CLIMATE CHANGE

By Team X

MOTIVATION

Climate is the long-term weather pattern in an area, typically averaged over 30 years.

Earth's climate is undergoing changes never seen before by humans. Compared with levels before the Industrial Revolution, the global average temperature has been rising steadily. That may not sound like much, but it's already severely impacted how our planet functions.

Studying climate change will help us understand why global temperatures continue to rise, how the climate affects us, and how we can tackle this challenge before things get much worse.

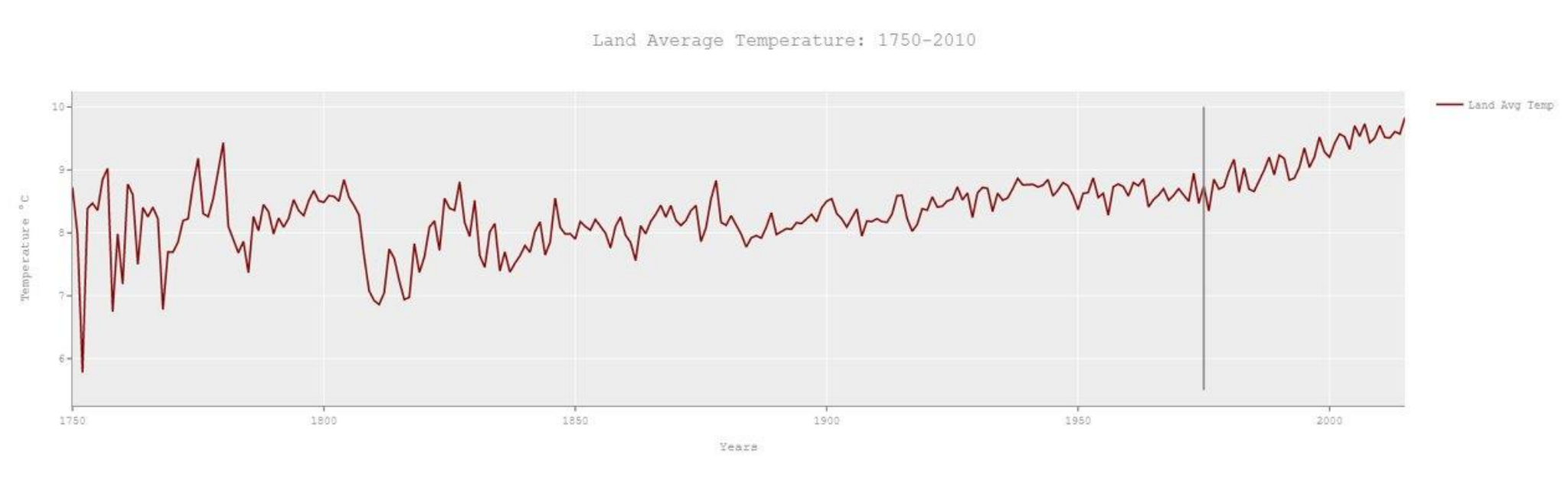
Effects of Climate Change

Left unchecked, climate change has the potential to:

- Increase the frequency of natural disasters.
- Damage natural ecosystems and human-built infrastructures.
- Cause human health issues via food shortages, increased heat, pollution, and more.

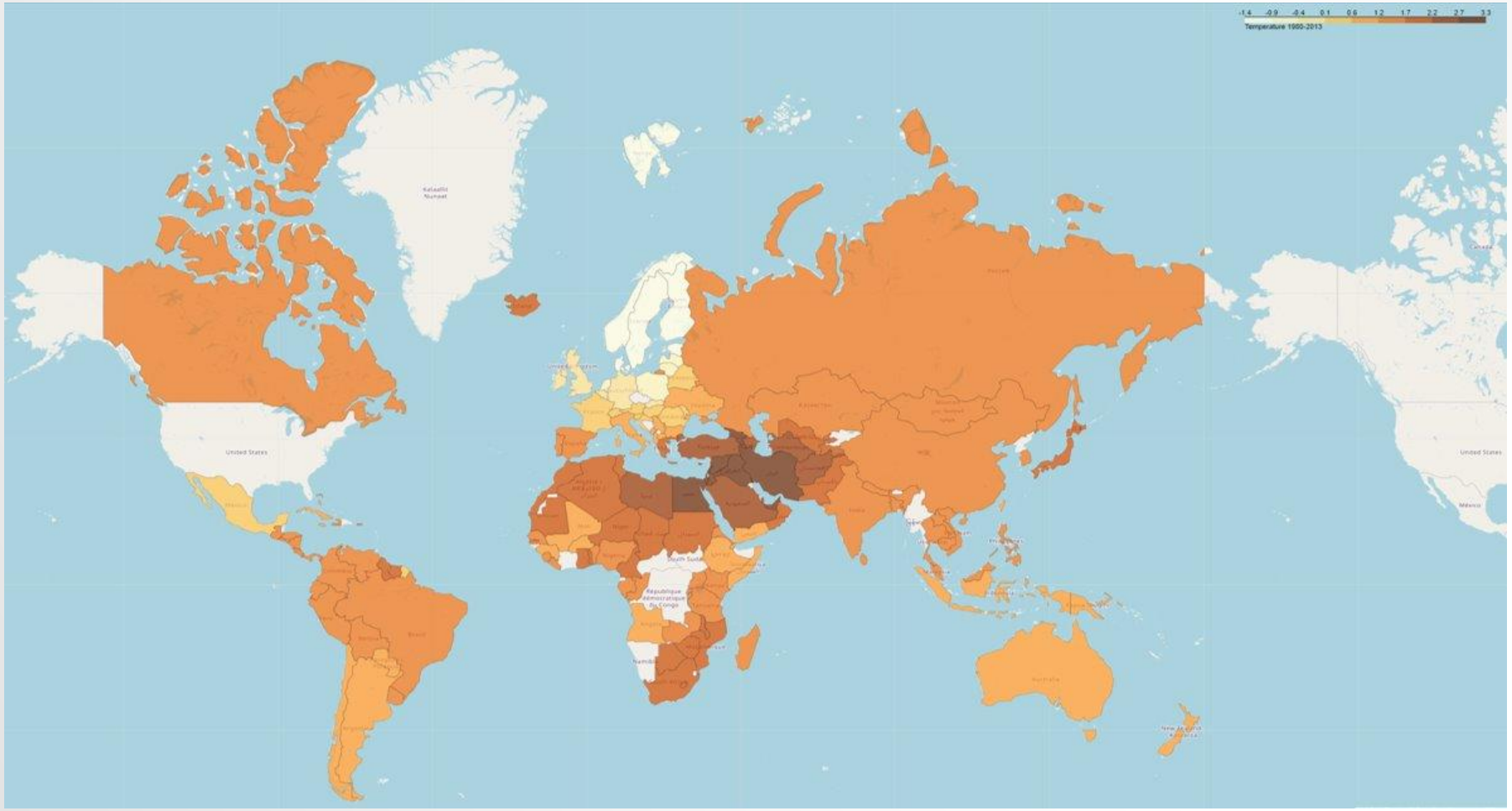
Any change that affects the planet ultimately affects human beings. The best way to help reduce the change is to stay educated and informed about climate change. After all, we caused it, so it's up to us to stop it.

Global Temperature Trend



Average rate of increase in temperature of **land & ocean** from 1980 per decade **0.23**°C (0.41°F)
Average rate of increase in temperature of **land & ocean** from 1880 per decade **0.08**°C (0.14°F)

Spatial Analysis



RAINFALL ANALYSIS

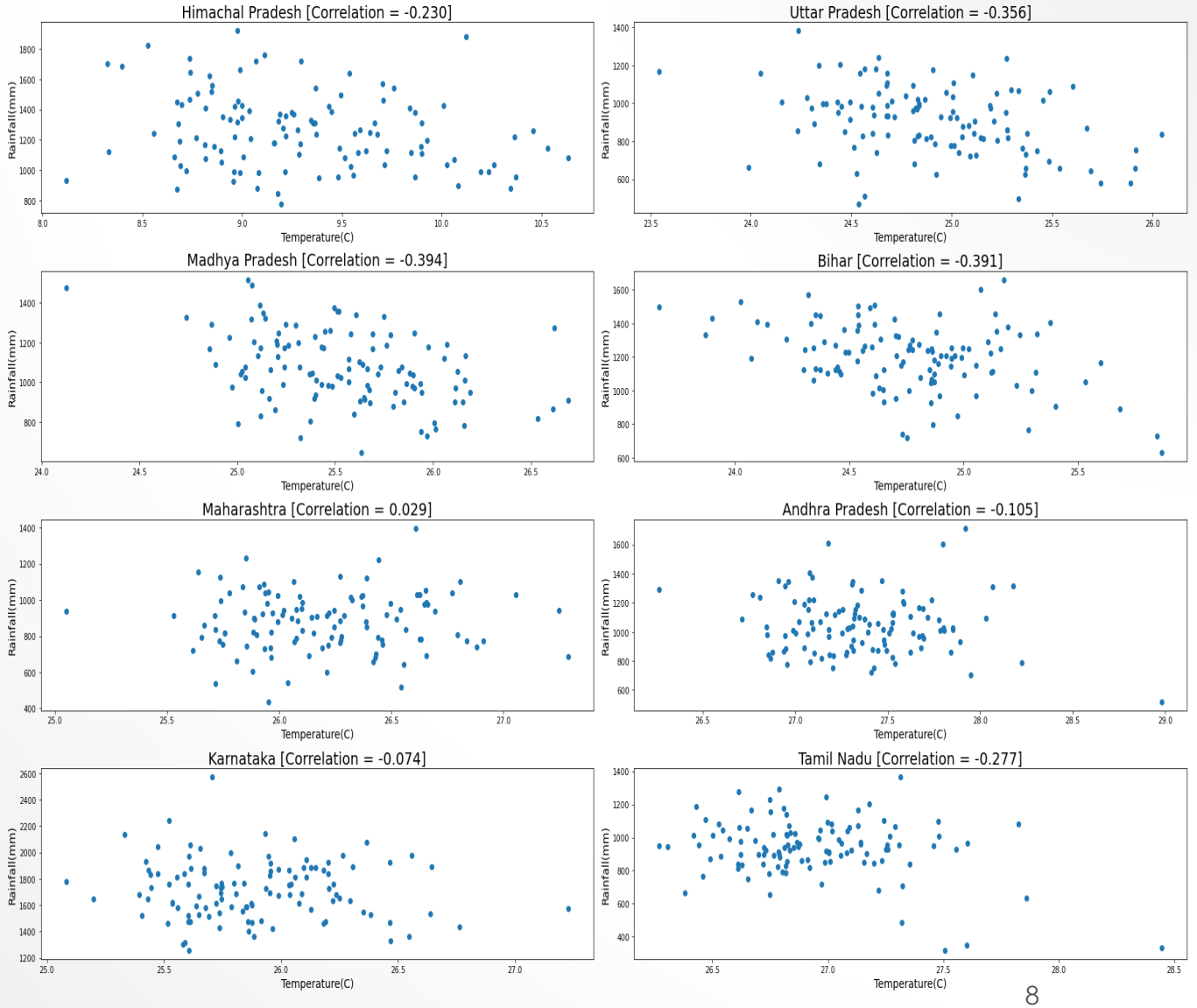
RAINFALL ANALYSIS

Rainfall is a climatic factor which affects,

- Crop Development
- Droughts, Floods
- Wildfires
- Land Degradation
- Desertification
- Ground Water level

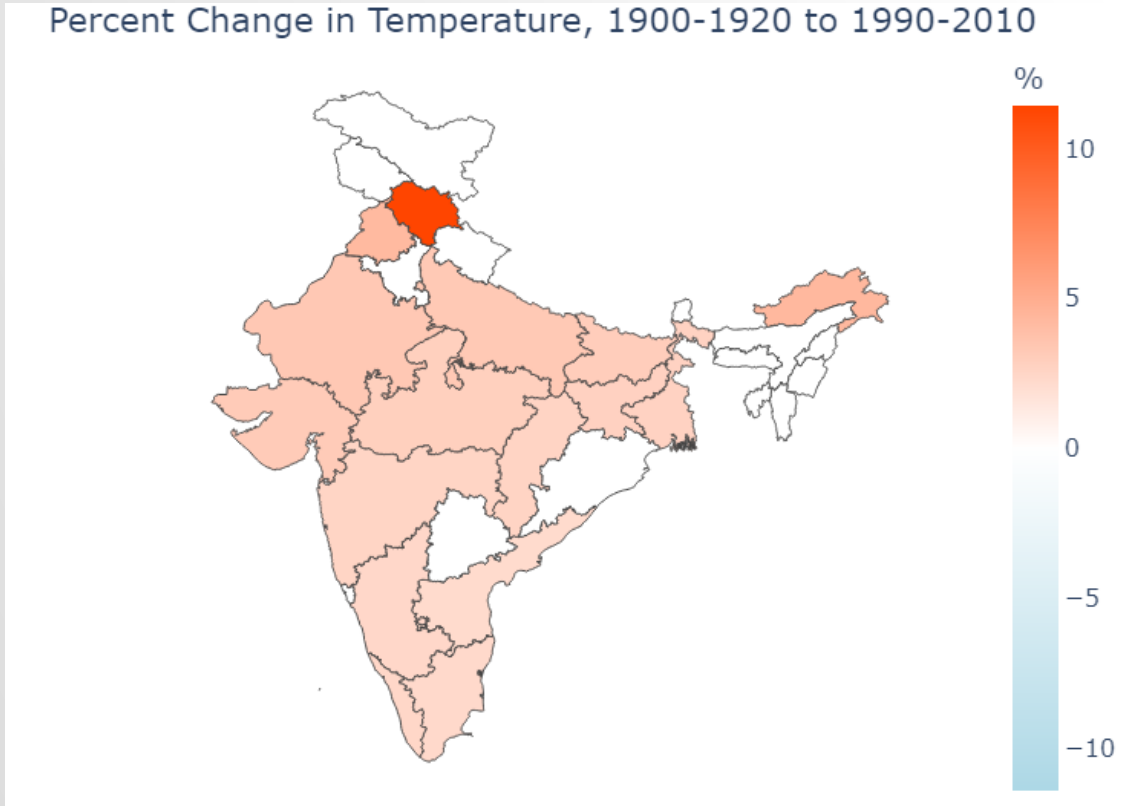
CORRELATION WITH RAINFALL

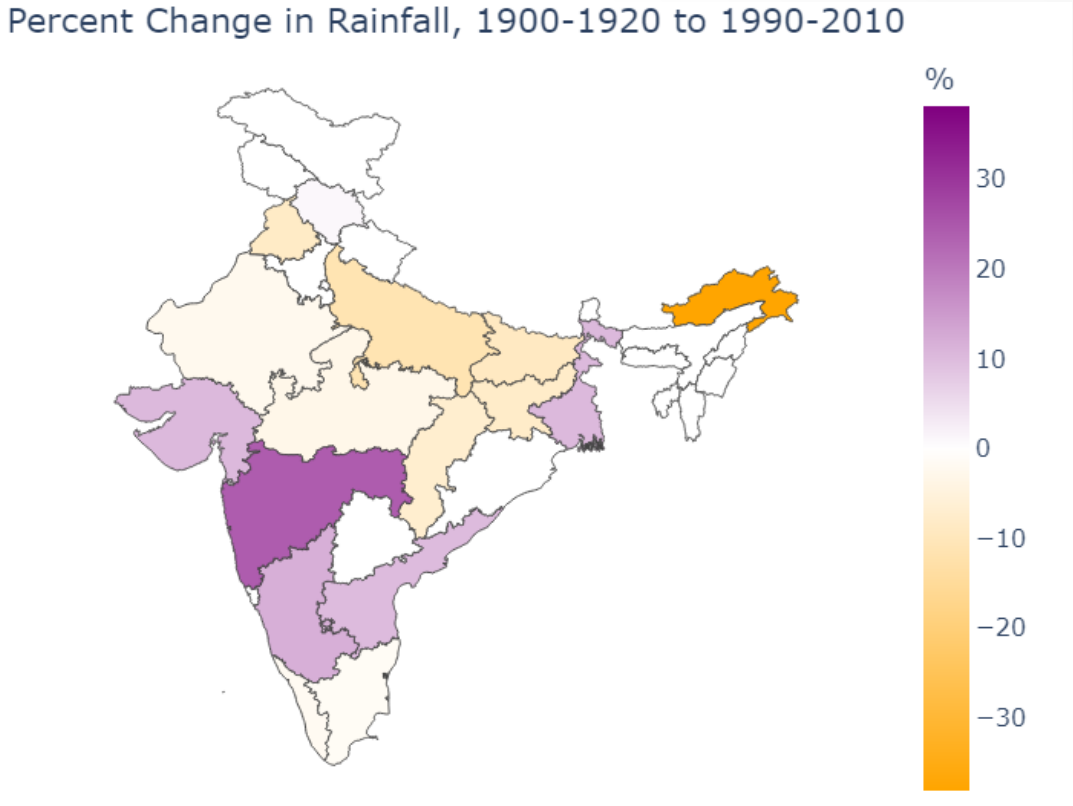
Correlation between Annual Rainfall and Average Annual Temperature on different states of India between (1900 – 2013).



RAINFALL ANALYSIS

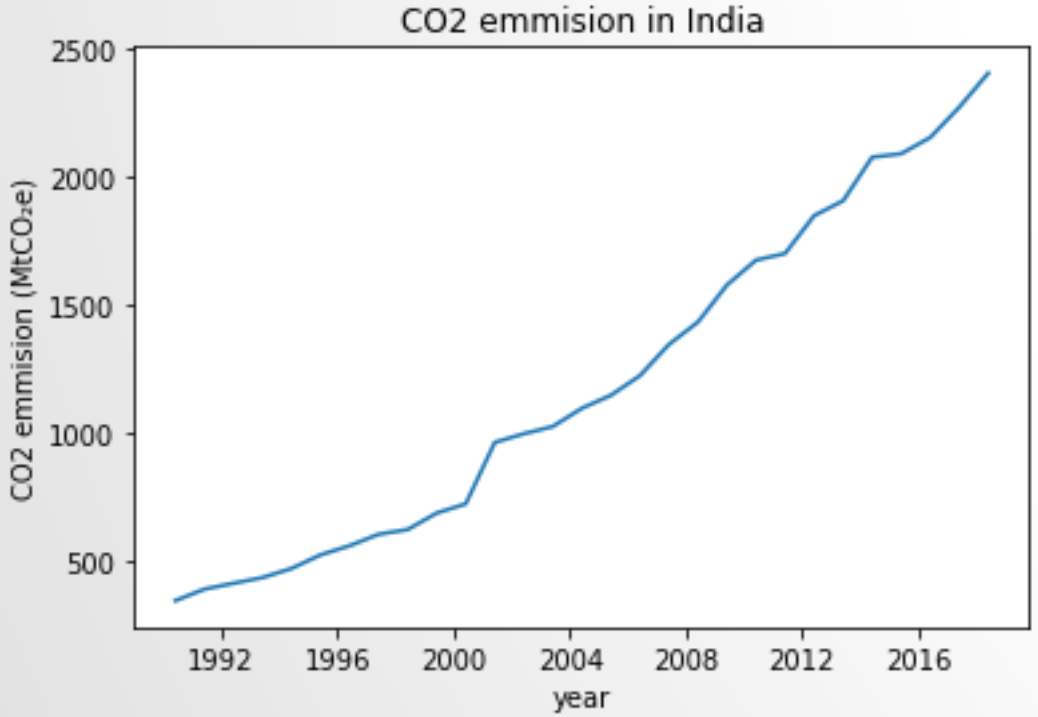
In every state Temperature has risen by 2% to 5% except for Himachal Pradesh where Temperature has risen by 11%.

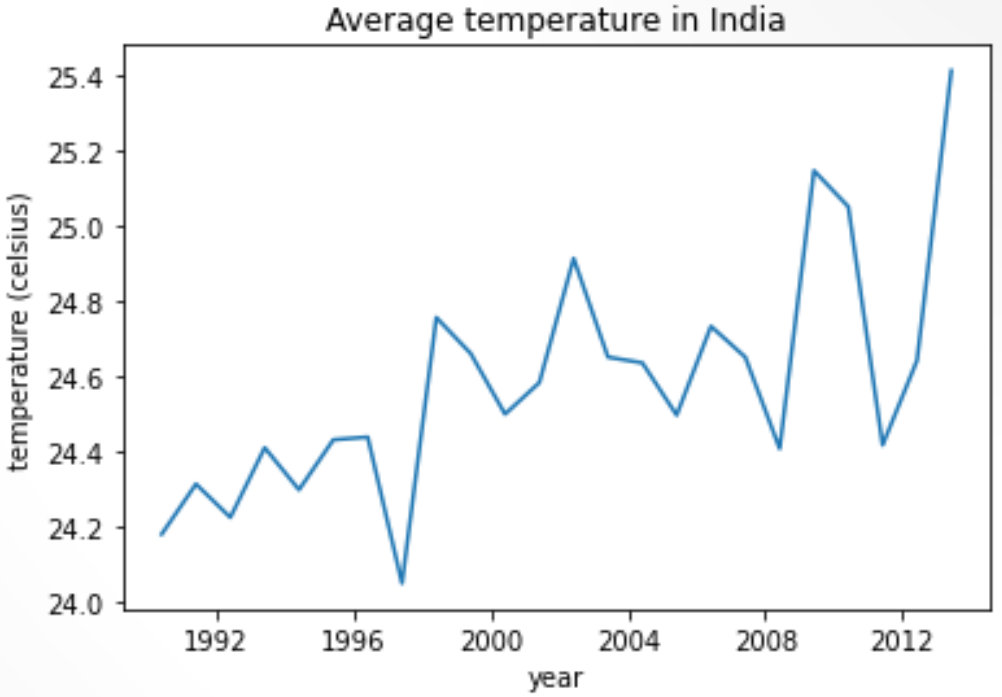




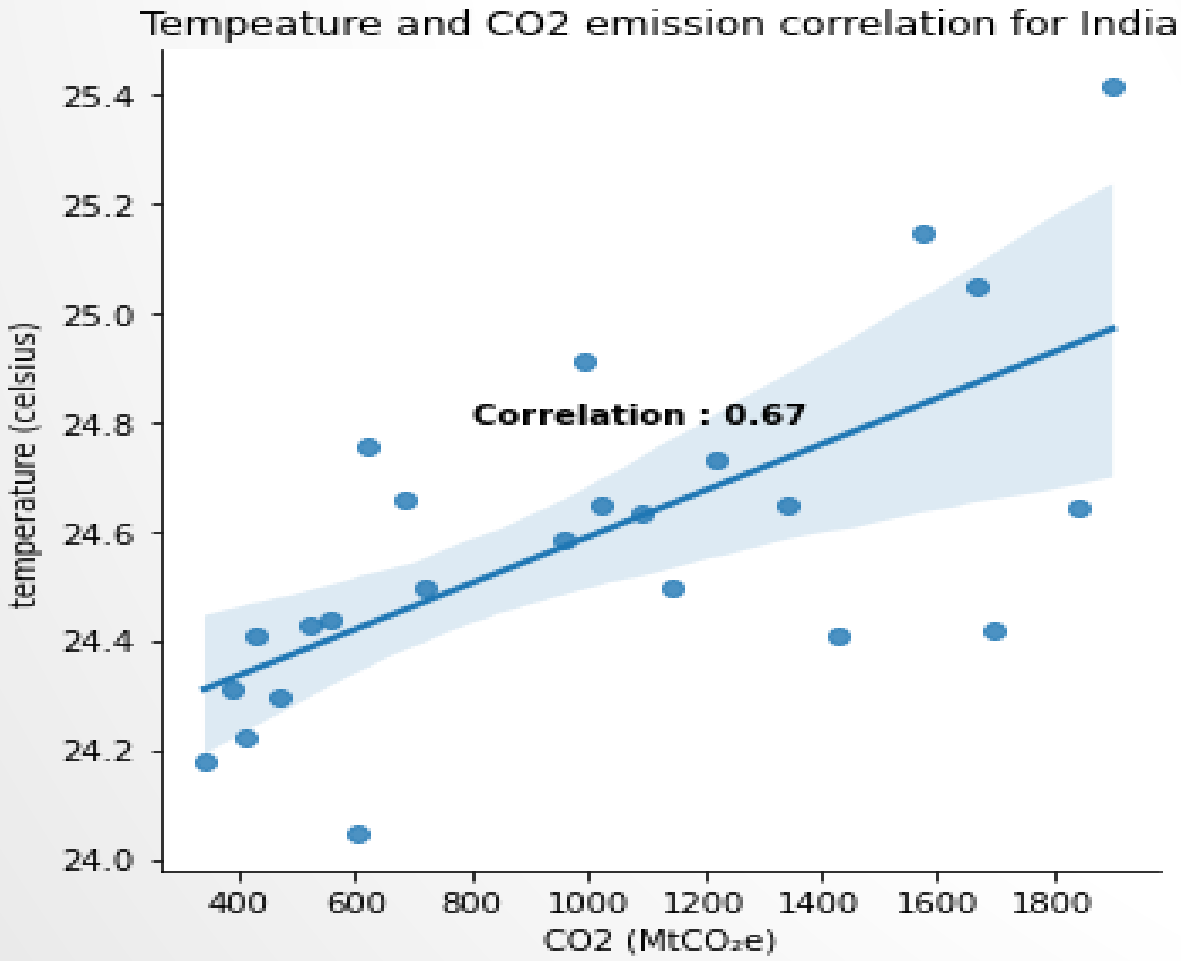
CORRELATION WITH CO_2 EMISSION

CORRELATION WITH CO_2 EMISSION

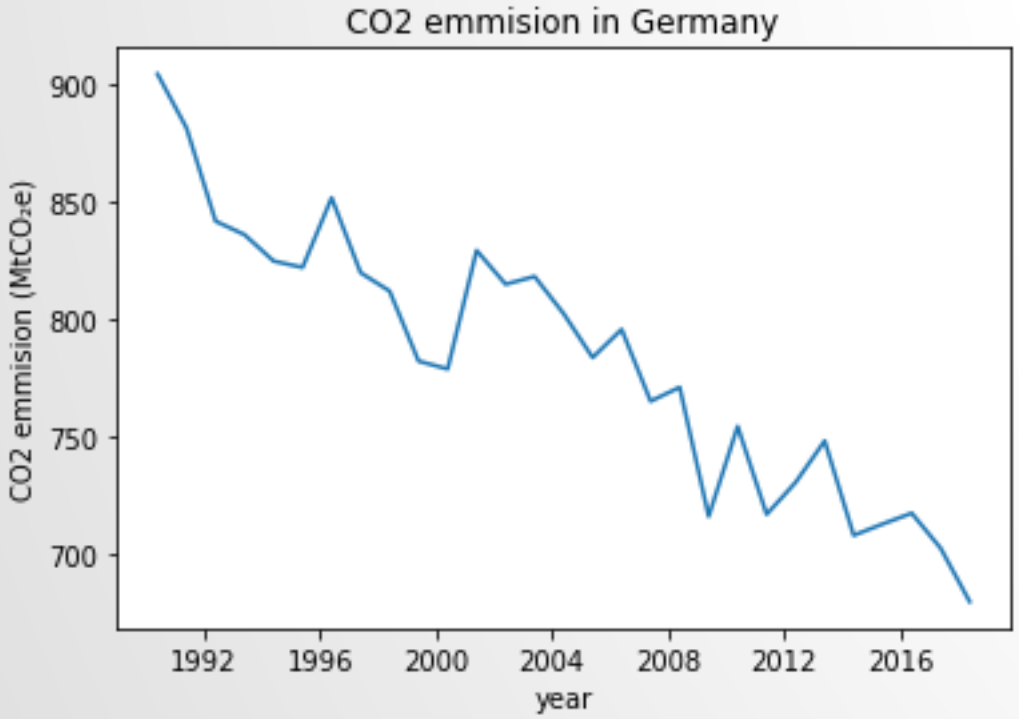


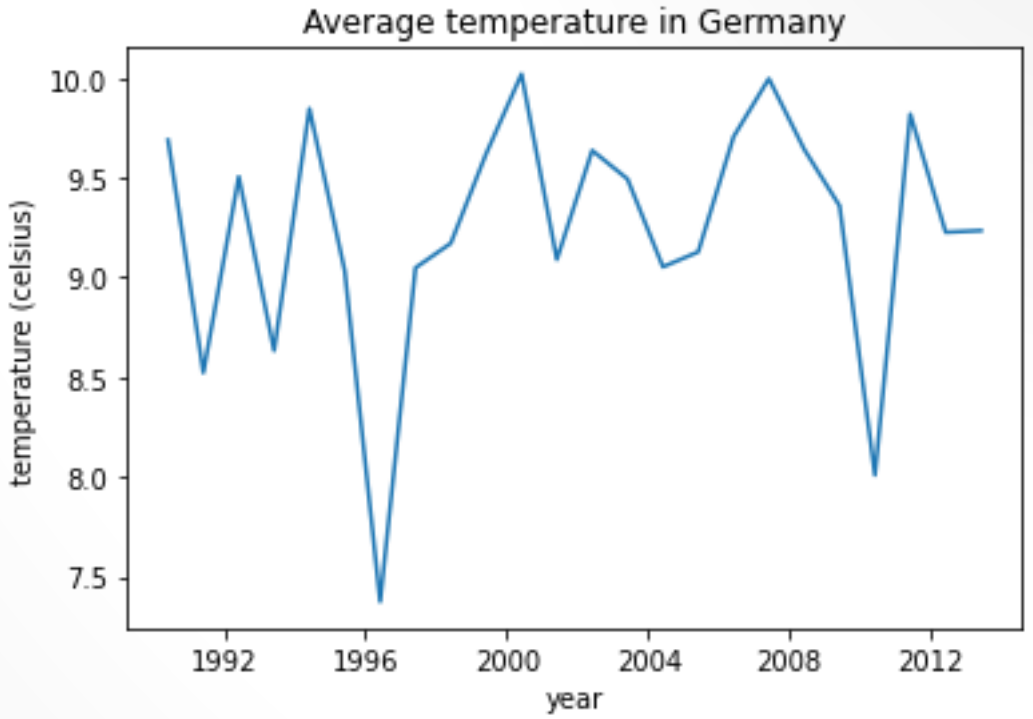


CORRELATION WITH CO_2 EMISSION

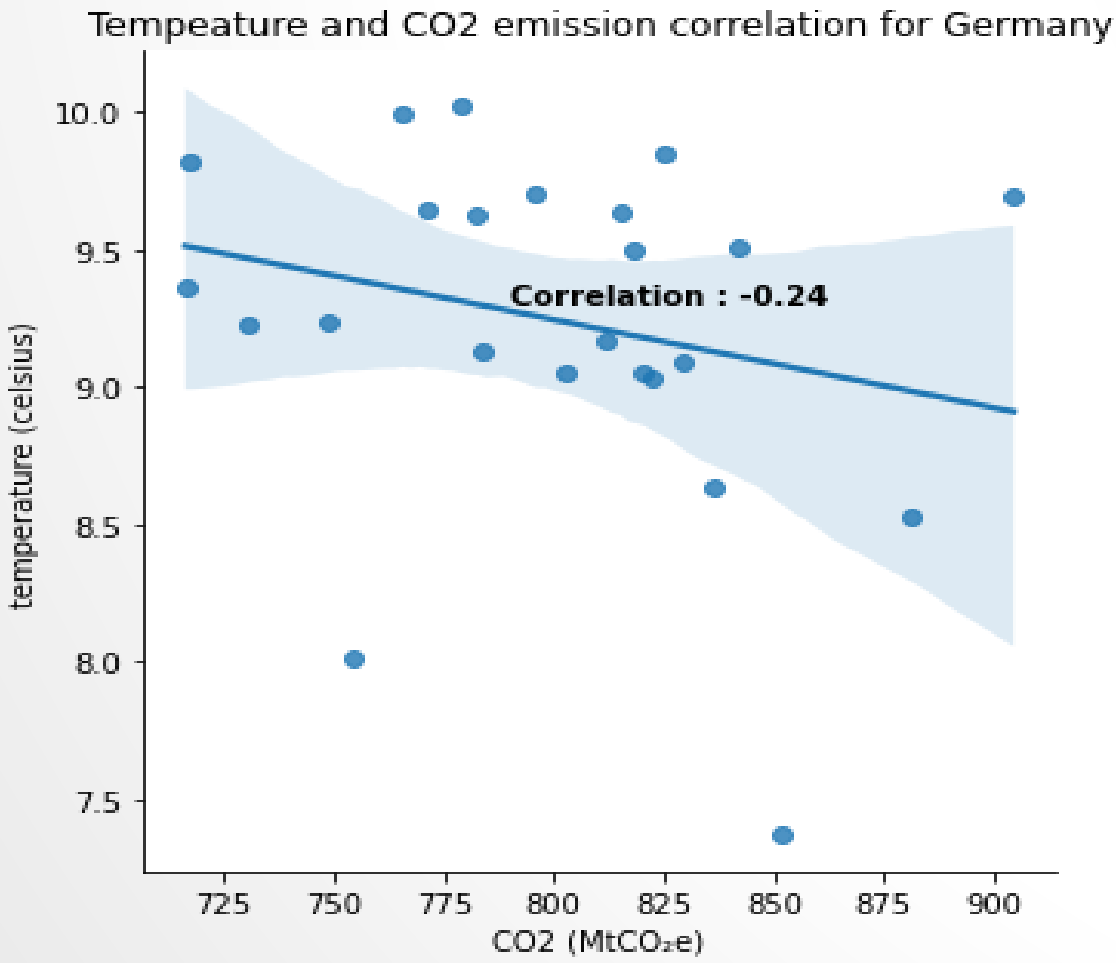


CORRELATION WITH CO_2 EMISSION





CORRELATION WITH CO_2 EMISSION

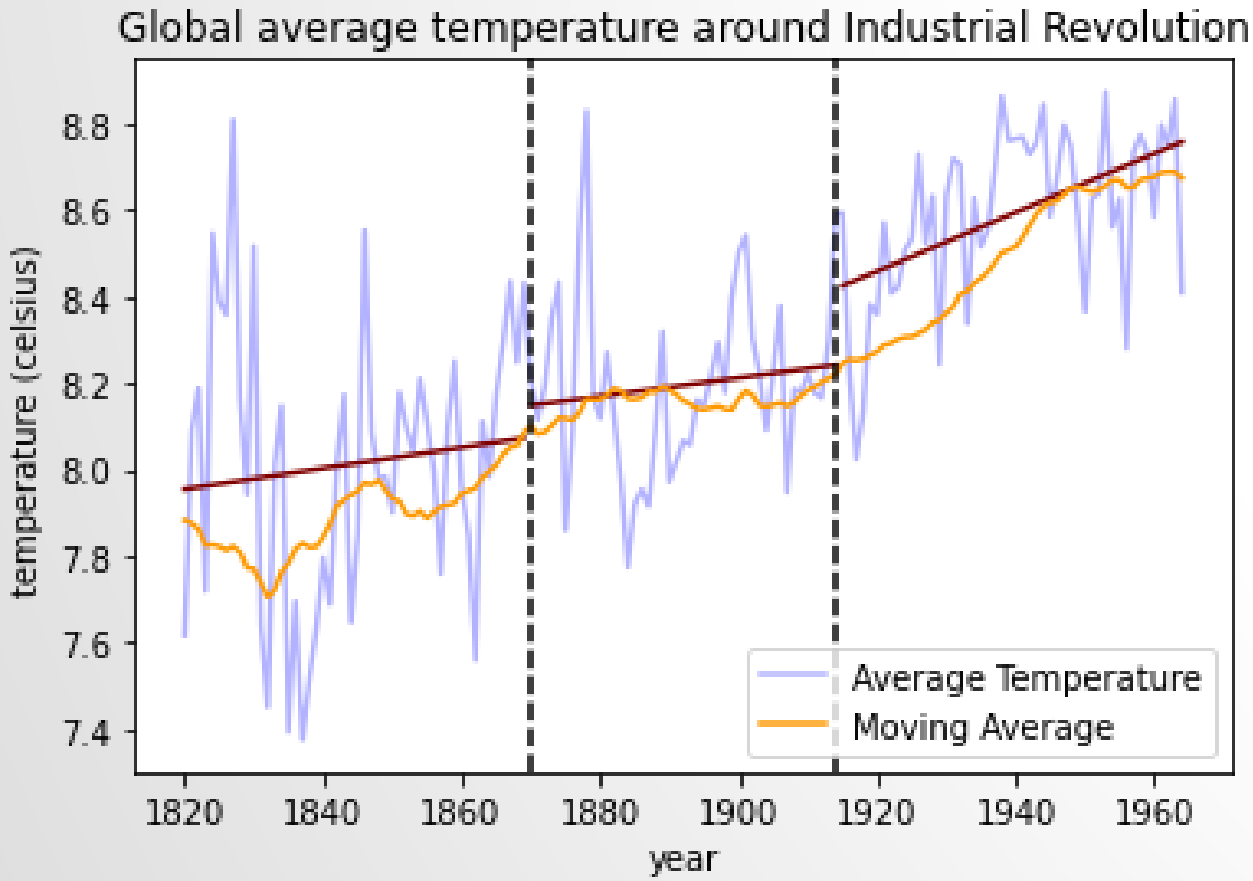


EVENT ANALYSIS

INDUSTRIAL REVOLUTION

- The Second Industrial Revolution, also known as the Technological Revolution, was a phase of rapid scientific discovery, standardization, mass production, and industrialization from the late 19th century into the early 20th century (1870 - 1915).

INDUSTRIAL REVOLUTION

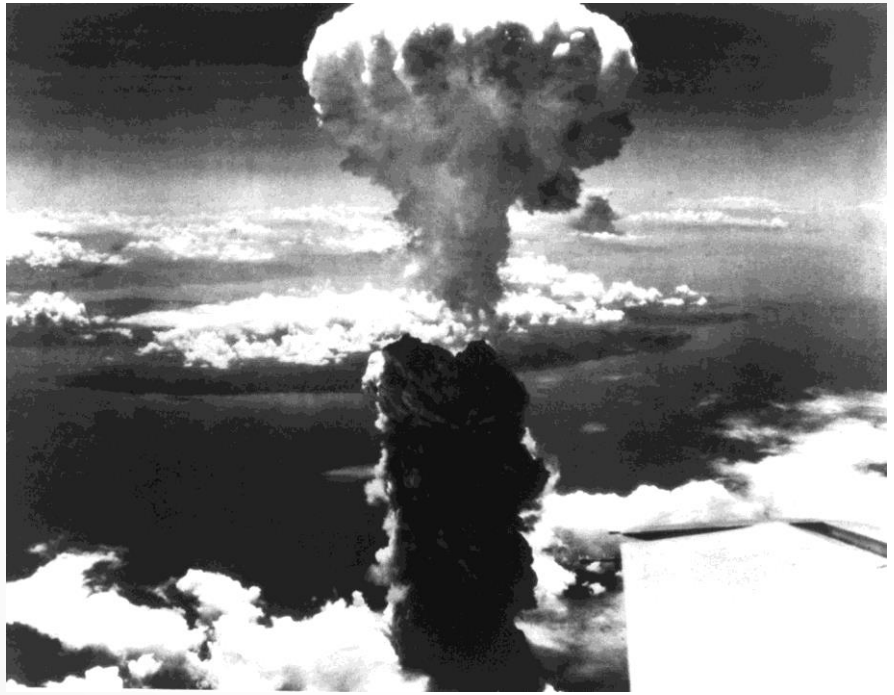


Average increase in global temperature :

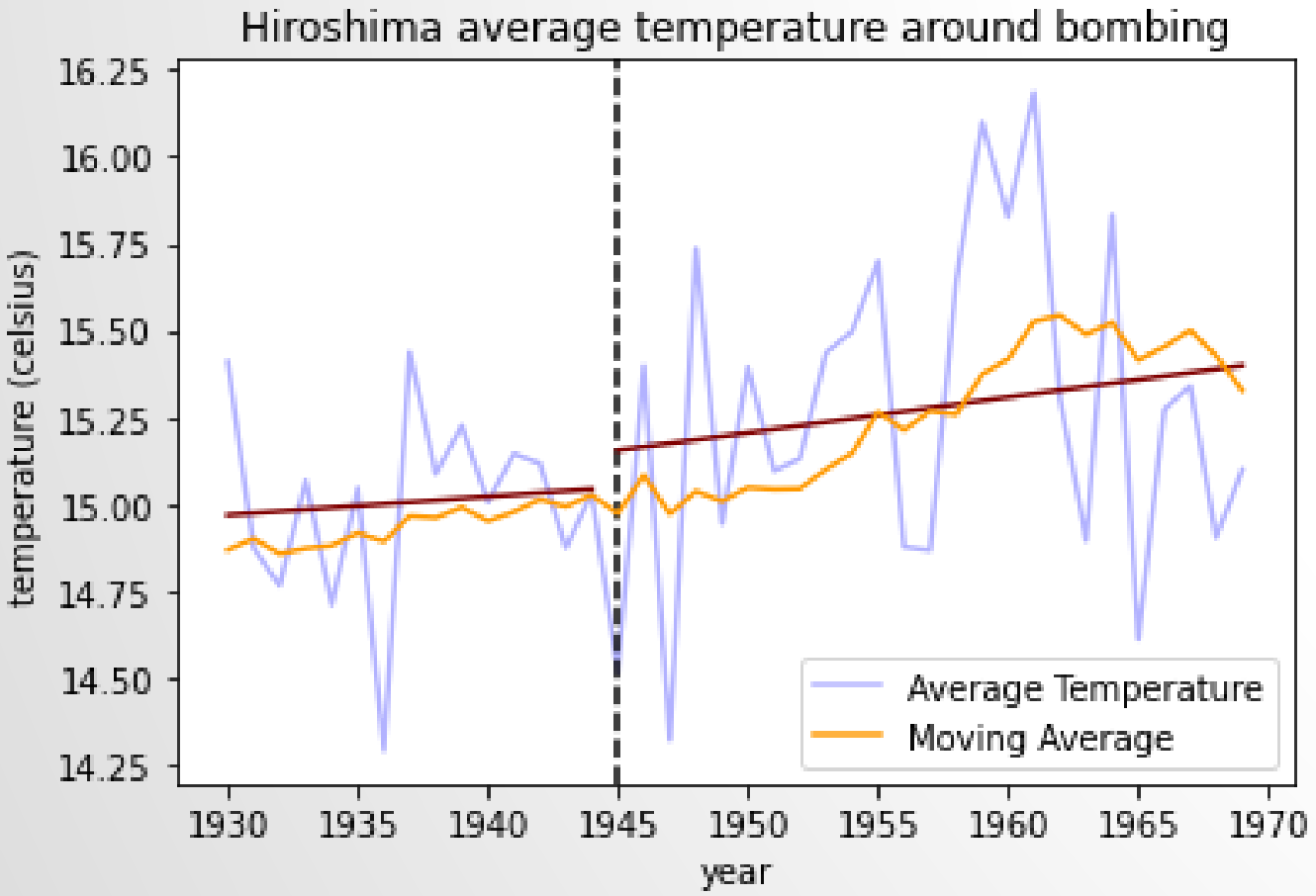
- Before 1870 : 0.0024 °C per year
- 1870 - 1915 : 0.0021 °C per year
- After 1915 : 0.0068 °C per year

HIROSHIMA BOMBING

- The United States detonated two atomic bombs over the Japanese cities of Hiroshima and Nagasaki on 6 and 9 August 1945, respectively. The two bombings killed between 129,000 and 226,000 people.



HIROSHIMA BOMBING



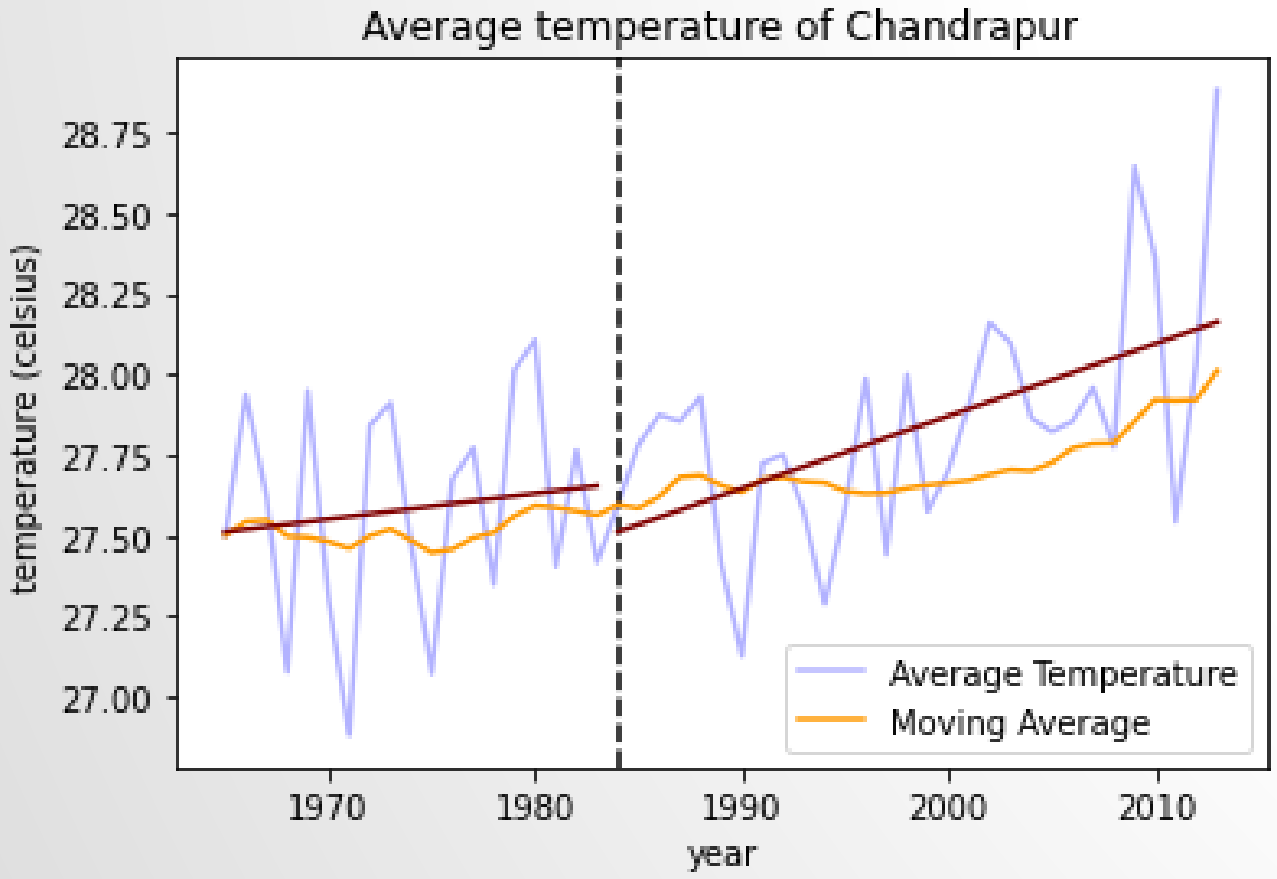
Average increase temperature in Hiroshima :

- Before 1945 : 0.0052 °C per year
- After 1945 : 0.0101 °C per year

CHANDRAPUR POWER PLANT

- Chandrapur power plant is a thermal power plant located in Chandrapur district in the Indian state of Maharashtra. With the total capacity of 3340MW the plant is the largest power plant in Maharashtra.

CHANDRAPUR POWER PLANT



Average increase temperature in Chandrapur :

- Before 1984 : 0.0079 °C per year
- After 1984 : 0.0224 °C per year

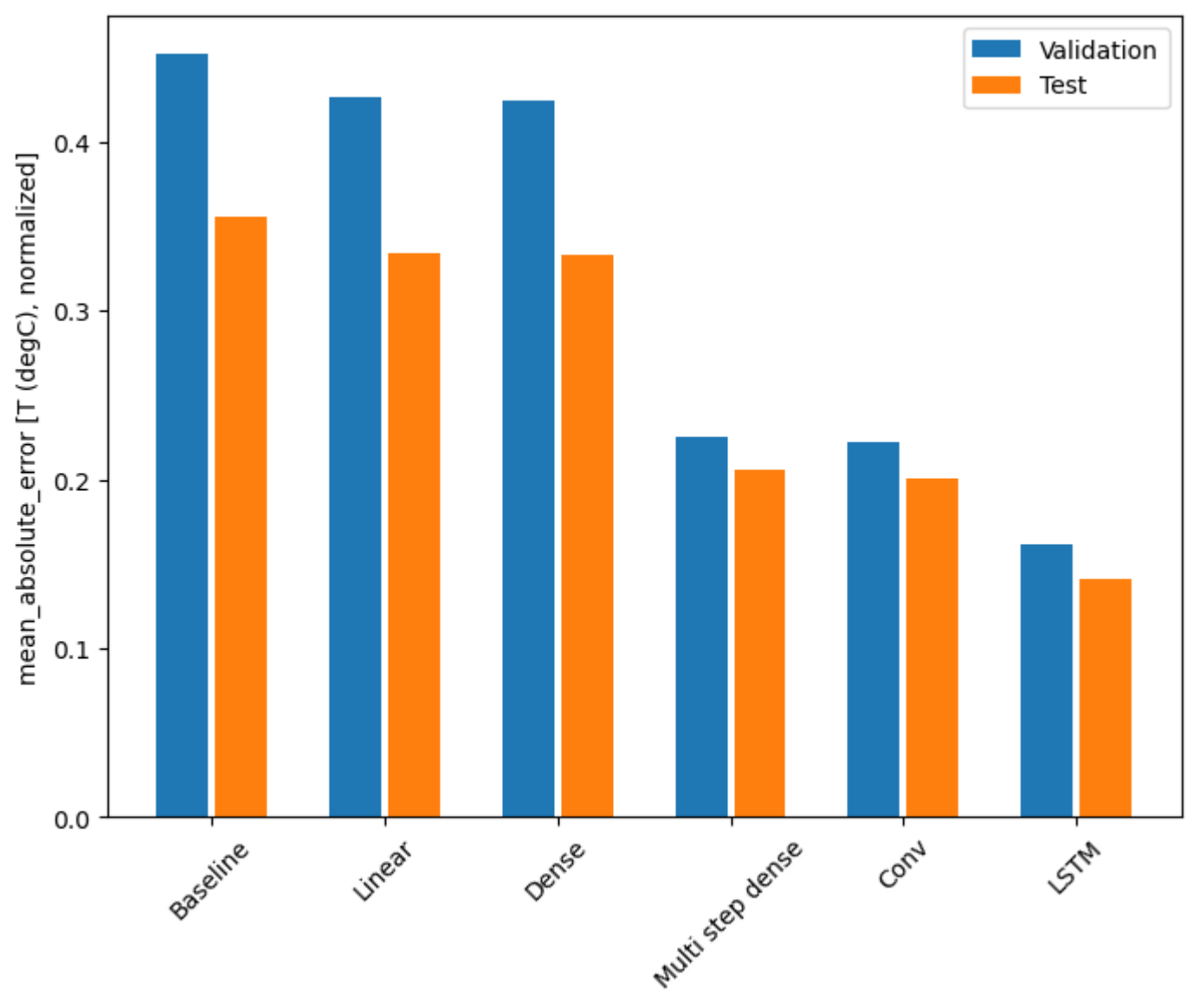
TEMPERATURE FORECASTING

Temperature forecasting

Temperature Forecasting is covered in two main parts:-

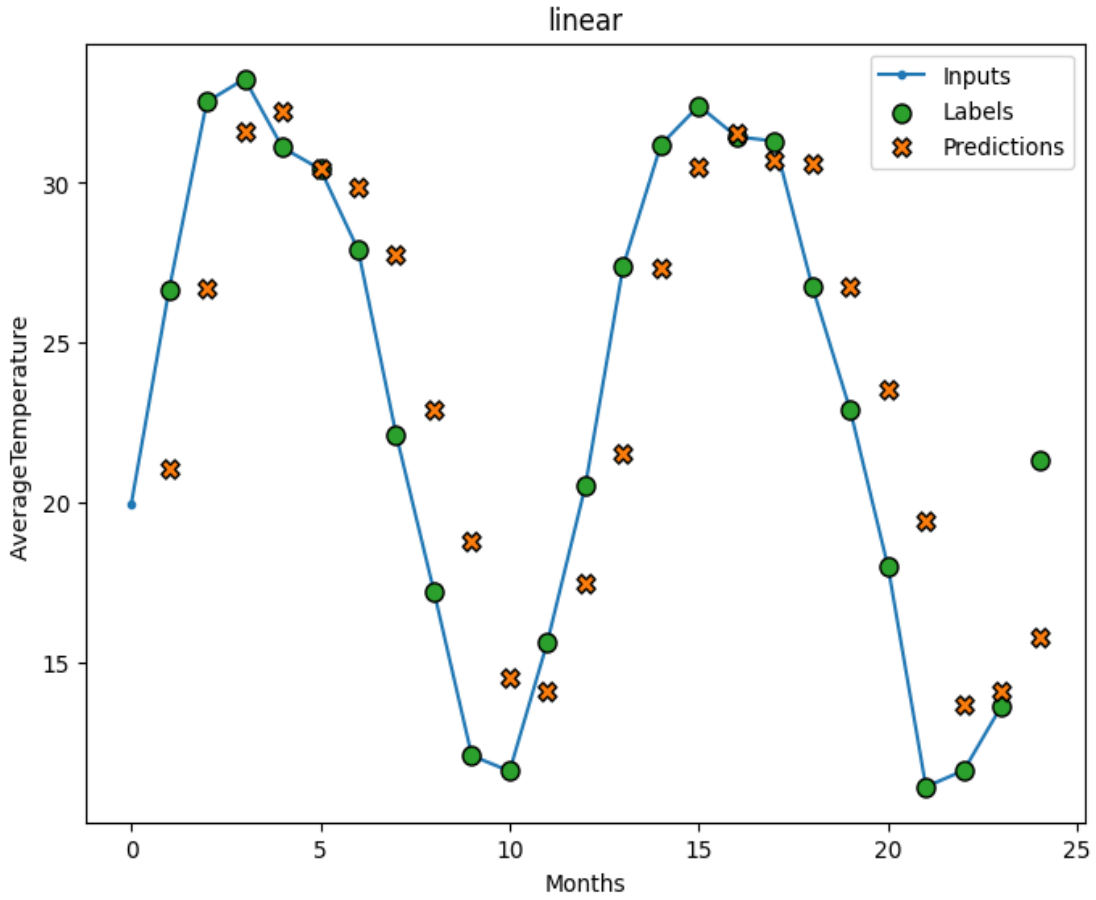
- Forecast for a single time step:
  - Using only a single timestep as input
  - Using multiple timesteps as input
- Forecast multiple steps:
  - Single-shot: Make the predictions all at once.
  - Autoregressive: Make one prediction at a time and feed the output back to the model.

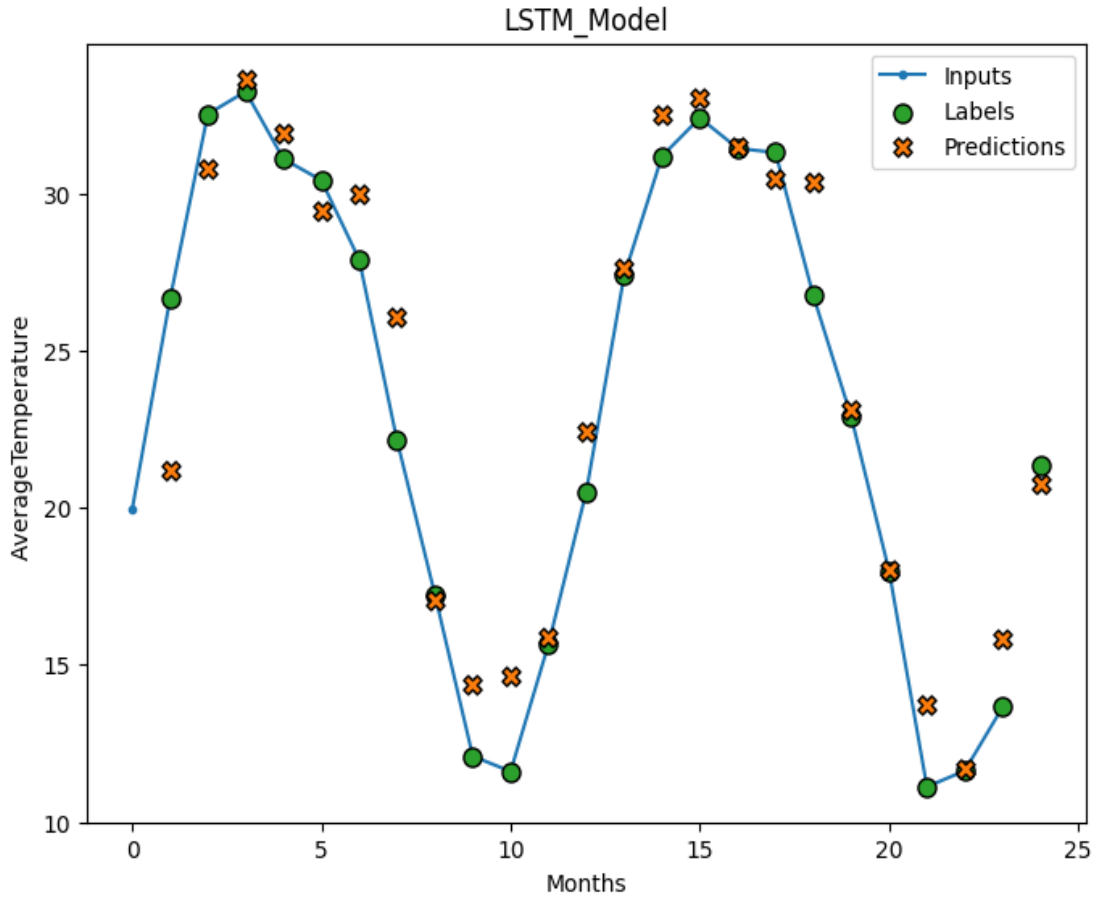
RESULTS ON SINGLE STEP MODELS



Model Name	MAE(on test Data)
Baseline	0.36
Linear	0.33
Dense	0.32
MultiStep Dense	0.2057
Convolution	0.19
LSTM	0.14

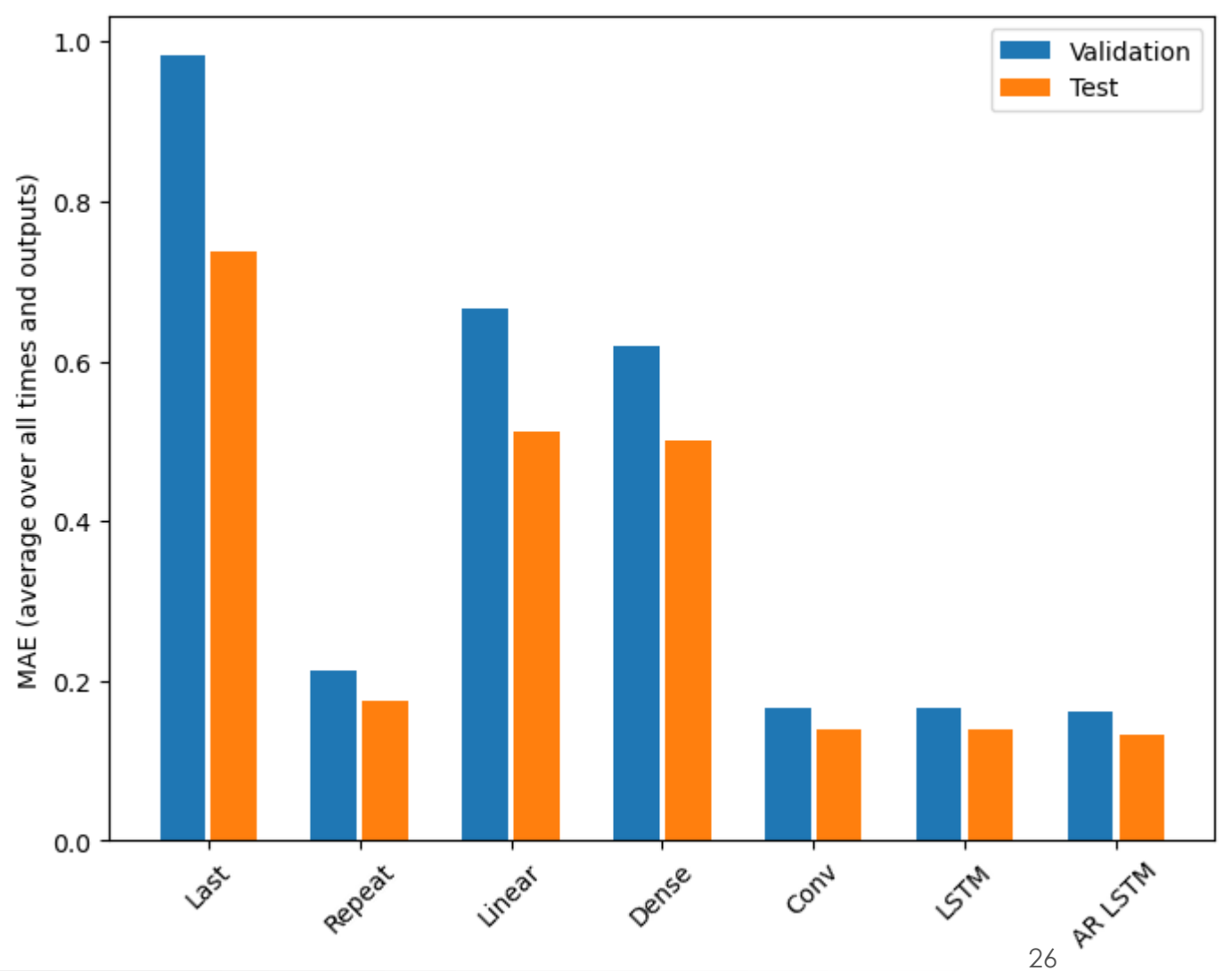
SINGLE STEP MODELS



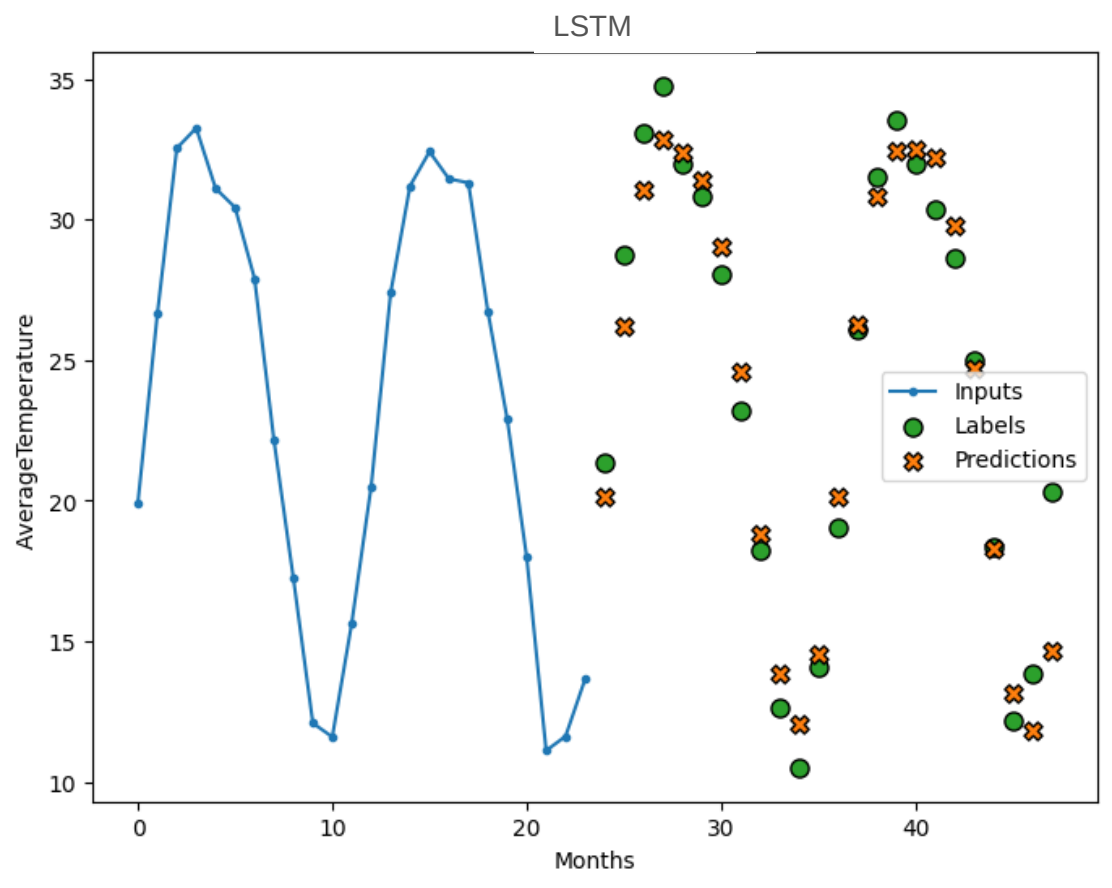


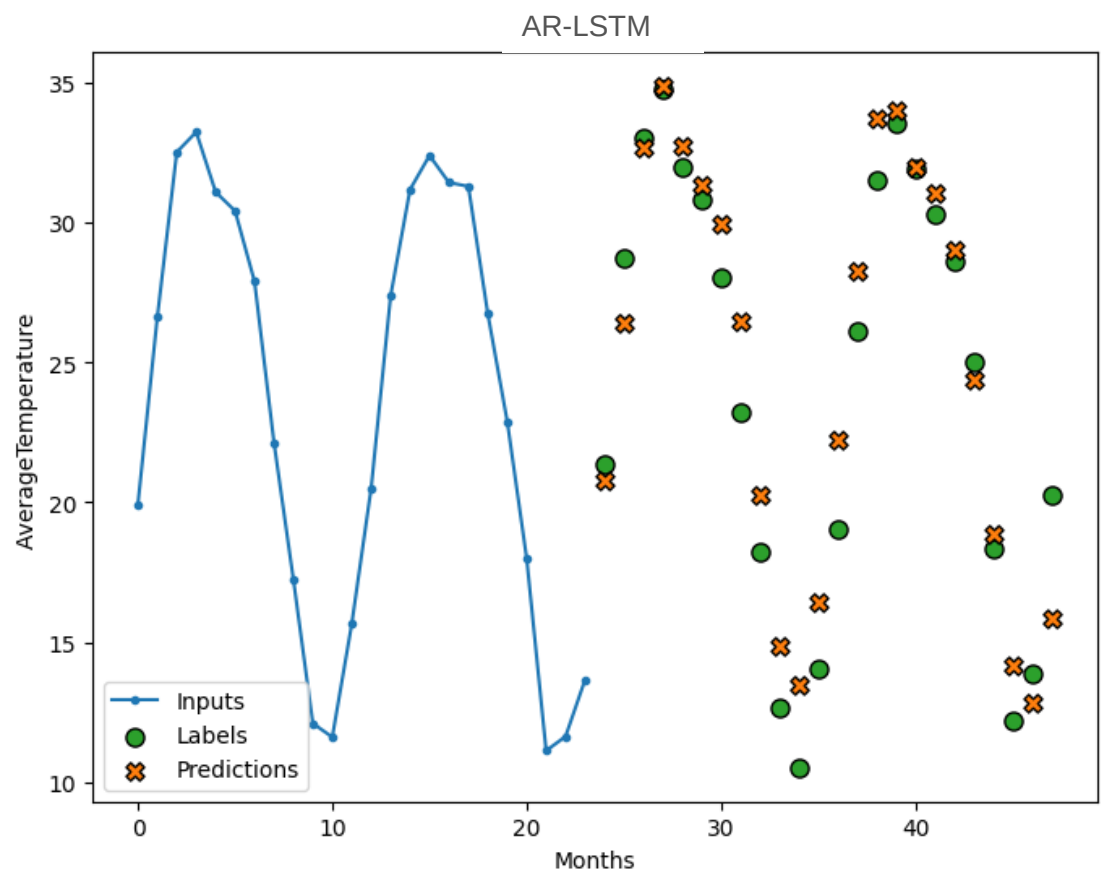
RESULTS ON MULTI STEP MODELS.

Model Name	MAE(on test Data)
Last	0.7378
Repeat	0.19
Linear	0.46
Dense	0.44
Convolution	0.17
LSTM	0.14
AR-LSTM	013



MULTI STEP MODELS





CONCLUSION

Our analysis show that the average temperature around the earth is steadily increasing. It also leads to extremes weather conditions and many natural disasters.

Rising temperatures maybe linked with rising CO_2 emissions. Greenhouse gas concentration are found to be highest in two million years, which should be immediate concern.

The melting of glaciers, rising sea levels, heatwaves, wildfires, droughts, floods are all increasing and maybe because of rising global temperatures.

It is the high time that the issue of climate change should be taken seriously and worked upon.

THANK YOU ☺