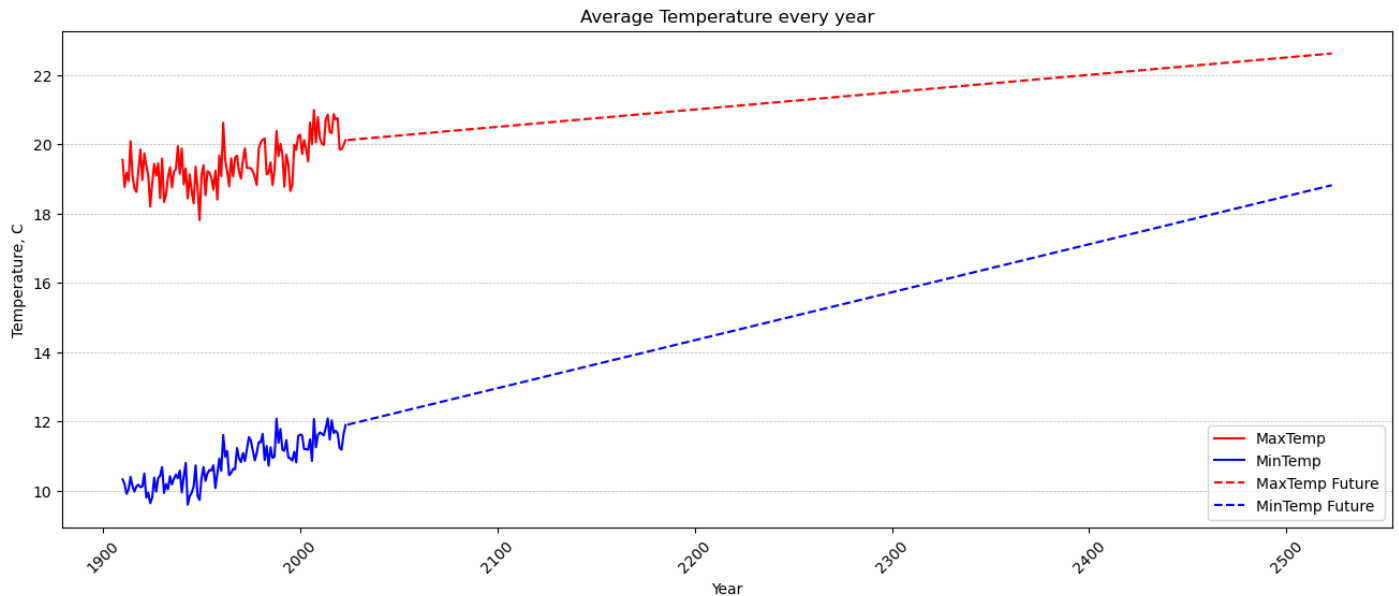


Predict the temperature rise for the next 500 years

Using a linear interpolation here is the trend in temperature increase.



Interesting to see that the max temperatures will increase from around 20C to 23 in 500 years whereas the minimum temperatures have a steeper trend going from 11C to 19C for the same period of time. There will be hotter nights but days will remain almost the same.

Here is the code:

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np

df_max = pd.read_csv('tmax.csv')
df_min = pd.read_csv('tmin.csv')

# Assuming df_max and df_min are your DataFrames
df_max = df_max.reset_index()
df_min = df_min.reset_index()

# Convert 'Date' column to datetime
df_max['Date'] = pd.to_datetime(df_max['Date'], dayfirst=True)
```

```

df_min['Date'] = pd.to_datetime(df_min['Date'], dayfirst=True)

# Calculate average temperature every year
df_max_year_avg = df_max.groupby(df_max['Date'].dt.year)['t_max'].mean().reset_index()
df_min_year_avg = df_min.groupby(df_min['Date'].dt.year)['t_min'].mean().reset_index()

# Rename columns
df_max_year_avg.columns = ['Year', 'Average Max Temperature']
df_min_year_avg.columns = ['Year', 'Average Min Temperature']

# Calculate slope and intercept of temperature trend
slope_max = (df_max_year_avg['Average Max Temperature'].iloc[-1] - df_max_year_avg['Average
Max Temperature'].iloc[0]) / (df_max_year_avg['Year'].iloc[-1] -
df_max_year_avg['Year'].iloc[0])
intercept_max = df_max_year_avg['Average Max Temperature'].iloc[0] - slope_max *
df_max_year_avg['Year'].iloc[0]

slope_min = (df_min_year_avg['Average Min Temperature'].iloc[-1] - df_min_year_avg['Average
Min Temperature'].iloc[0]) / (df_min_year_avg['Year'].iloc[-1] -
df_min_year_avg['Year'].iloc[0])
intercept_min = df_min_year_avg['Average Min Temperature'].iloc[0] - slope_min *
df_min_year_avg['Year'].iloc[0]

# Extrapolate temperature trend for next 500 years
years_future = np.arange(df_max_year_avg['Year'].iloc[-1] + 1, df_max_year_avg['Year'].iloc[-
1] + 501)
temp_max_future = slope_max * years_future + intercept_max
temp_min_future = slope_min * years_future + intercept_min

# Plotting
plt.figure(figsize=(16,6))
plt.plot(df_max_year_avg['Year'], df_max_year_avg['Average Max Temperature'], color='red',
label='MaxTemp')
plt.plot(df_min_year_avg['Year'], df_min_year_avg['Average Min Temperature'], color='blue',
label='MinTemp')
plt.plot(years_future, temp_max_future, color='red', linestyle='--', label='MaxTemp Future')
plt.plot(years_future, temp_min_future, color='blue', linestyle='--', label='MinTemp Future')
plt.legend()
plt.xlabel('Year')
plt.ylabel('Temperature, C')

```

```
plt.grid(axis='y', linestyle='--', linewidth=0.5)
plt.title('Average Temperature every year')
plt.xticks(rotation=45)
plt.show()
```

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