Friedrich-Alexander-Universität
Technische Fakultät

The Interplay of Crop Plantation and Climate Change: Cultivating Understanding for a Sustainable Future

Arash Mousavi
July 2024

Agenda

1. Introduction
2. Datasets
3. Visualization
4. Result
5. Conclusion

Introduction

Introduction

- how various types of crops affect the climate change
- if there is a link between the increase of country temperature and the amount of crops being harvested
- Example concepts that can be interepreted:
  - how is the temperature trend
  - What crops are commonly produced
  - Which crops have better effects?

Loading Datasets

Datasets

We go over datasets that are picked for this project

Climate Change: Earth Surface Temperature Data

Published by :

- **Data gathered by Berkely Earth Laboratory**

Some Factors:

- **date**
- **Average Temperature**
- **AverageTemperatureUncertainty**
- **Country**
- **Latitude**
- **Longitude**

Global Food & Agriculture Statistics

Gathered by :

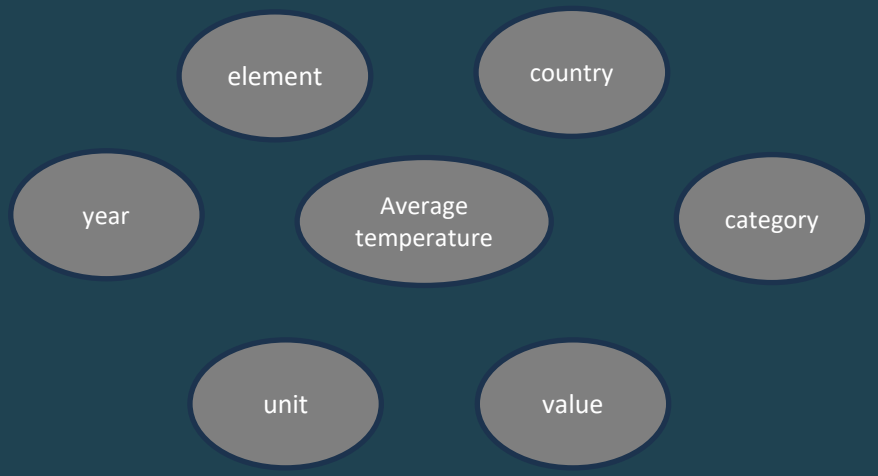
- **United Nations based on 1961 until 2007**

Some Factors:

- **country_or_area**
- **element_code**
- **element**
- **year**
- **value**
- **unit**
- **category**
- **value footnotes**

Final Dataset Info

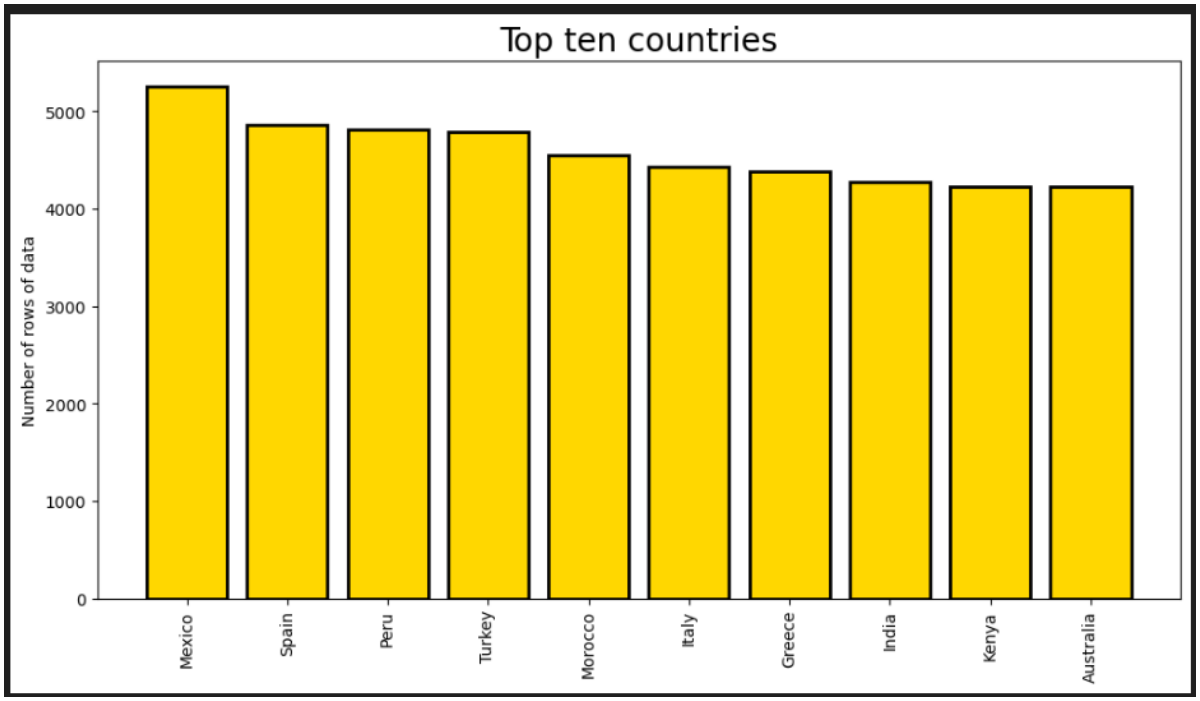
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 371868 entries, 0 to 371867
Data columns (total 7 columns):
 #   Column                      Non-Null Count   Dtype
---  ------                      --------------   -----
 0   element                     371868 non-null  object
 1   year                        371868 non-null  float64
 2   unit                        371868 non-null  object
 3   value                       371868 non-null  float64
 4   category                    371868 non-null  object
 5   Country                     371868 non-null  object
 6   average_yearly_temperature  371868 non-null  float64
dtypes: float64(3), object(4)
memory usage: 19.9+ MB
```

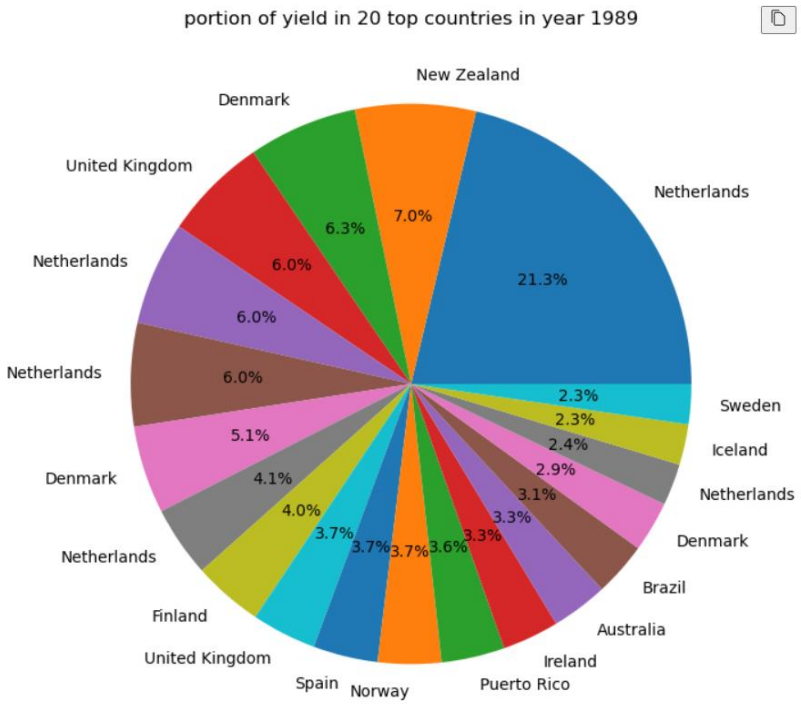


Data Visualization

Dataset Visualization

- Categorical Variable
- Based on regional indicatior

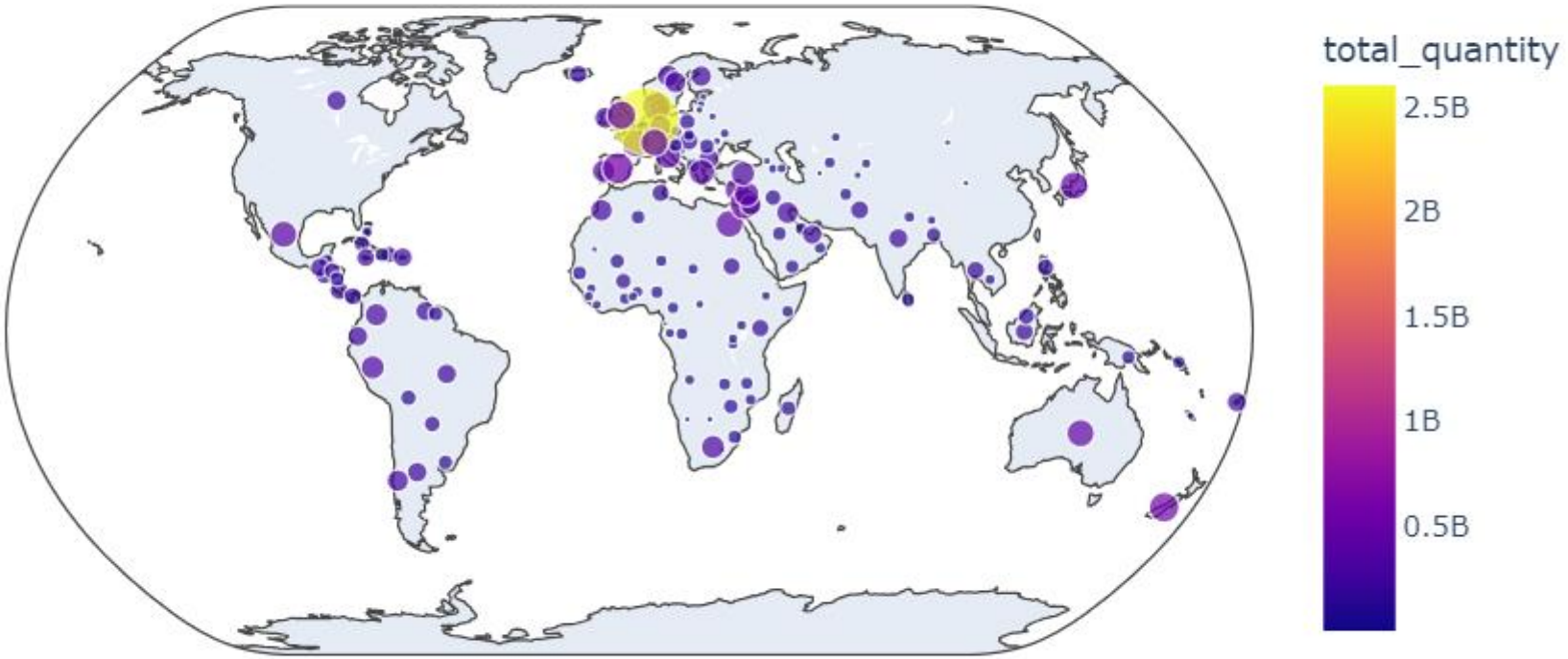




Dataset Visualization

Top 20 products by countries

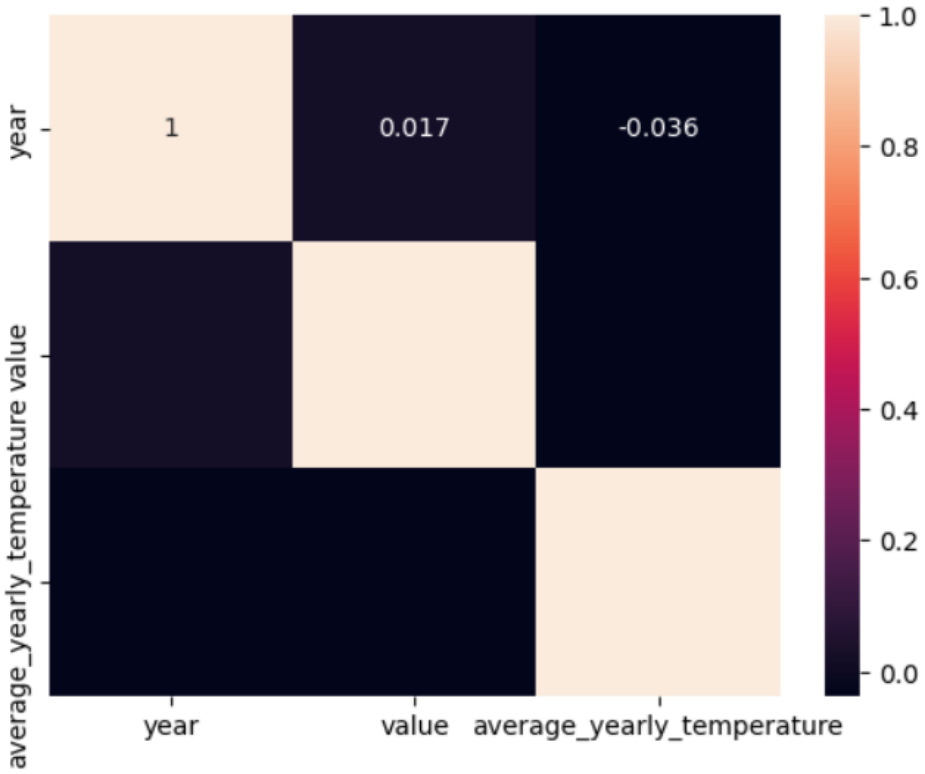
Bubble Map of Sum by Country



Result

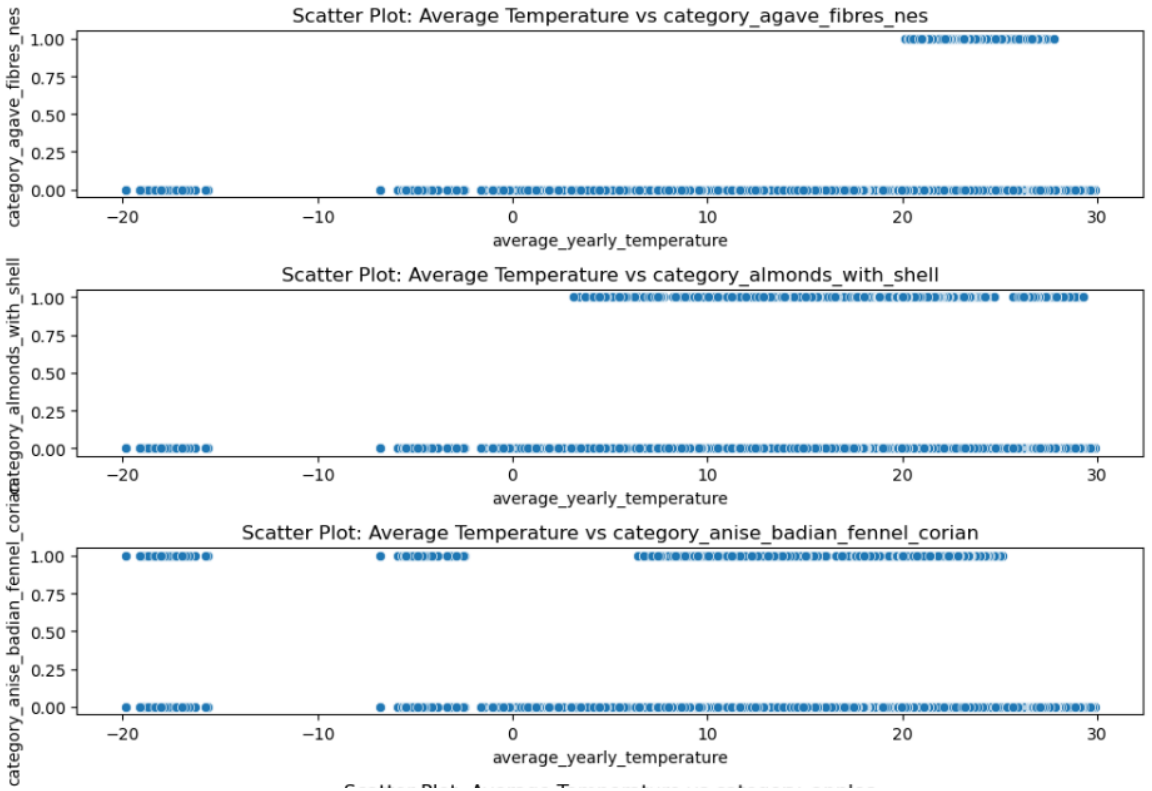
Correleation Matrix for the final Data

- used to summarize data
- Through this the relation between data is clarified
- The variables show the relation and trend between them



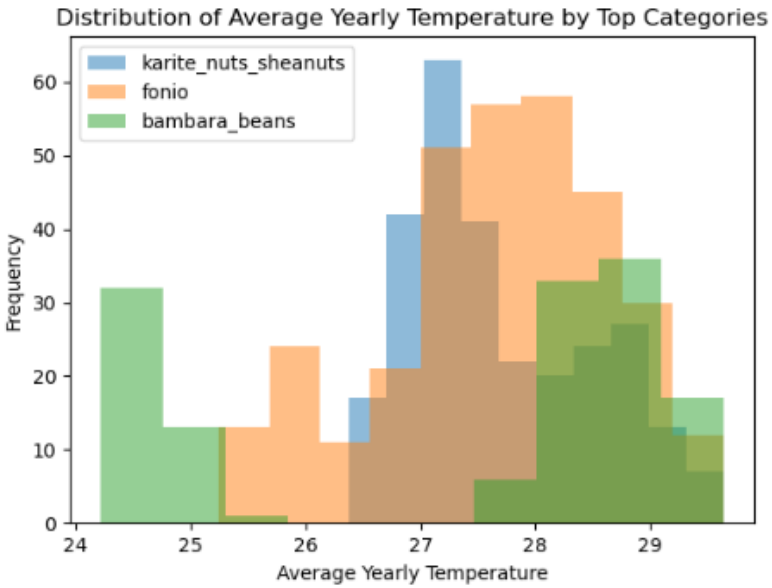
Dataset Visualization

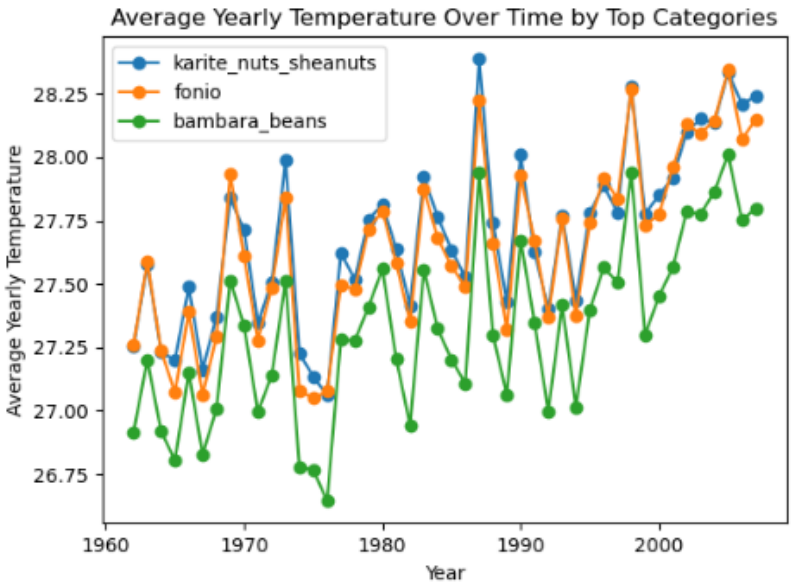
- for visualizing the relationship between two continuous variables
- create scatter plots to see how every crop is distributed on which temperature



Dataset Visualization

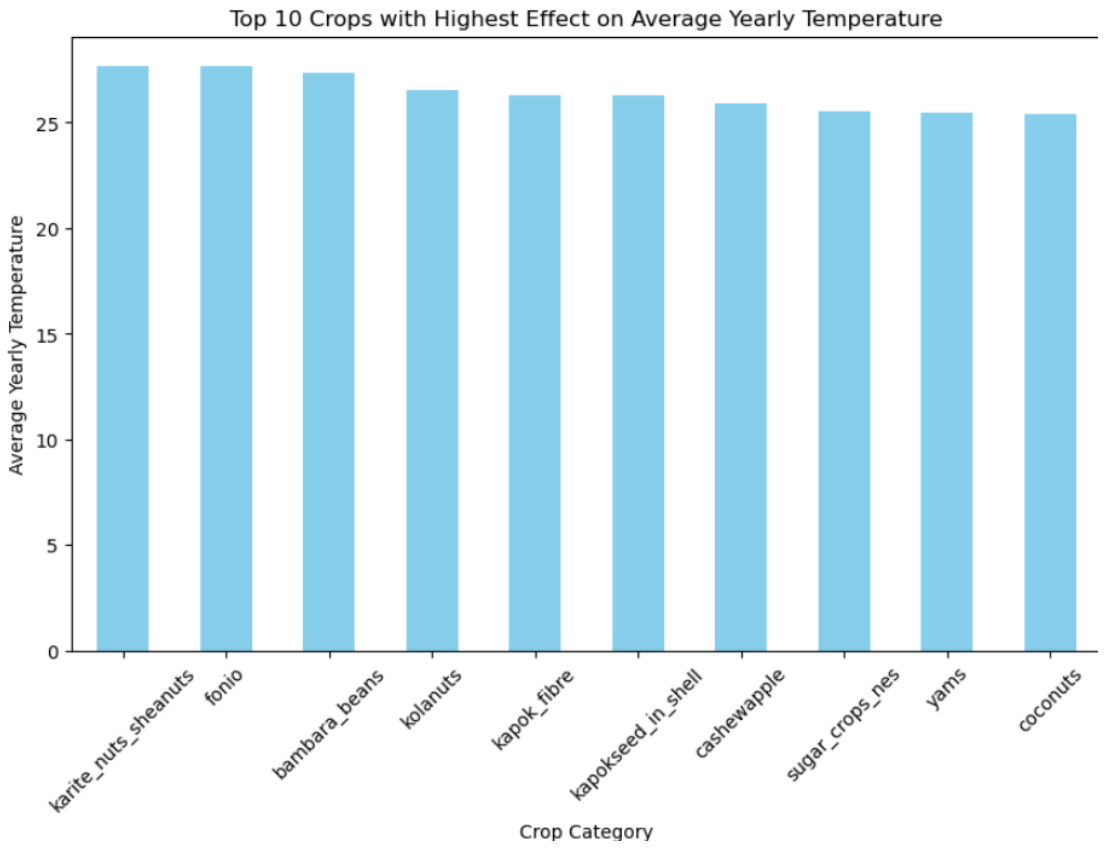
Checking the categories and their trends





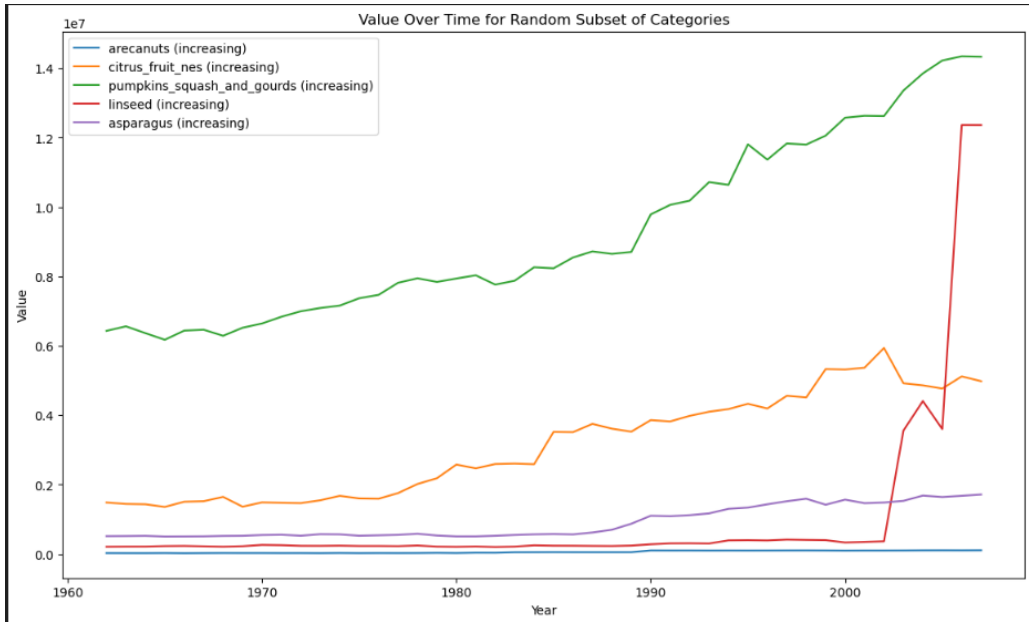
Dataset Visualization

- Plotting the most effective crops



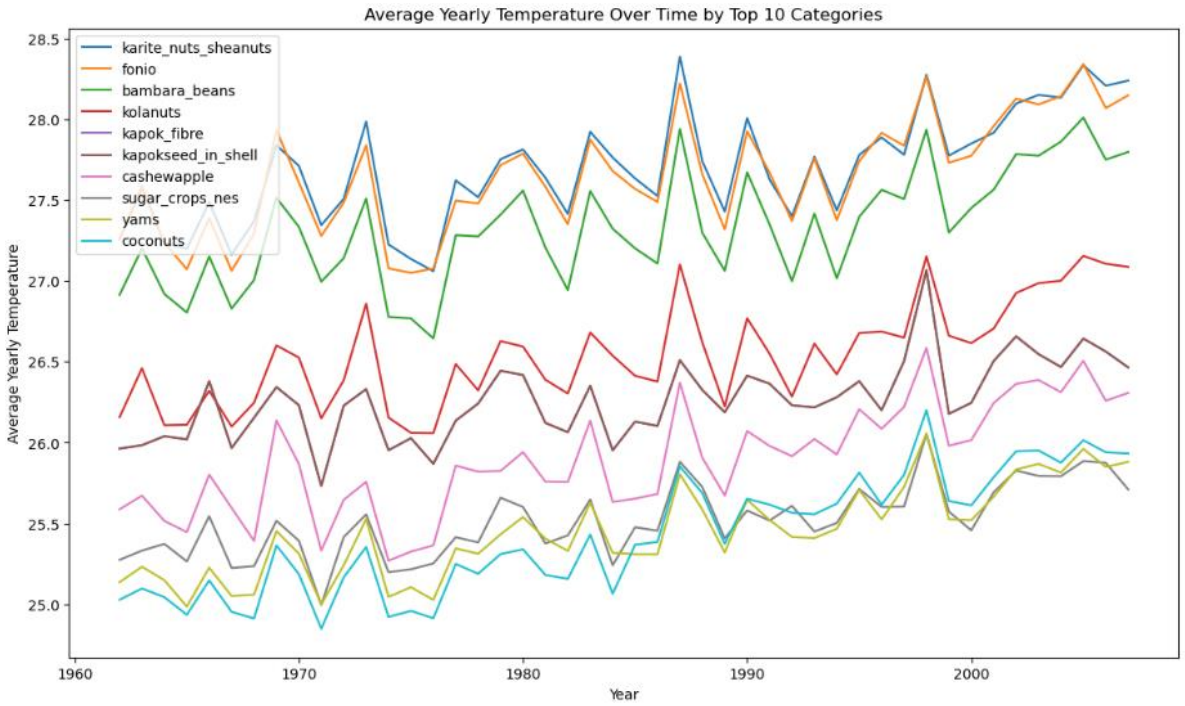
Dataset Visualization

- Using time series to check the trend over time
- Here we see the value of these products over time



Dataset Visualization

Temperature time series for products



Results

The unexpected correlation between crops and temperature indicates a far more intricate and sophisticated look at this greatly mysterious project. As previously explained, there are several factors and elements with regard to choosing an alternative crop that will reduce the temperature to an extent but has other disadvantageous effects on the economy and geo policy. Due to this fact, a far more comprehensive research must be conducted with meticulous data regarding all the effectual aspects. To achieve such thriving goal, one must have access to way sophisticated models with a plethora of data to train Neural networks and other more advanced tools to find these intricate patterns.

Discussion

Disscussion

Possible Explanations

Fluctuation trend:

Sudden increase in temperature even with a decrease in production shows a direct effect of overall global population increase and a great effect of alternative foods and harvestings to compensate for the ever growing population of the world. Another important concept is the fact that the great increase of temperature in the world is interconnected and a surge in India's production will have indirect geo effects on European weather and nature.

Social structures and behaviors:

Better agricultural methods and modern approaches and standards such as the Netherlands methods which is a top player and most important producer makes greater difference than the less advanced and effective methods of South American countries

Hidden reasons:

Global warming is affected by various factors and the agriculture sector is indeed a key part of the industrial world, however, there are several other aspects such as production facilities and the use of fossil resources that have their significant effect on that specific period of time.

Considerations and Limitations:

- **Data Quality and Variability:**

Acknowledging limitations related to data accuracy, completeness, and consistency across diverse countries is crucial.

- **Multifactorial Nature:**

Economic status alone may not fully explain infection rates; various factors like population density, governance, and cultural norms like eating certain crops might contribute significantly

Thanks for your attention