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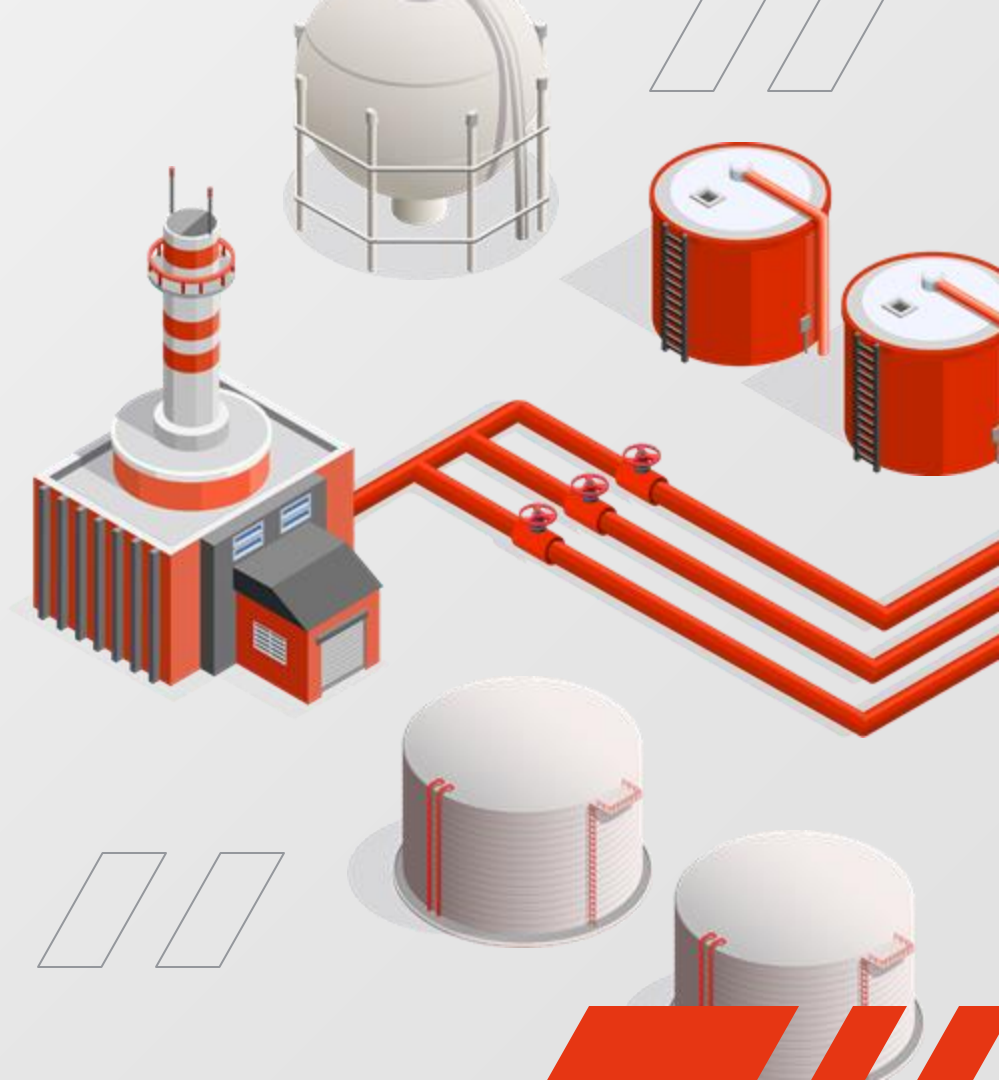
# Predictive Analysis of Global Oil Consumption

Understanding Trends and Predicting the  
Future of Oil Consumption



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An isometric illustration of an oil refinery, featuring several tall distillation columns with ladders, interconnected by a network of pipes. In the foreground and background, there are large cylindrical storage tanks. The entire scene is rendered in a monochromatic red color scheme, giving it a stylized, industrial appearance.

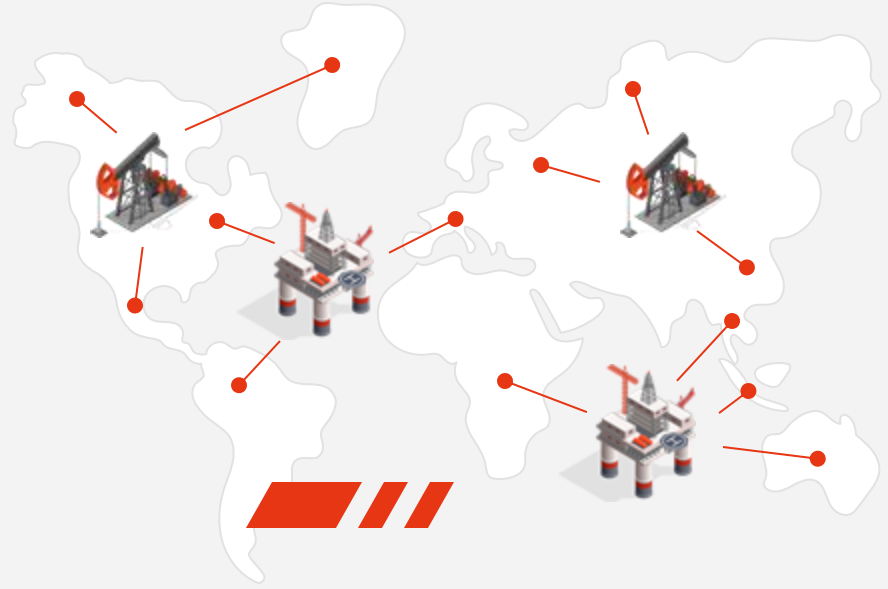
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# Introduction

Global Oil Consumption &  
Reserves Analysis

# Global Oil Consumption & Reserves Analysis

- Oil consumption and reserves are essential for understanding global energy use and sustainability.
- This project predicts future consumption trends, providing countries with insights into when they might need to consider transitioning to sustainable energy sources.
- The analysis provides key insights for policy-makers to make informed decisions about energy planning.





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# Problem Statement

Motivation Behind the Analysis

## Motivation Behind the Analysis

- Forecast future oil consumption trends for each country using historical data.
- Understand the relationship between oil consumption and reserves.
- Address key research questions:
  - How can historical data predict future oil consumption trends?
  - How do oil reserves and consumption change over time, and what patterns indicate a shift towards cleaner energy?
  - Can we identify countries likely to switch to renewable energy based on the data?







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# Data Overview

Data Sources and Coverage

# Data Sources and Coverage

## Datasets used:

- Oil Consumption: Data from 1965 - 2023:

	Entity	1965	1966	1967
0	Africa	342.133700	370.450000	369.19354
1	Africa (El)	342.133700	370.450000	369.19350
2	Algeria	15.405252	20.272705	18.94203
3	Argentina	275.215900	283.876300	290.73495
4	Asia	2249.215000	2581.326200	2914.79130

5 rows x 60 columns

- Oil Consumption: Data from 1965 - 2023:

Oil Reserves Dataset Preview:			
	World Crude Oil Reserves (billion)	1995	1996
0	Afghanistan	0	0
1	Albania	0.165	0.165
2	Algeria	9.2	9.2
3	American Samoa	0	0
4	Angola	5.412212	5.412212

5 rows x 28 columns

1965



1995



2023

The background of the slide is a vibrant red with an isometric illustration of a circuit board. It features various electronic components such as integrated circuits, resistors, and capacitors, all rendered in a 3D style with perspective. The components are interconnected by a network of fine, glowing red lines that represent the circuit traces.

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# Data Cleaning & Preparation

Data Cleaning and Alignment



# Data Cleaning and Alignment



## Handled missing Values

Handled missing values in the datasets to ensure accuracy.



## Merging Tables

Merged the oil consumption and reserves datasets for overlapping years to align the data.



## Alignment

This alignment was critical to ensure consistency in analysis and modeling.





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```
<class 'pandas.core.frame.DataFrame'>  
Index: 5814 entries, 0 to 6135  
Data columns (total 3 columns):  
#   Column          Non-Null Count  Dtype  
---  ---  
0   Country          5814 non-null   object  
1   Year             5814 non-null   int64  
2   Oil Consumption   5814 non-null   float64  
dtypes: float64(1), int64(1), object(1)  
memory usage: 181.7+ KB  
None
```

Info about Cleaned Oil Reserves Dataset Preview:

```
<class 'pandas.core.frame.DataFrame'>  
Index: 5736 entries, 0 to 6236  
Data columns (total 3 columns):  
#   Column          Non-Null Count  Dtype  
---  ---  
0   Country          5736 non-null   object  
1   Year             5736 non-null   int64  
2   Oil Reserves     5736 non-null   float64  
dtypes: float64(1), int64(1), object(1)  
memory usage: 179.2+ KB  
None
```

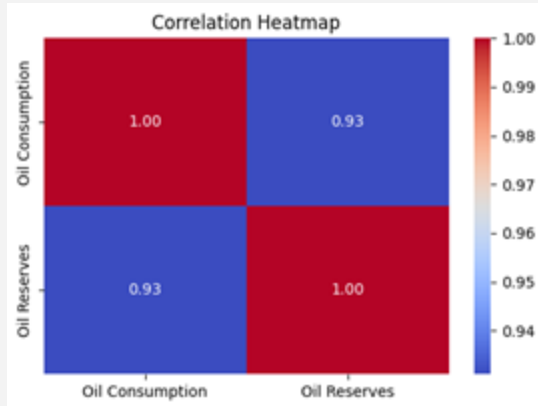
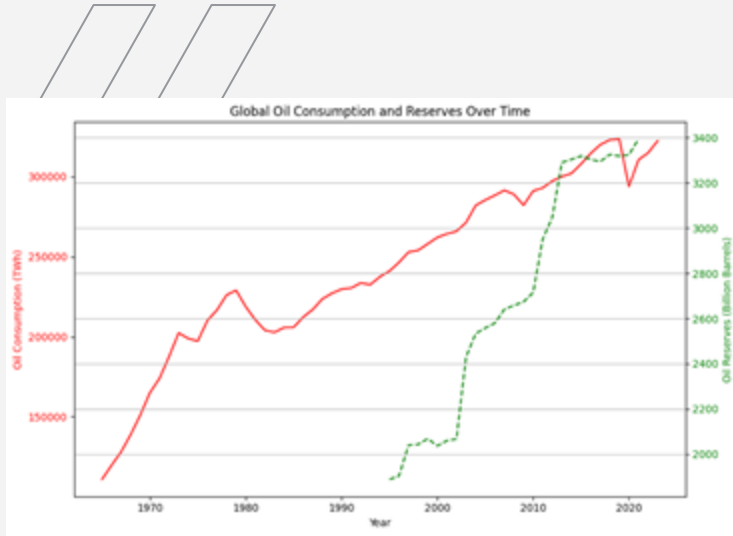
	Country	Year	Oil Consumption	Oil Reserves
0	Algeria	1995	103.142280	9.200000
1	Argentina	1995	259.543640	2.216787
2	Australia	1995	427.777500	1.614720
3	Austria	1995	135.623750	0.100800
4	Bangladesh	1995	34.853485	0.004000



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# Exploratory Data Analysis (EDA)

Understanding the Trends



## Understanding the Trends

- Analysis of historical trends in oil consumption and reserves.
- Identified correlations between consumption and reserves data.
- Key insights into how consumption varies across the overall global trends.





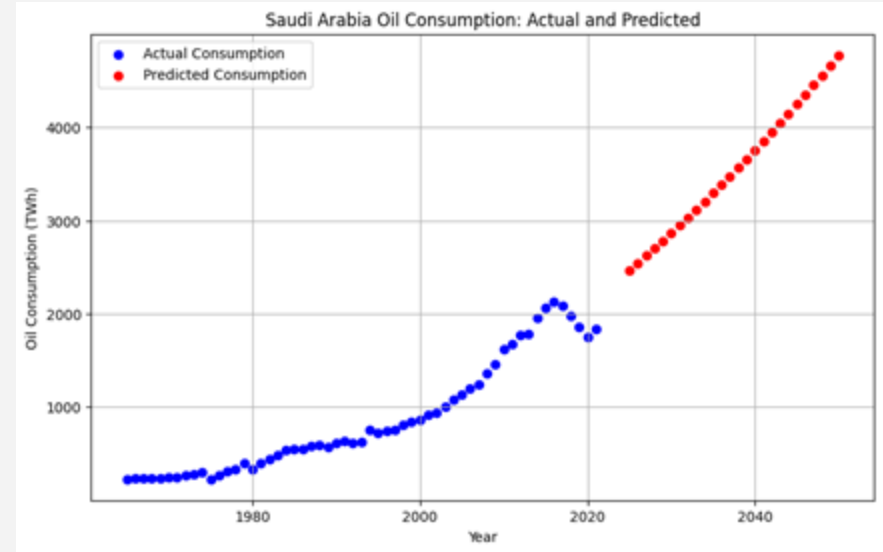
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# Predictive Modeling Approach

Modeling Oil Consumption

# Modeling Oil Consumption

- Used Polynomial Regression with a degree of 2 to predict future oil consumption trends.
- Cross-validation was performed to assess the accuracy and reliability of the model.
- Polynomial Regression was chosen because it could capture non-linear trends effectively in the data.





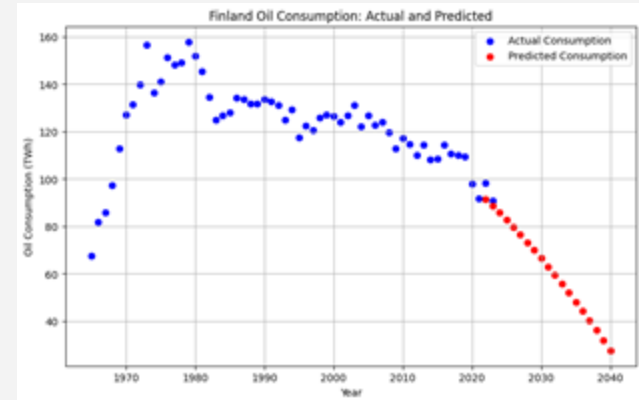
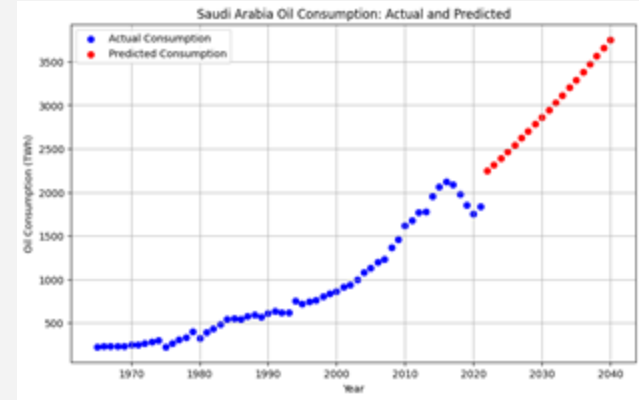
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# Predictive Results and Insights

Country-Wise Prediction & Key  
Insights

# Modeling Oil Consumption

- Predictions were made for Saudi Arabia, and Finland until 2040.
- Insights indicate a continuous increase in consumption trends for Saudi Arabia, but decreasing in Finland indicating changing to sustainable energy.
- The model is limited in predicting reserves trends due to the shorter time span of available data.



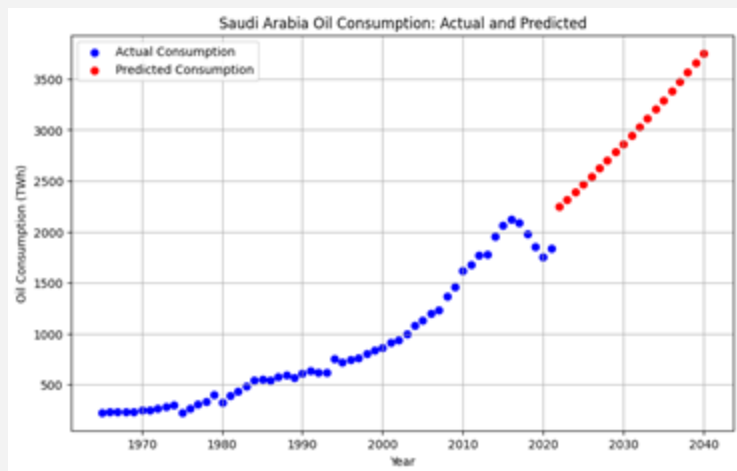
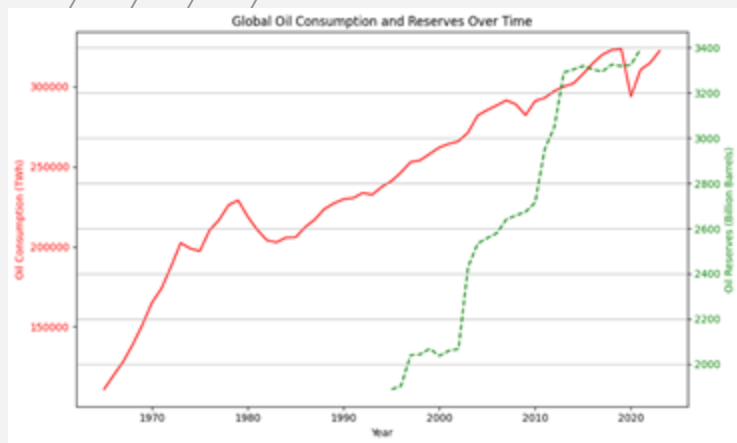




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# Limitations of the Prediction Model

Challenges and Limitations



## Challenges and Limitations

- The model only considers country and year as features, excluding critical factors such as economic conditions, geopolitical events, or pandemics, For Example COVID-19 in 2019.
- The absence of additional features like GDP, technological advancements, and policy changes limits the model's accuracy and predictive power.
- Including these features will make the predictive model more usable and realistic to be used to countries

## Research Questions

- How can historical data predict future oil consumption trends?
- How do oil reserves and consumption change over time, and what patterns indicate a shift towards cleaner energy?
- Can we identify countries likely to switch to renewable energy based on the data?



**Thank you**