```
import numpy as np
import pandas as pd
import plotly.express as px
import plotly.graph_objects as go
from plotly.subplots import make_subplots
from datetime import datetime
```

```
df=pd.read_csv("Weather Data in India from 1901 to 2017.csv",index_col=0)
```

```
df.shape[1]
```

```
13
```

```
df.head()
```

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	1901	17.99	19.43	23.49	26.41	28.28	28.60	27.49	26.98	26.26	25.08	21.73	18.95
1	1902	19.00	20.39	24.10	26.54	28.68	28.44	27.29	27.05	25.95	24.37	21.33	18.78
2	1903	18.32	19.79	22.46	26.03	27.93	28.41	28.04	26.63	26.34	24.57	20.96	18.29
3	1904	17.77	19.39	22.95	26.73	27.83	27.85	26.84	26.73	25.84	24.36	21.07	18.84
4	1905	17.40	17.79	21.78	24.84	28.32	28.69	27.67	27.47	26.29	26.16	22.07	18.71

Next steps: Generate code with df View recommended plots New interactive sheet

```
df.columns
```

```
Index(['YEAR', 'JAN', 'FEB', 'MAR', 'APR', 'MAY', 'JUN', 'JUL', 'AUG', 'SEP',
       'OCT', 'NOV', 'DEC'],
      dtype='object')
```

```
df1=pd.melt(df,id_vars="YEAR",value_vars=df.columns[1:])
```

```
df1.head()
```

	YEAR	variable	value
0	1901	JAN	17.99
1	1902	JAN	19.00
2	1903	JAN	18.32
3	1904	JAN	17.77
4	1905	JAN	17.40

Next steps: Generate code with df1 View recommended plots New interactive sheet

```
df1['Date']=df1['variable']+ ' ' +df1['YEAR'].astype(str)
df1.loc[:,'Date']=df1['Date'].apply(lambda x:datetime.strptime(x, '%b %Y'))
```

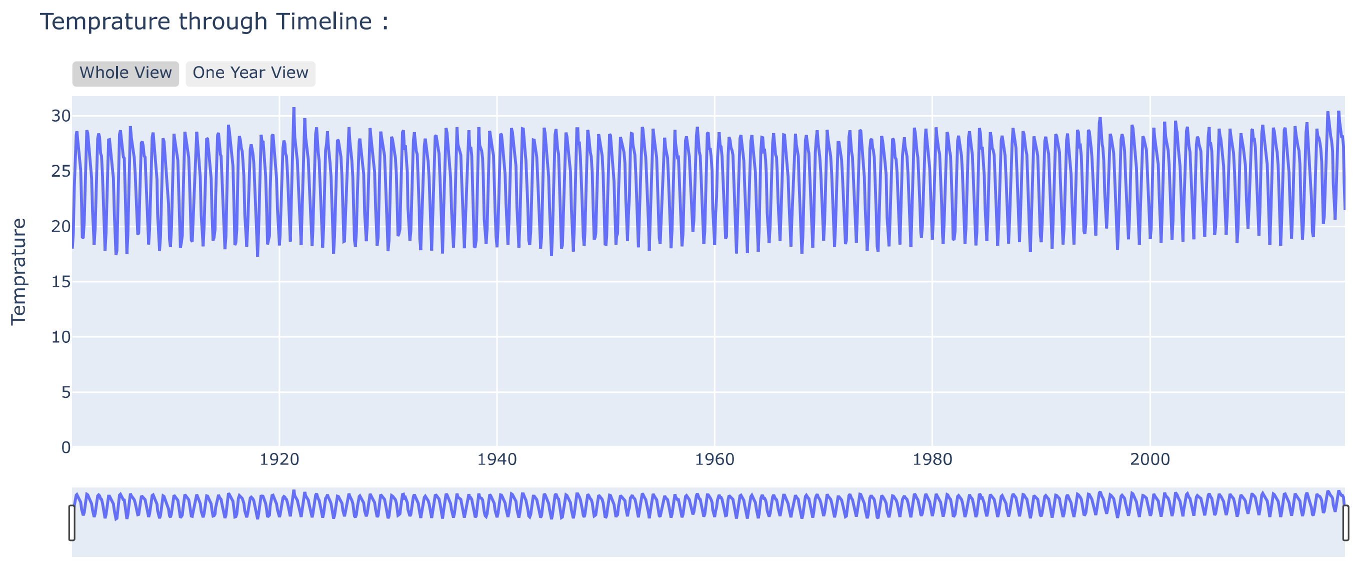
```
df1.head()
```

	YEAR	variable	value	Date
0	1901	JAN	17.99	1901-01-01 00:00:00
1	1902	JAN	19.00	1902-01-01 00:00:00
2	1903	JAN	18.32	1903-01-01 00:00:00
3	1904	JAN	17.77	1904-01-01 00:00:00
4	1905	JAN	17.40	1905-01-01 00:00:00

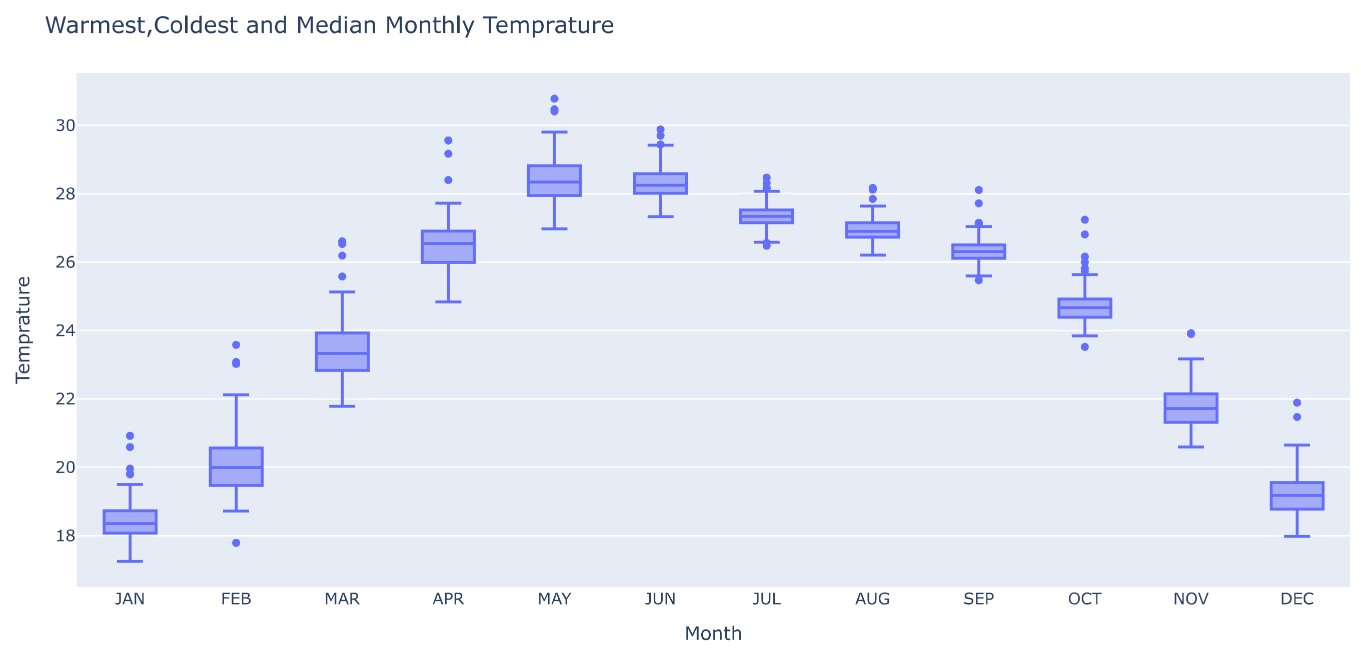
Next steps: Generate code with df1 View recommended plots New interactive sheet

Double-click (or enter) to edit

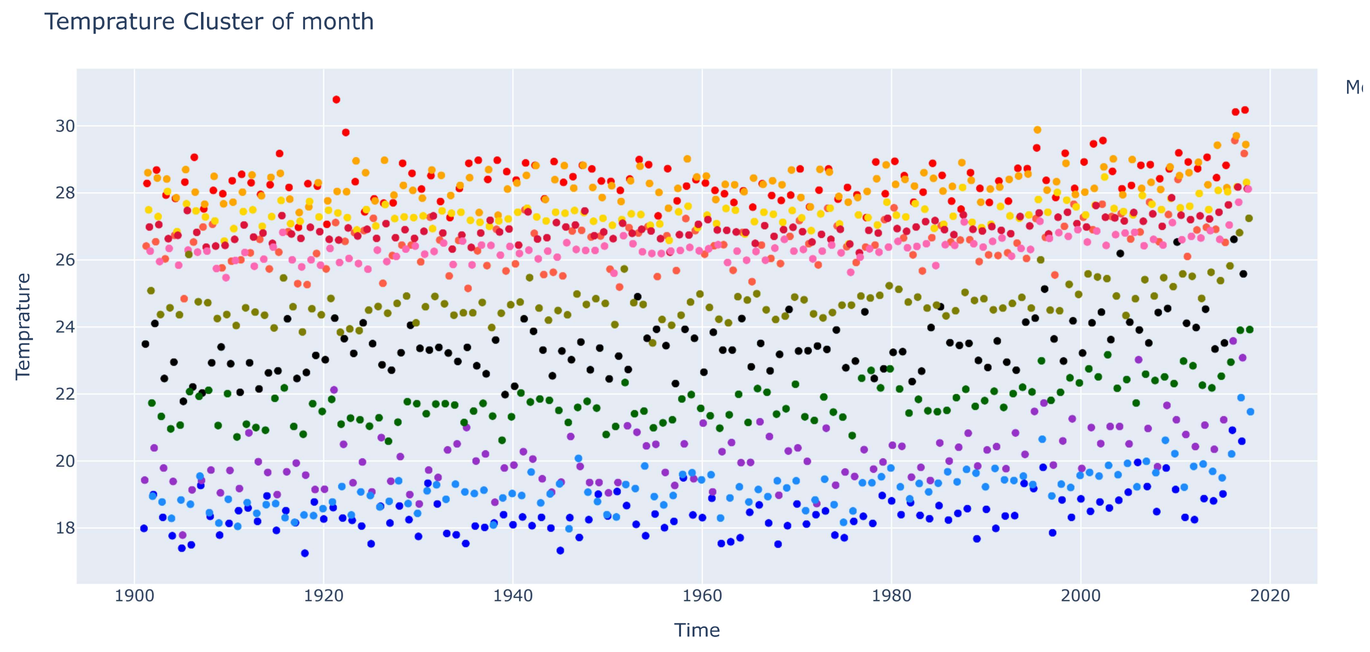
```
df1.columns=['Year','Month','Temprature','Date']
df1.sort_values(by='Date',inplace=True)

fig=go.Figure(layout=go.Layout(yaxis=dict(range=[0,df1['Temprature'].max()+1])))
fig.add_trace(go.Scatter(x=df1['Date'], y=df1['Temprature']),)
fig.update_layout(title='Temprature through Timeline :',xaxis_title='Time',yaxis_title='Temprature')
fig.update_layout(xaxis=go.layout.XAxis(
    rangeselector=dict(
        buttons=list([dict(label="Whole View", step="all"),
                      dict(count=1,label="One Year View",step="year",stepmode="todate")
                     ])),
        rangeslider=dict(visible=True),type="date")
)

fig.show()
```



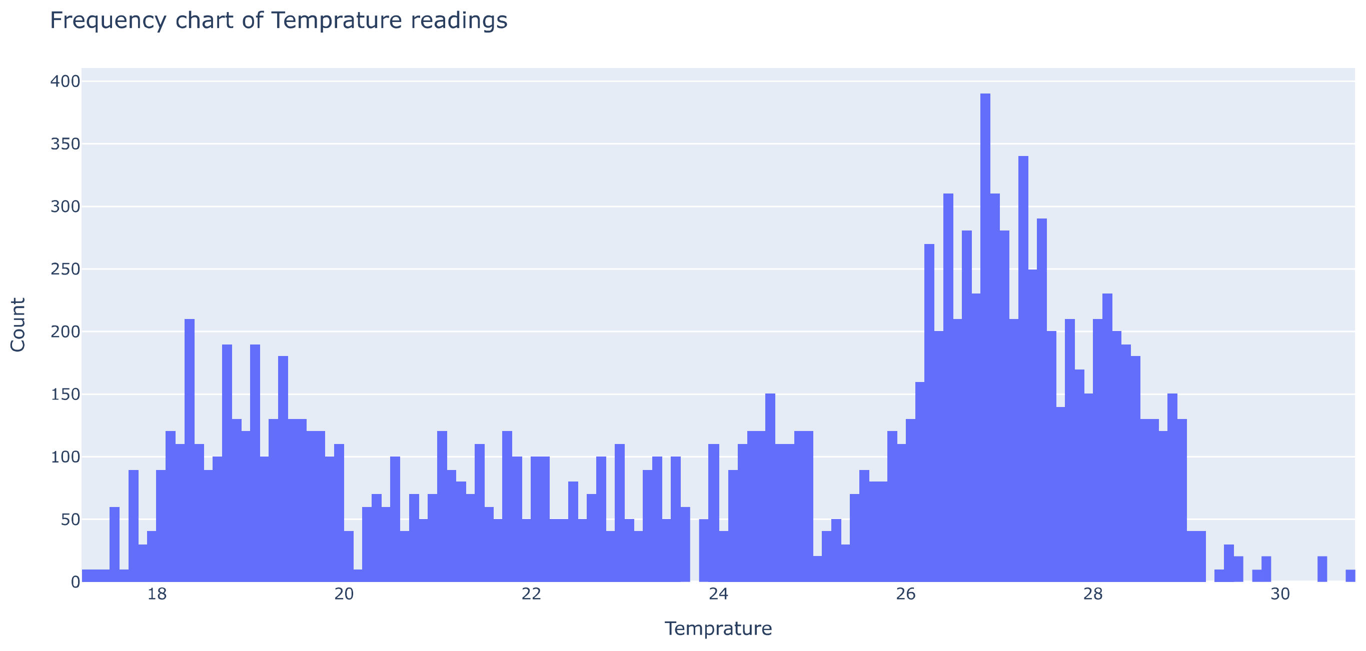
```
fig=px.box(df1,'Month','Temprature')
fig.update_layout(title='Warmest,Coldest and Median Monthly Temprature')
fig.show()
```



```
fig=px.scatter(df1,'Date', 'Temprature',color='Month',color_discrete_sequence=['blue','darkorchid','black','tomato','red','orange','gold','c
fig.update_layout(title='Temprature Cluster of month',xaxis_title='Time',yaxis_title='Temprature')
```



```
fig=px.histogram(x=df1['Temprature'],nbins=200,histnorm='density')
fig.update_layout(title='Frequency chart of Temprature readings',xaxis_title='Temprature',yaxis_title='Count')
```

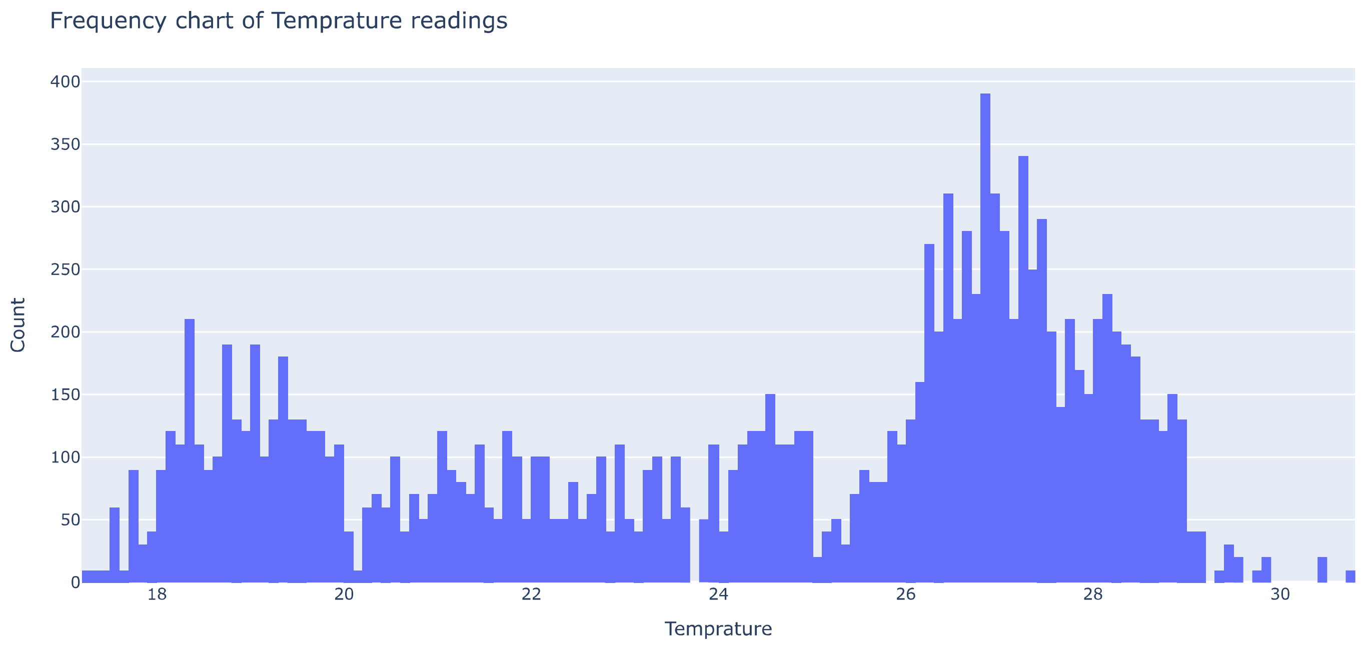


```
df['Yearly Mean'] = df.iloc[:,1:].mean(axis=1)
fig = go.Figure(data=[go.Scatter(name='Yearly Tempratures' , x=df['YEAR'], y=df['Yearly Mean'], mode='lines'),go.Scatter(name='Yearly Tempra
])
fig.update_layout(title='Yearly Mean Temprature',xaxis_title='Time',yaxis)
```

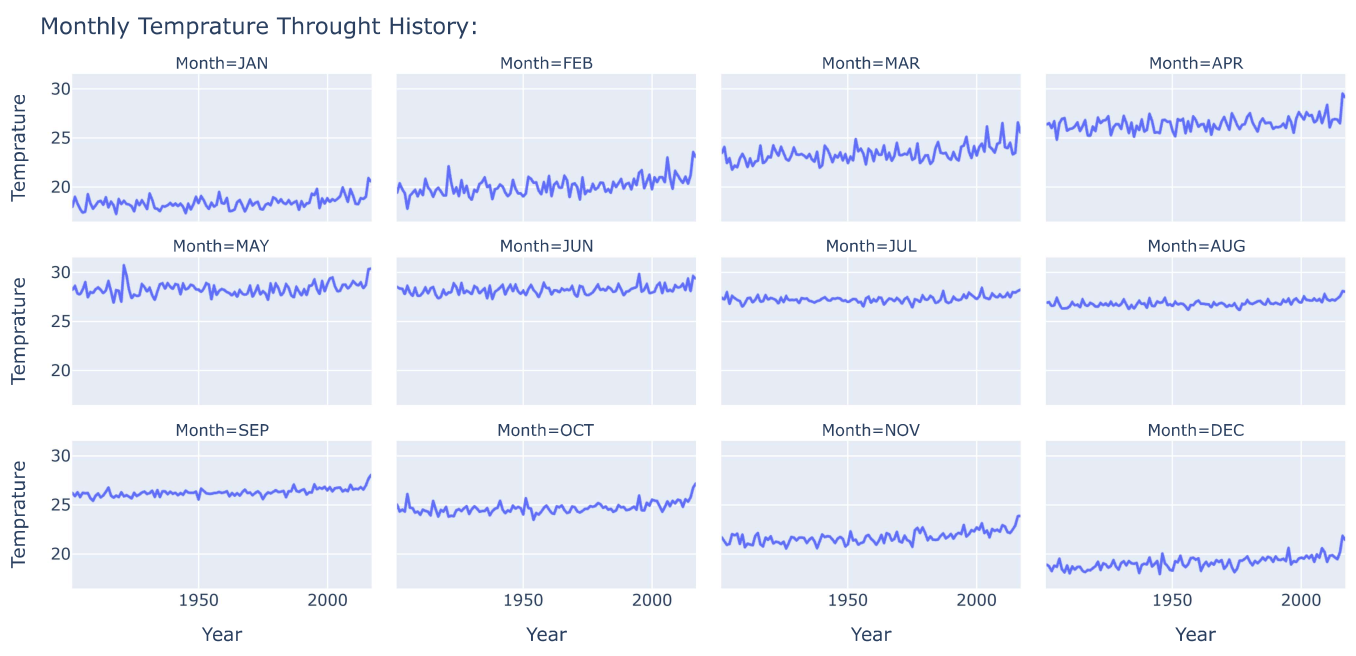
```
  File "<ipython-input-17-3696d0b0486d>", line 4
    fig.update_layout(title='Yearly Mean Temprature',xaxis_title='Time',yaxis)
                                                                              ^
SyntaxError: positional argument follows keyword argument
```

Next steps: Explain error

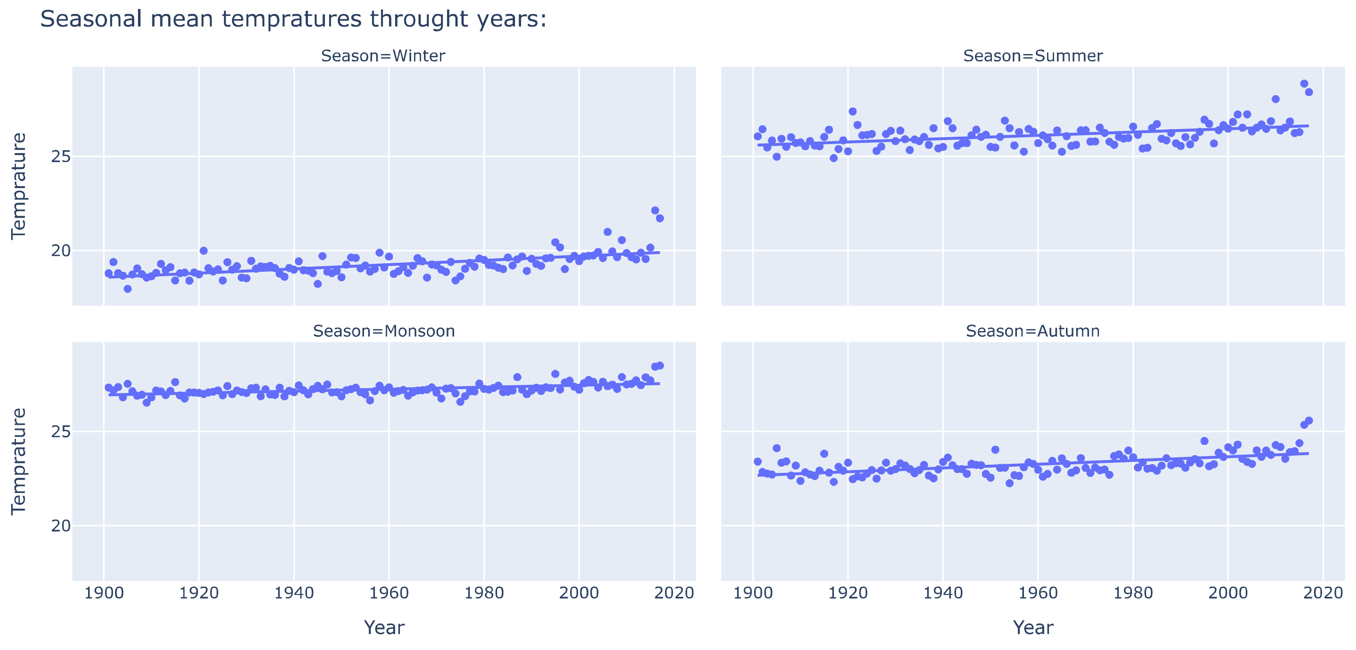
```
fig.show()
```



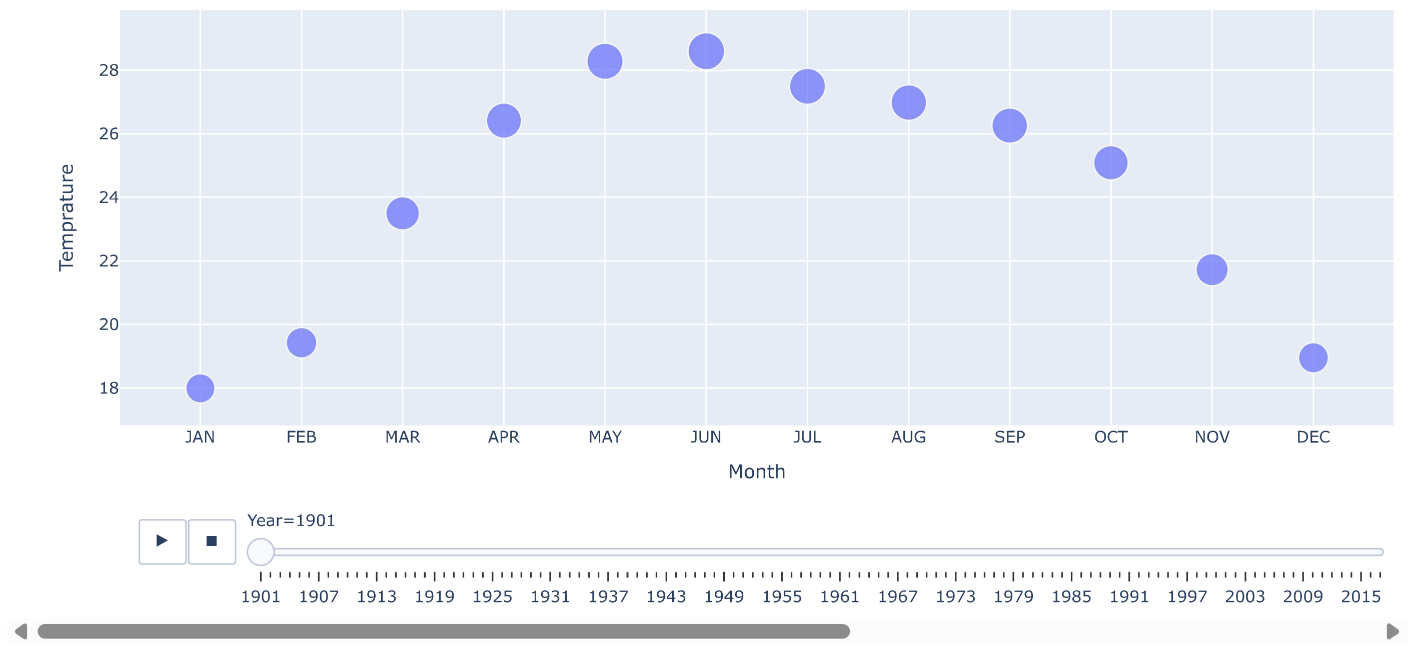
```
fig = px.line(df1, 'Year', 'Temprature', facet_col='Month', facet_col_wrap=4)
fig.update_layout(title='Monthly Temprature Throught History:')
```



```
df['Winter'] = df[['DEC', 'JAN', 'FEB']].mean(axis=1)
df['Summer'] = df[['MAR', 'APR', 'MAY']].mean(axis=1)
df['Monsoon'] = df[['JUN', 'JUL', 'AUG', 'SEP']].mean(axis=1)
df['Autumn'] = df[['OCT', 'NOV']].mean(axis=1)
seasonal_df = df[['YEAR', 'Winter', 'Summer', 'Monsoon', 'Autumn']]
seasonal_df = pd.melt(seasonal_df, id_vars='YEAR', value_vars=seasonal_df.columns[1:])
seasonal_df.columns=['Year', 'Season', 'Temprature']


fig = px.scatter(seasonal_df, 'Year', 'Temprature', facet_col='Season', facet_col_wrap=2, trendline='ols')
fig.update_layout(title='Seasonal mean tempratures throught years:')
```



```
px.scatter(df1, 'Month', 'Temprature', size='Temprature', animation_frame='Year')
```



```
from sklearn.tree import DecisionTreeRegressor
from sklearn.model_selection import train_test_split
from sklearn.metrics import r2_score

df2 = df1[['Year', 'Month', 'Temprature']].copy()
df2 = pd.get_dummies(df2)
y = df2[['Temprature']]
x = df2.drop(columns='Temprature')
dtr = DecisionTreeRegressor()
train_x, test_x, train_y, test_y = train_test_split(x,y,test_size=0.3)
dtr.fit(train_x, train_y)
pred = dtr.predict(test_x)
r2_score(test_y, pred)
```

```
0.9581907823331162
```

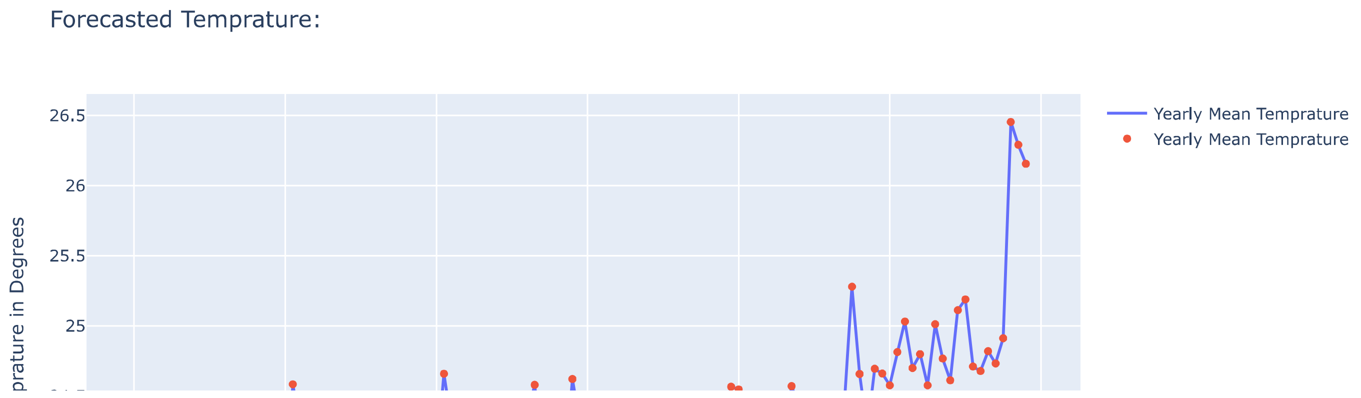
```
next_Year = df1[df1['Year']==2017][['Year', 'Month']]
next_Year.Year.replace(2017,2018, inplace=True)
next_Year= pd.get_dummies(next_Year)
temp_2018 = dtr.predict(next_Year)
temp_2018 = {'Month':df1['Month'].unique(), 'Temprature':temp_2018}
temp_2018=pd.DataFrame(temp_2018)
temp_2018['Year'] = 2018
temp_2018
```

```
<ipython-input-24-ccaa41336445>:2: FutureWarning:

A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting valu

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].me
```

```
   Month  Temprature  Year
0  JAN         20.59  2018
```

Next steps: Generate code with temp_2018 | View recommended plots | New interactive sheet

```
forecasted_temp = pd.concat([df1,temp_2018], sort=False).groupby(by='Year')['Temprature'].mean().reset_index()
fig = go.Figure(data=[go.Scatter(name='Yearly Mean Temprature', x=forecasted_temp['Year'], y=forecasted_temp['Temprature'], mode='lines'), g
fig.update_layout(title='Forecasted Temprature:',xaxis_title='Time', yaxis_title='Temprature in Degrees')
```


Forecasted Temprature:
prature in Degrees
Yearly Mean Temprature
Yearly Mean Temprature