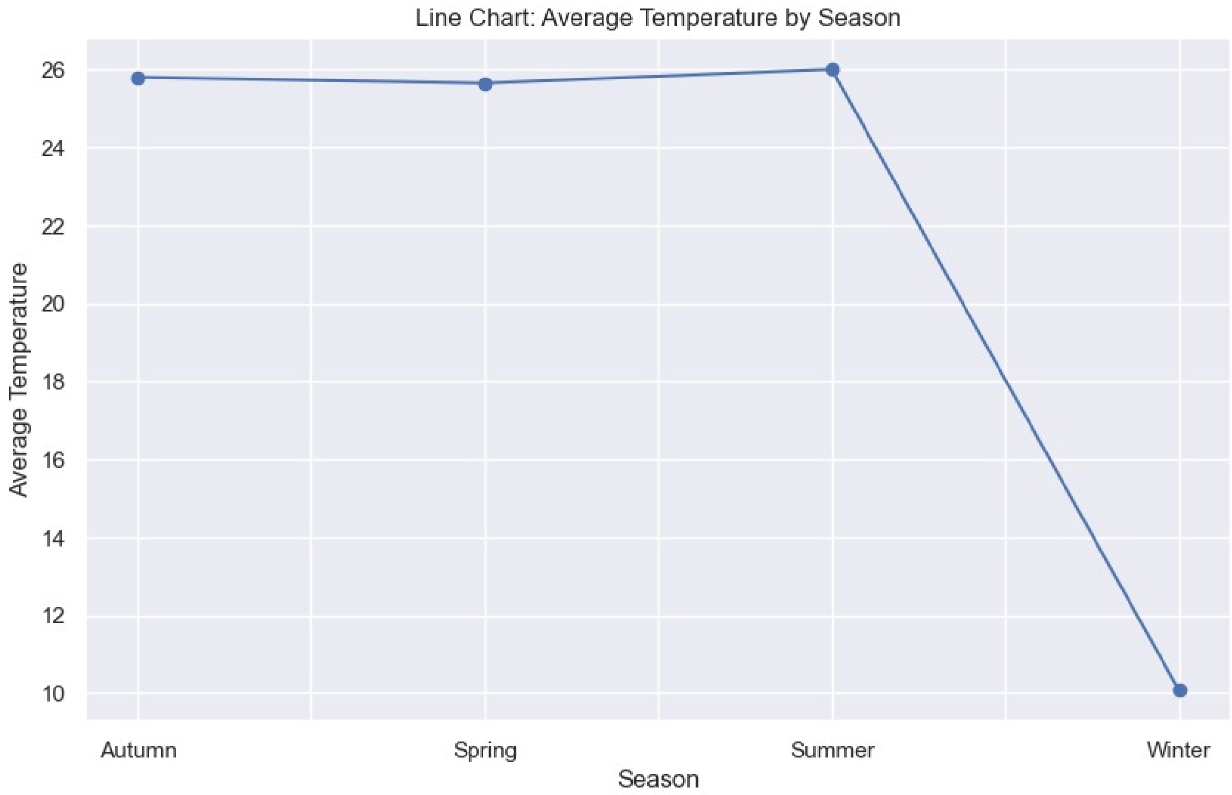
```


fig.show()
```


Box plot: Wind Speed Distribution by Season

```
#  scatter plot
fig = px.scatter(weather, x='Temperature', y='Humidity',
color='Season', title='Scatter plot:Temperature vs Humidity',
                 labels={'Temperature': 'Temperature', 'Humidity':
'Humidity'})


fig.show()
```


Scatter plot:Temperature vs Humidity

```
#line chart
df = pd.read_csv('weather_classification_data.csv')
seasonal_avg_temp = df.groupby('Season')['Temperature'].mean()
plt.figure(figsize=(10, 6))
seasonal_avg_temp.plot(kind='line', marker='o', color='b')
plt.title('Line Chart: Average Temperature by Season')
plt.xlabel('Season')
plt.ylabel('Average Temperature')
plt.grid(True)
plt.show()
```


Line Chart: Average Temperature by Season