CLIMATE ACTION: FOOD SHORTAGE & GREENHOUSE EMISSIONS

Team: NOVA

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INTRODUCTION

GOALS

1. Collect and analyze climate data and its correlation with food availability
2. Perform trend analysis on greenhouse gas emissions and temperature
3. Compare trends of developing vs developed countries

MOTIVATION

1. Study fluctuations in climate related data
2. Lack of a data pipeline to aggregate the climate data across different stations and countries

WHY BIG DATA?

1. Handling large volumes of data – scalability and distributed computing
2. Extracting meaningful insights
3. Addressing regional disparities

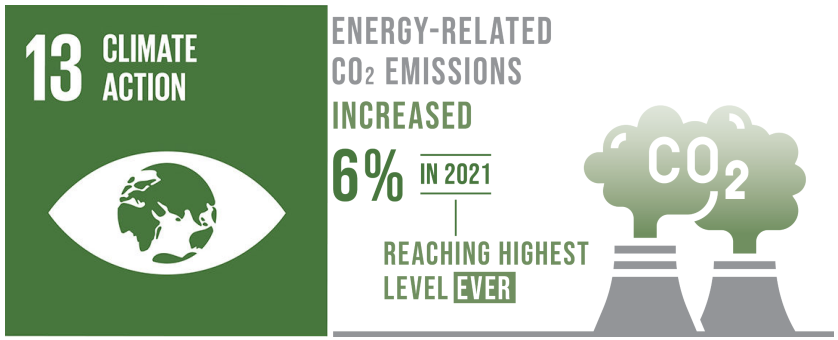
BACKGROUND

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

Empowering farmers for climate-smart agriculture and sustainable futures

Global Yield Gap Atlas

Providing vital insights into crop yield potential to support informed decision-making for global food security.



Concerning levels of greenhouse gases and major emphasis on food security

DATA

IOWA STATE UNIVERSITY (IOWA ENVIRONMENTAL MESONET)

- Raw weather data collected across 1960 – 2016
- ~ 50 GB, 7 features, 150+ countries
- Multiple stations across multiple countries

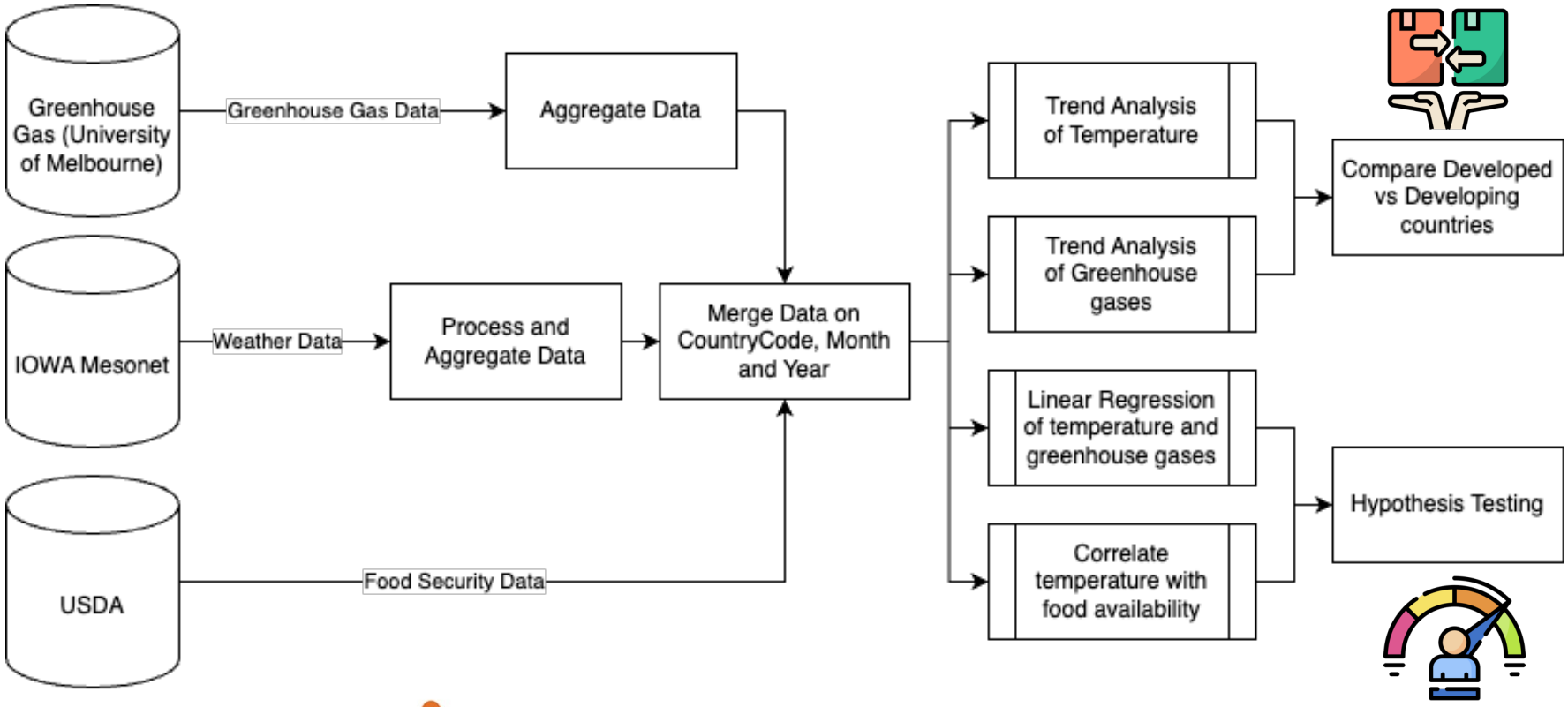
UNIVERSITY OF MELBOURNE – GREENHOUSE GASES LEVELS

- Carbon Dioxide, Methane and Nitrous Oxide data collected across 1960 – 2015
- ~ 1.5 GB, 8 features

UNITED STATES DEPARTMENT OF AGRICULTURE

- Food security related data from 1990 – 2015
- ~ 10 MB, 25+ features

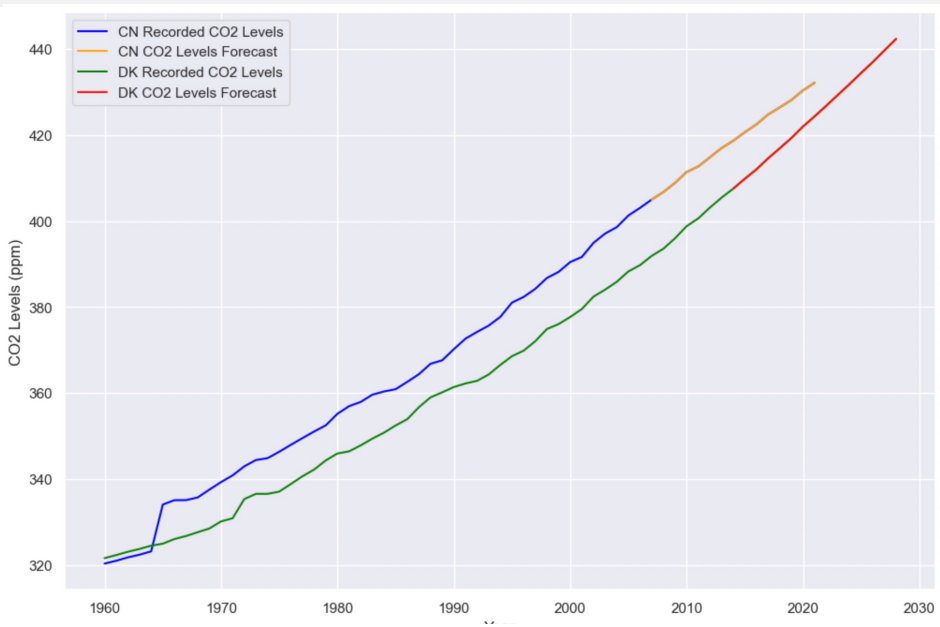
METHODS

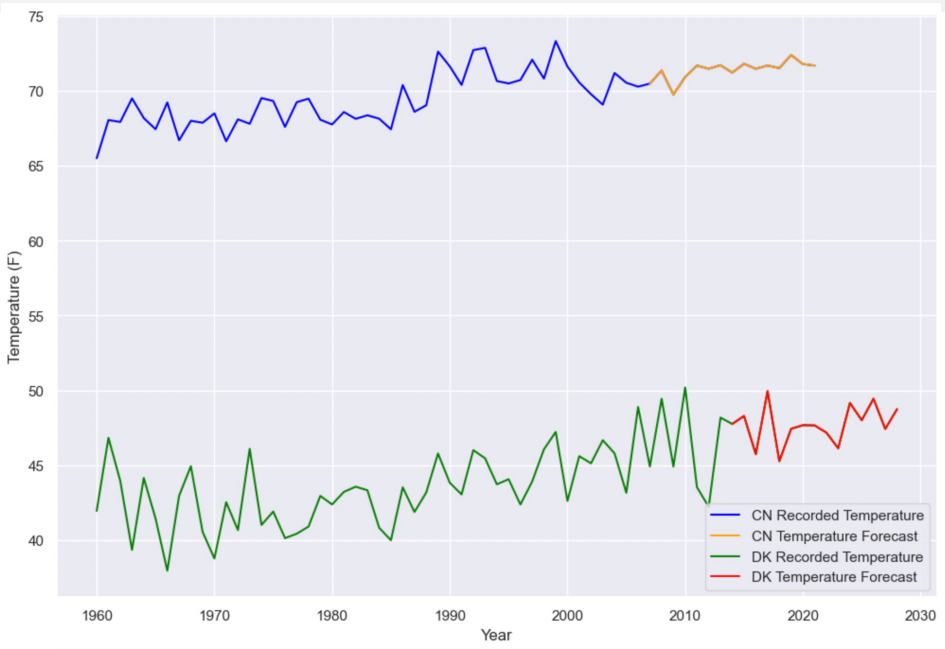


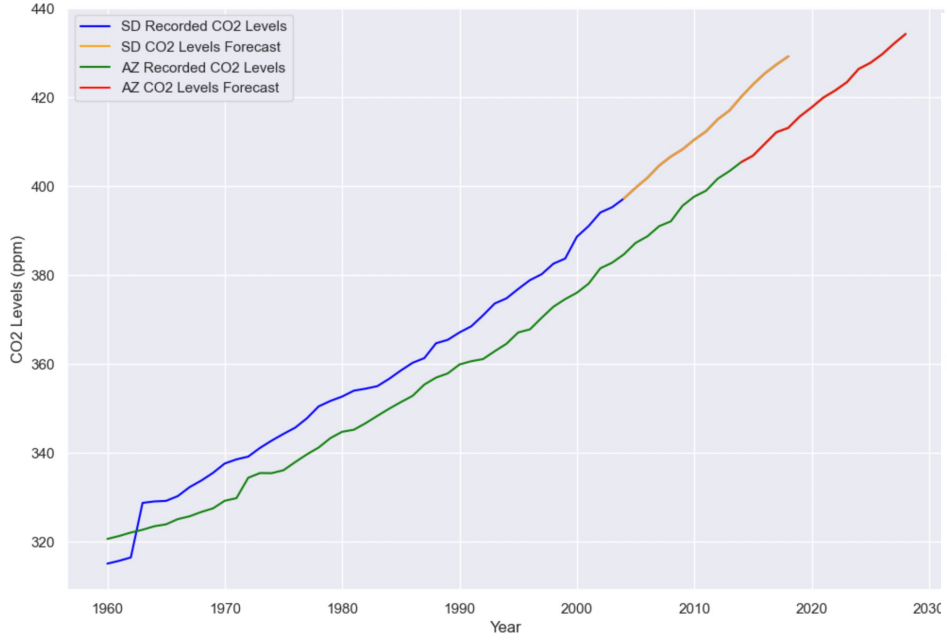
PySpark

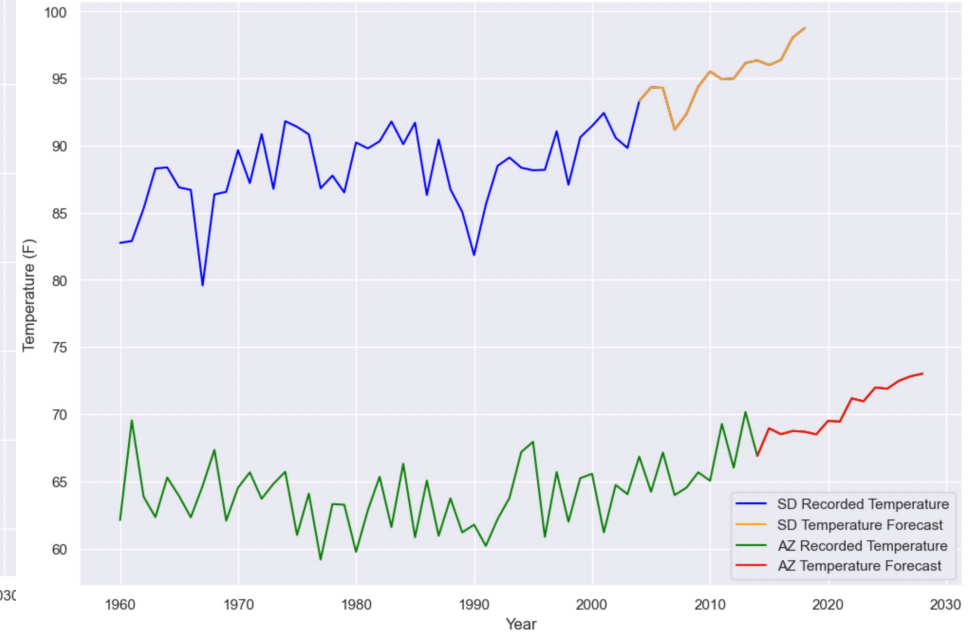
PyTorch

TREND ANALYSIS OF TEMPERATURE & GHG



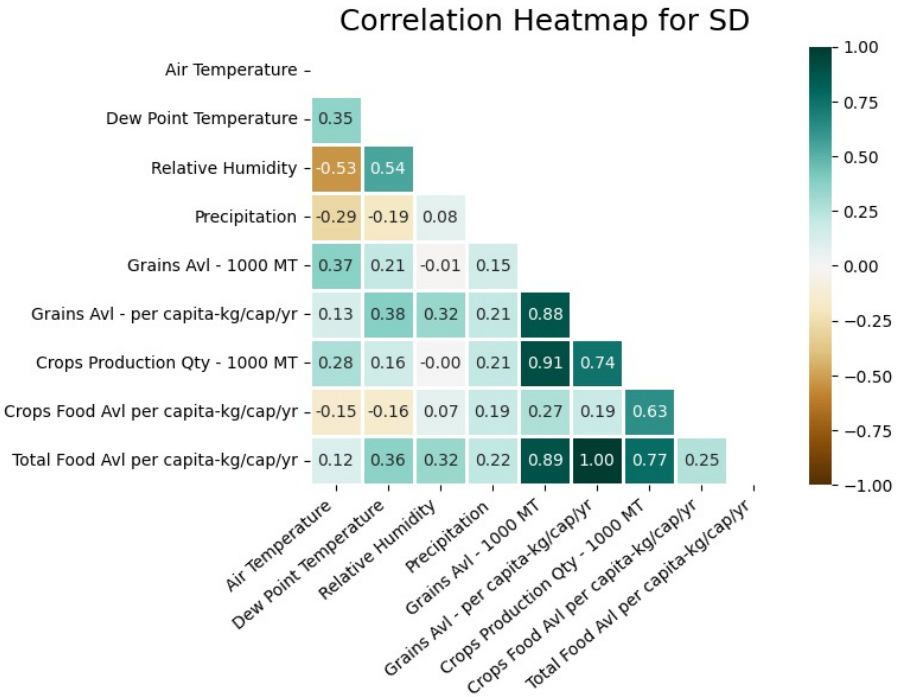


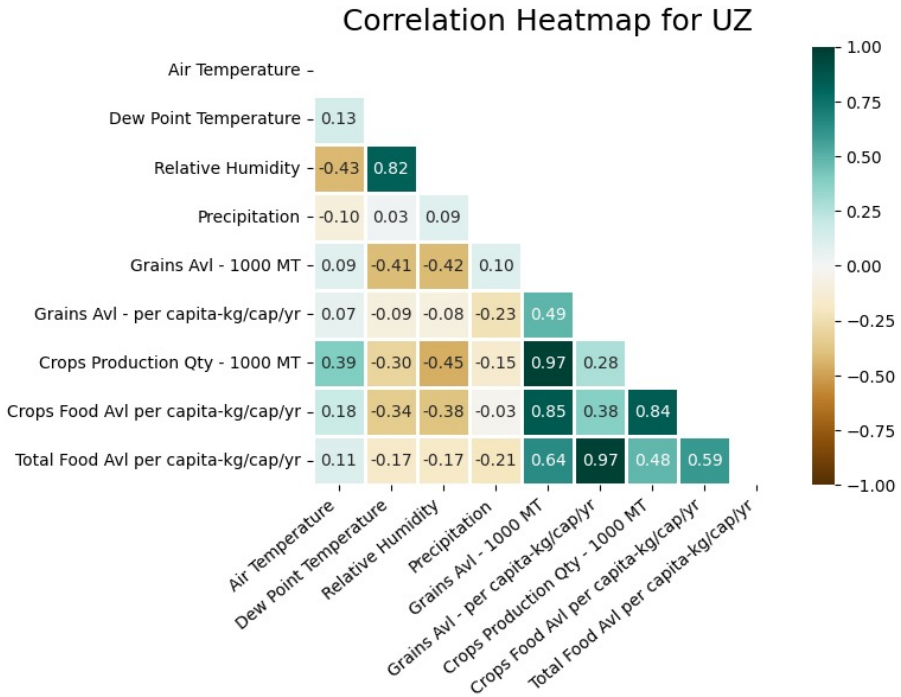




HYPOTHESIS TESTING & CORRELATION

Variable	Corresponding Beta Value	T statistic	p-value	Result
Sea Pressure	0.1287	-0.08	0.464	Failed to reject
Wind speed	-0.1004	0	0.47	Failed to reject
Feel like	0.0016	0	0.5	Failed to reject
Humidity	-0.0015	0	0.5	Failed to reject
Ice acceleration	-0.0144	0	0.498	Failed to reject
Precipitation	-0.0064	0.04	0.498	Failed to reject
CO2	-0.4435	0.02	0.483	Failed to reject
Methane levels	-2.1074	0.01	0.49	Failed to reject
NO levels	2.6312	0.09	0.497	Failed to reject





CONCLUSION

1.Time series analysis gives valuable insights into greenhouse gases emissions and temperature

2. Climate change is complex, influenced by GHG emissions.

3. Adjusting for the month-on-month seasonality in temperature data is a challenging task and requires domain expertise

4. Quantifying climate's impact on food production is challenging

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