Weather Forecasting using Python

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
```

```
data = pd.read_csv(r"/content/DailyDelhiClimateTest.csv")
print(data.head())
```

```
         date   meantemp   humidity  wind_speed  meanpressure
0  2017-01-01  15.913043  85.869565    2.743478     59.000000
1  2017-01-02  18.500000  77.222222    2.894444   1018.277778
2  2017-01-03  17.111111  81.888889    4.016667   1018.333333
3  2017-01-04  18.700000  70.050000    4.545000   1015.700000
4  2017-01-05  18.388889  74.944444    3.300000   1014.333333
```

```
data.size
```

```
570
```

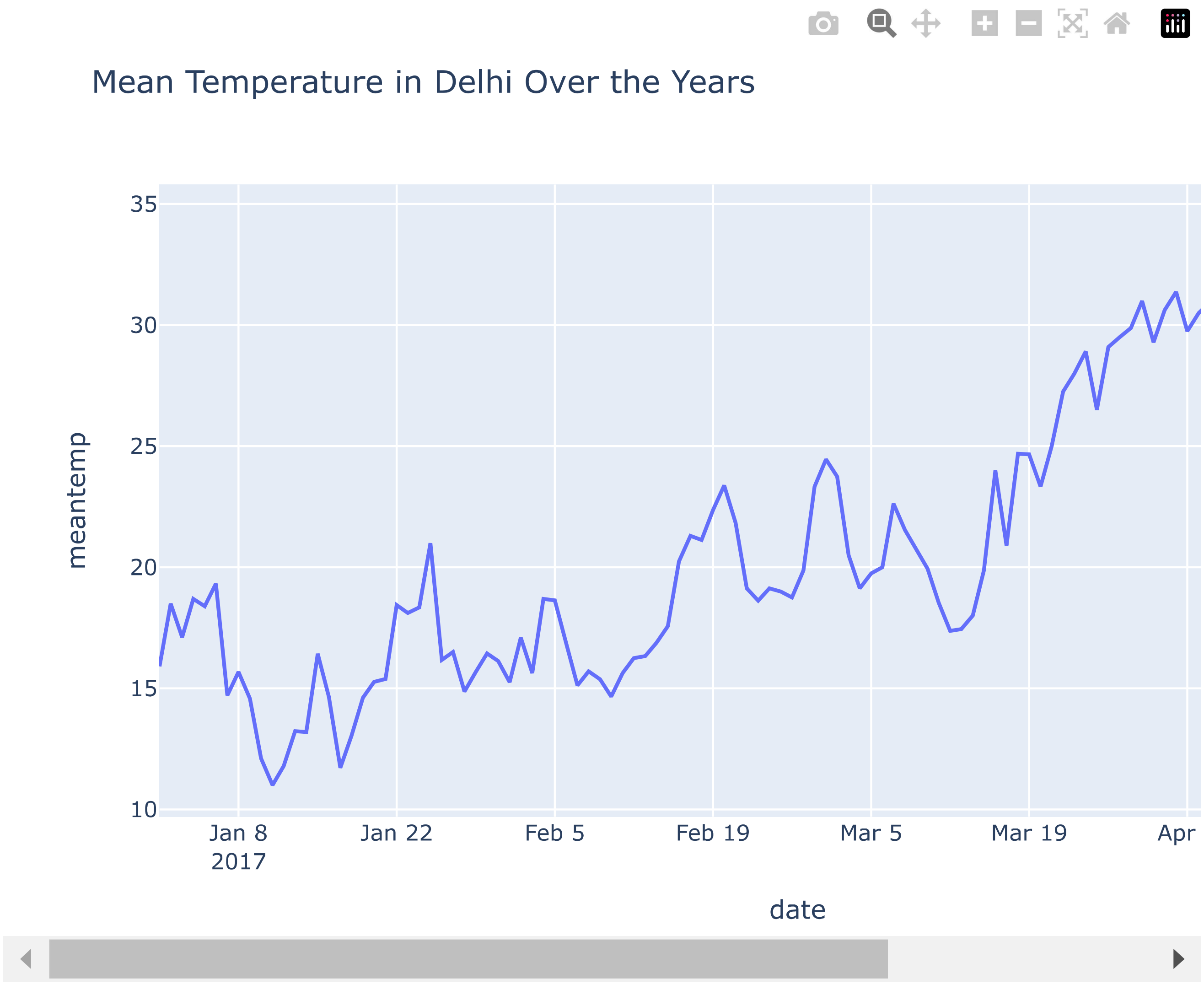
```
print(data.describe())
```

```
         meantemp    humidity  wind_speed  meanpressure
count  114.000000  114.000000  114.000000    114.000000
mean    21.713079   56.258362    8.143924   1004.035090
std      6.360072   19.068083    3.588049     89.474692
min     11.000000   17.750000    1.387500     59.000000
25%     16.437198   39.625000    5.563542   1007.437500
50%     19.875000   57.750000    8.069444   1012.739316
75%     27.705357   71.902778   10.068750   1016.739583
max     34.500000   95.833333   19.314286   1022.809524
```

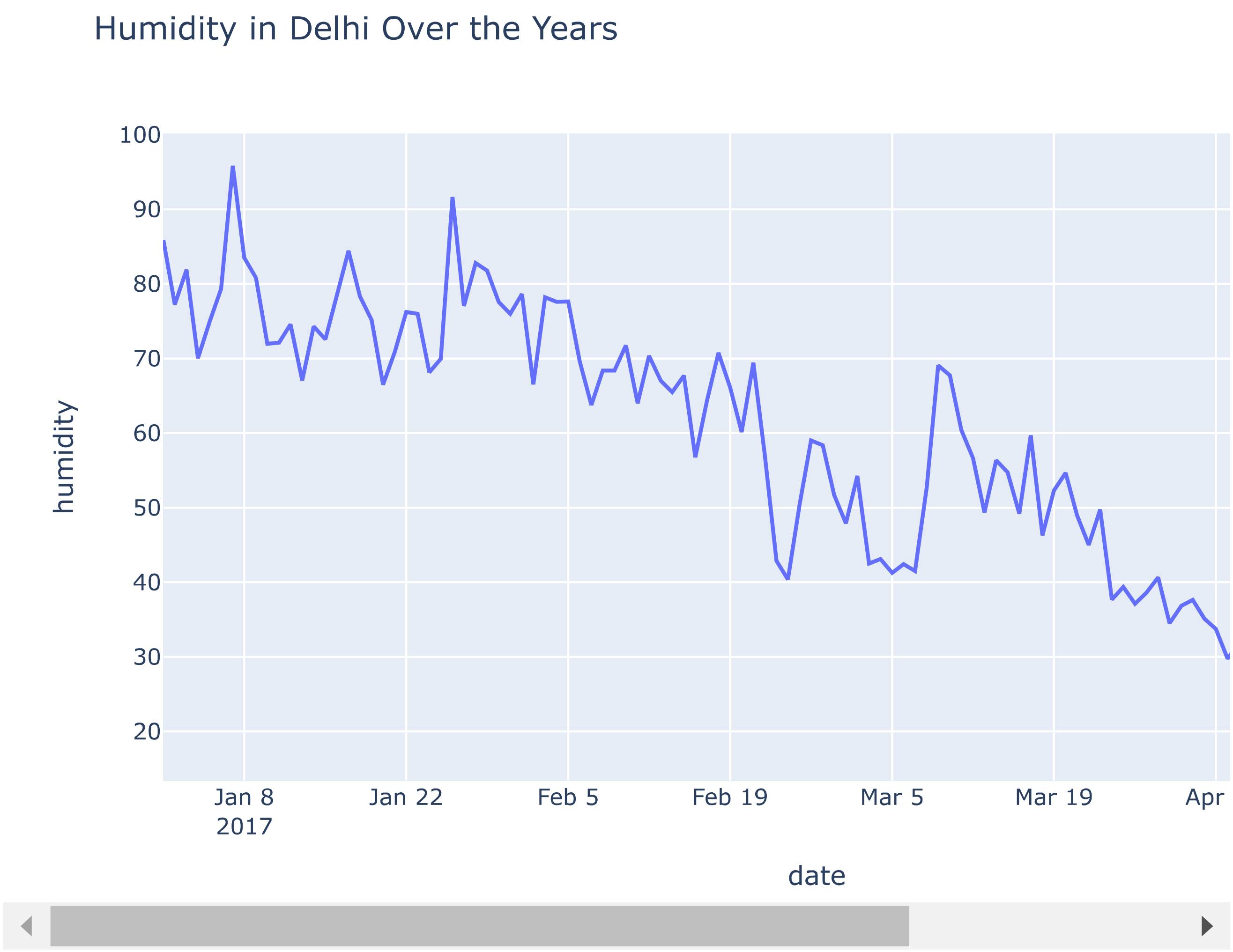
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 114 entries, 0 to 113
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   date          114 non-null    object 
 1   meantemp      114 non-null    float64
 2   humidity      114 non-null    float64
 3   wind_speed    114 non-null    float64
 4   meanpressure  114 non-null    float64
dtypes: float64(4), object(1)
memory usage: 4.6+ KB
```

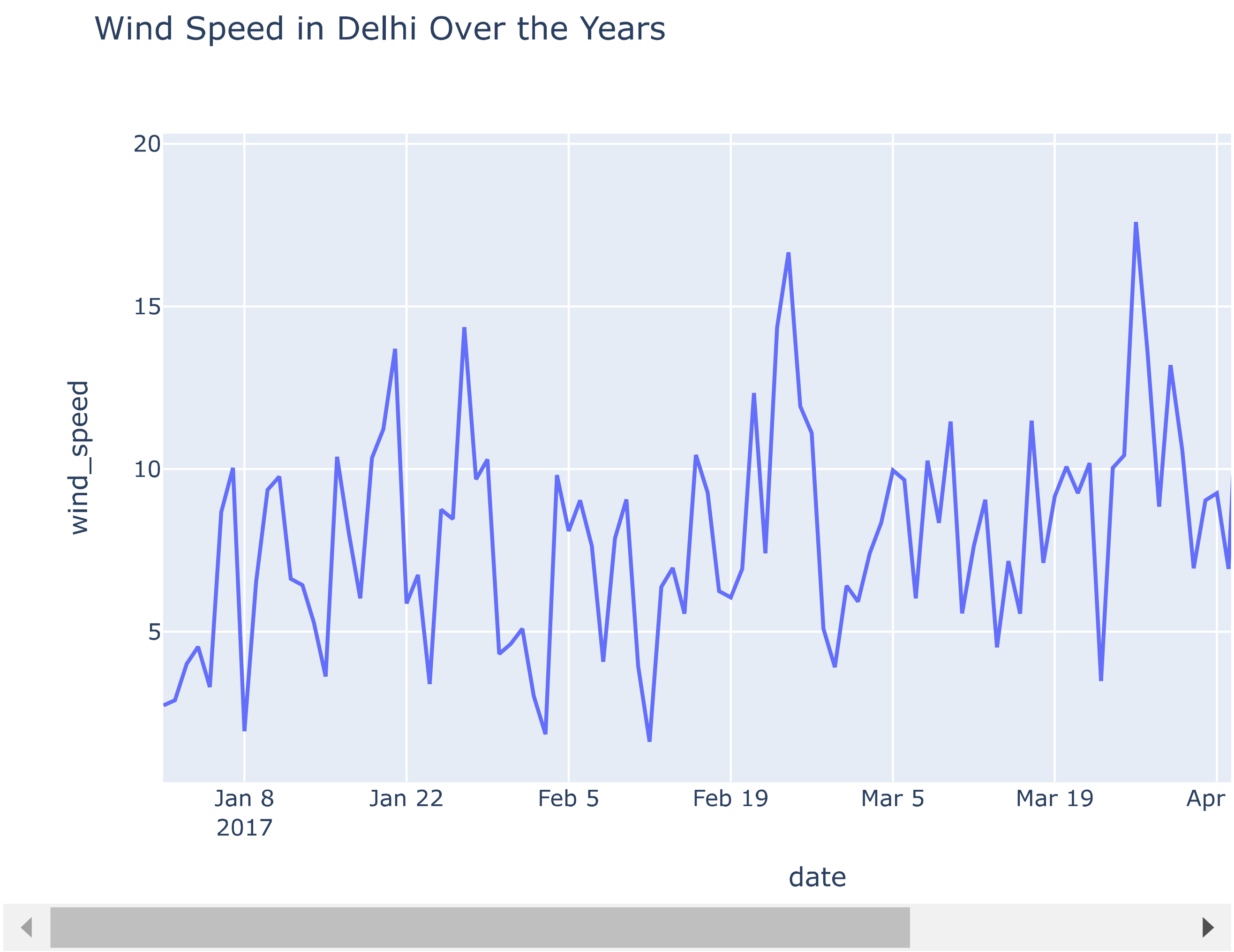
```
figure = px.line(data, x="date",
                 y="meantemp",
                 title='Mean Temperature in Delhi Over the Years')
figure.show()
```



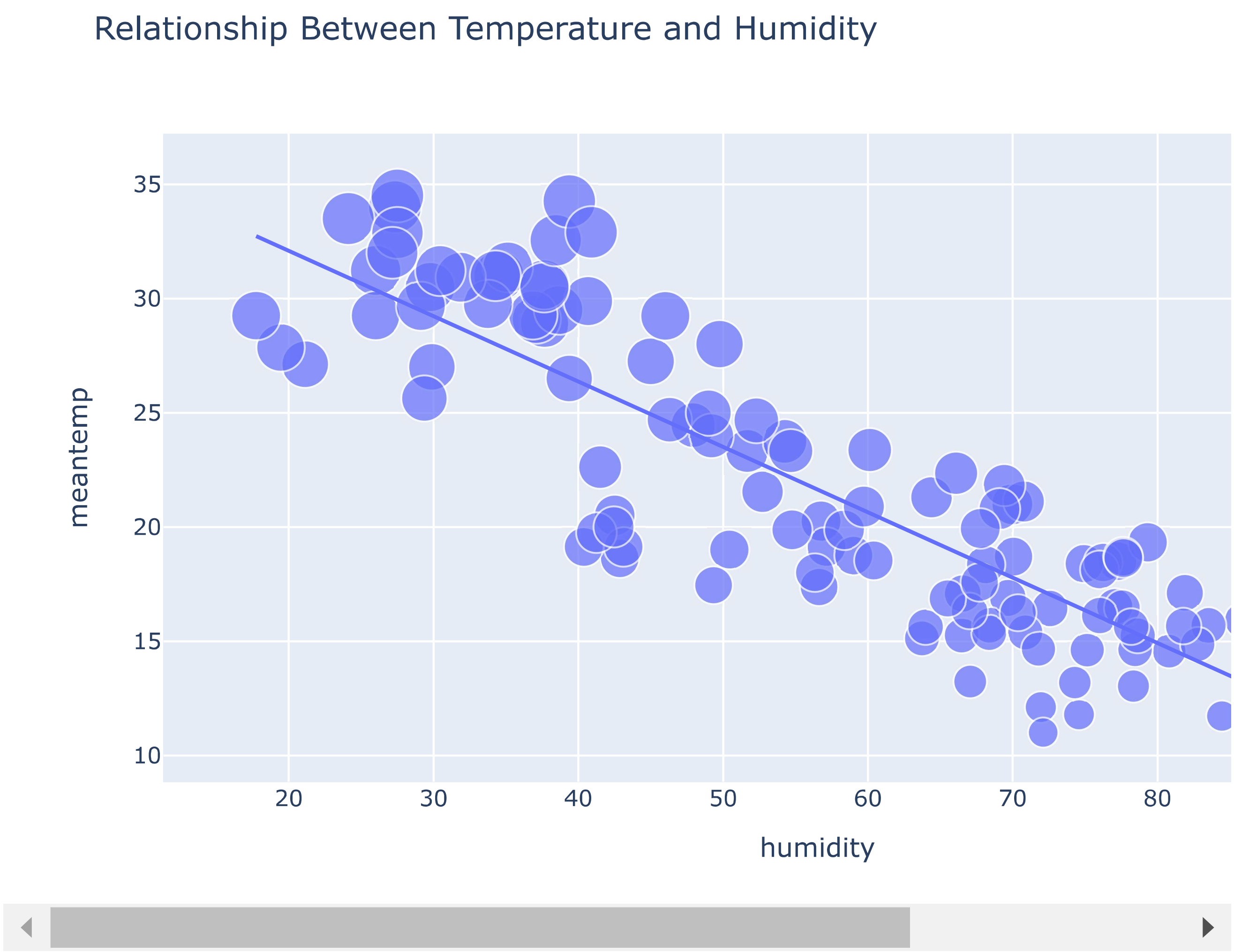

```
figure = px.line(data, x="date",
                 y="humidity",
                 title='Humidity in Delhi Over the Years')
figure.show()
```




```
figure = px.line(data, x="date",
                 y="wind_speed",
                 title='Wind Speed in Delhi Over the Years')
figure.show()
```




```
figure = px.scatter(data_frame = data, x="humidity",
                    y="meantemp", size="meantemp",
                    trendline="ols",
                    title = "Relationship Between Temperature and Humidity")
figure.show()
```

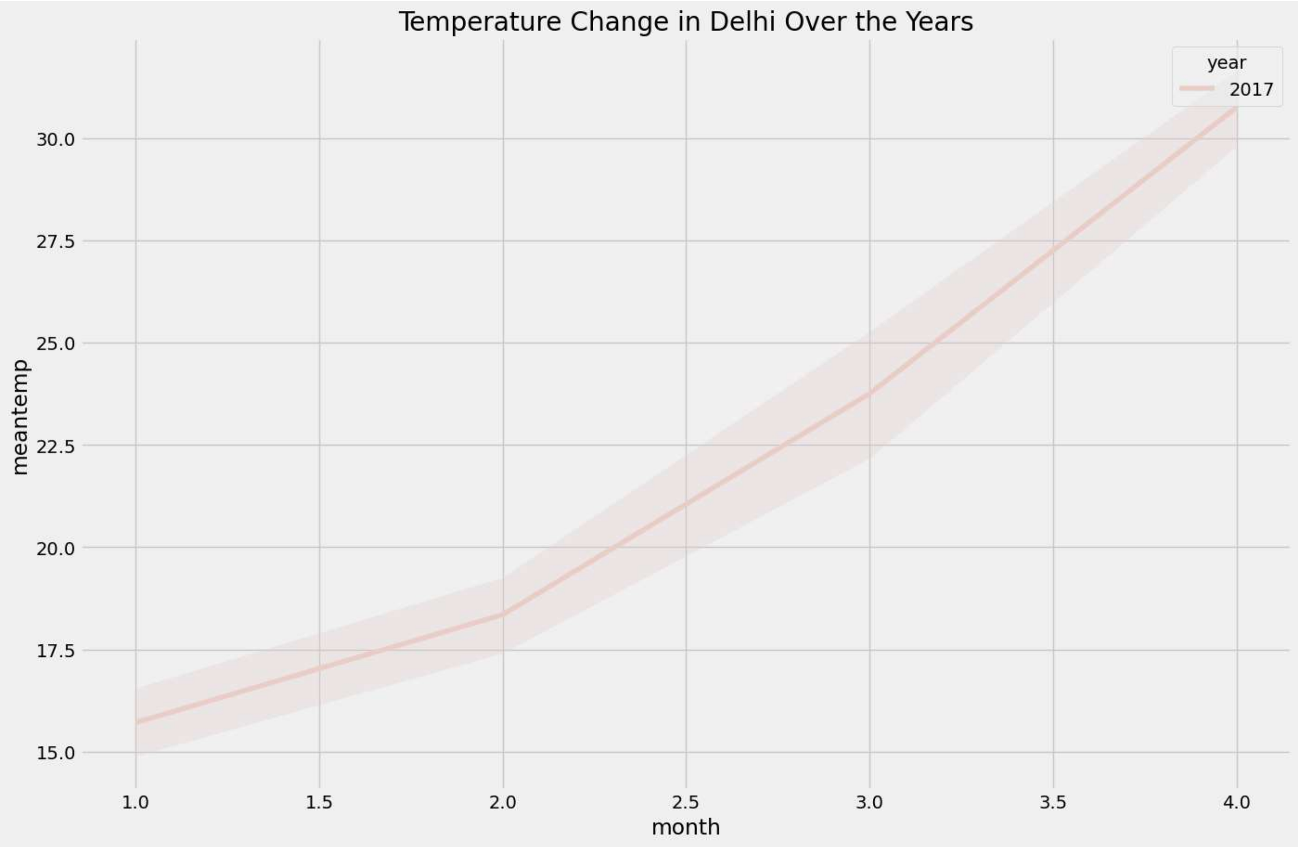


Analyzing Temperature Change

```
data["date"] = pd.to_datetime(data["date"], format = '%Y-%m-%d')
data['year'] = data['date'].dt.year
data["month"] = data["date"].dt.month
print(data.head())
```

	date	meantemp	humidity	wind_speed	meanpressure	year	month
0	2017-01-01	15.913043	85.869565	2.743478	59.000000	2017	1
1	2017-01-02	18.500000	77.222222	2.894444	1018.277778	2017	1
2	2017-01-03	17.111111	81.888889	4.016667	1018.333333	2017	1
3	2017-01-04	18.700000	70.050000	4.545000	1015.700000	2017	1
4	2017-01-05	18.388889	74.944444	3.300000	1014.333333	2017	1

```
plt.style.use('fivethirtyeight')
plt.figure(figsize=(15, 10))
plt.title("Temperature Change in Delhi Over the Years")
sns.lineplot(data = data, x='month', y='meantemp', hue='year')
plt.show()
```



Forecasting Weather using Python

```
forecast_data = data.rename(columns = {"date": "ds",
                                       "meantemp": "y"})
print(forecast_data)
```

```
             ds          y   humidity  wind_speed  meanpressure  year  month
0    2017-01-01  15.913043  85.869565    2.743478     59.000000  2017      1
1    2017-01-02  18.500000  77.222222    2.894444   1018.277778  2017      1
2    2017-01-03  17.111111  81.888889    4.016667   1018.333333  2017      1
3    2017-01-04  18.700000  70.050000    4.545000   1015.700000  2017      1
4    2017-01-05  18.388889  74.944444    3.300000   1014.333333  2017      1
..          ...        ...        ...         ...           ...   ...    ...
109  2017-04-20  34.500000  27.500000    5.562500    998.625000  2017      4
110  2017-04-21  34.250000  39.375000    6.962500    999.875000  2017      4
111  2017-04-22  32.900000  40.900000    8.890000   1001.600000  2017      4
112  2017-04-23  32.875000  27.500000    9.962500   1002.125000  2017      4
113  2017-04-24  32.000000  27.142857   12.157143   1004.142857  2017      4

[114 rows x 7 columns]
```

```
from prophet import Prophet
from prophet.plot import plot_plotly, plot_components_plotly
model = Prophet()
model.fit(forecast_data)
forecasts = model.make_future_dataframe(periods=365)
predictions = model.predict(forecasts)
plot_plotly(model, predictions)
```

```
INFO:prophet:Disabling yearly seasonality. Run prophet with yearly_seasonality=True t
INFO:prophet:Disabling daily seasonality. Run prophet with daily_seasonality=True to
DEBUG:cmdstanpy:input tempfile: /tmp/tmpfovhrxot/s2a1uzah.json
DEBUG:cmdstanpy:input tempfile: /tmp/tmpfovhrxot/iqs5v_x6.json
DEBUG:cmdstanpy:idx 0
DEBUG:cmdstanpy:running CmdStan, num_threads: None
DEBUG:cmdstanpy:CmdStan args: ['/usr/local/lib/python3.10/dist-packages/prophet/stan_
05:08:46 - cmdstanpy - INFO - Chain [1] start processing
INFO:cmdstanpy:Chain [1] start processing
05:08:46 - cmdstanpy - INFO - Chain [1] done processing
INFO:cmdstanpy:Chain [1] done processing
```