Energy Production Time Series Project

The Datalion Team

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Business Understanding

- Energy production is key in economic and social development.
- Environmental factors lead to fluctuations in production.
- These fluctuations lead to power outages resulting to business losses.

Problem Statement:

- Energy production fluctuations do not only impact businesses but also homesteads.
- There is a need to come up with a model that will help predict production to solve this problem.

Objective:

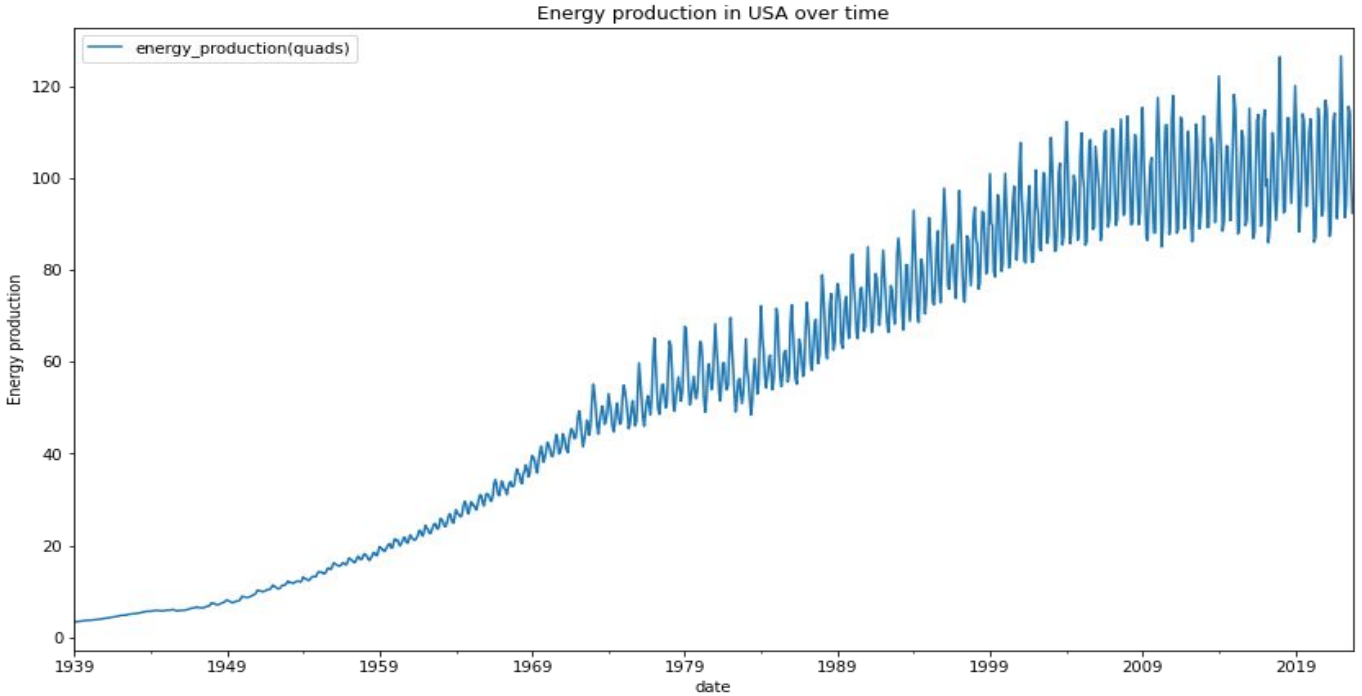
To build a time series model that will forecast energy production in the United States.

Data Understanding:

- Data was sourced from The Federal Reserve Economic Data (FRED) website.
- The dataset spans from 1939-2022
- Contains monthly energy production
- Has 1006 entries and 2 columns

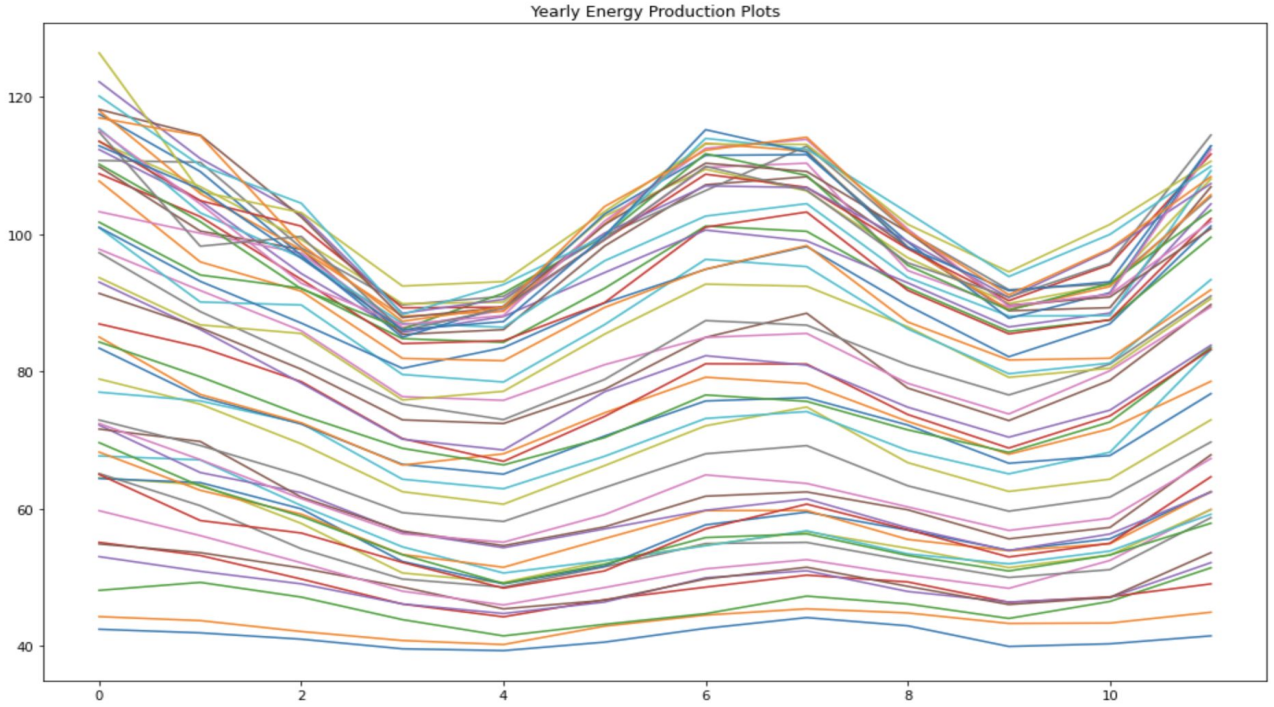
Exploratory Data Analysis (EDA)

The time series line-plot below shows the energy production in the United States from 1939 to 2022. Notice the trend?



Exploratory Data Analysis (EDA) Cont..

This plot shows yearly energy production fluctuations. It is an excellent way to determine seasonality in production.

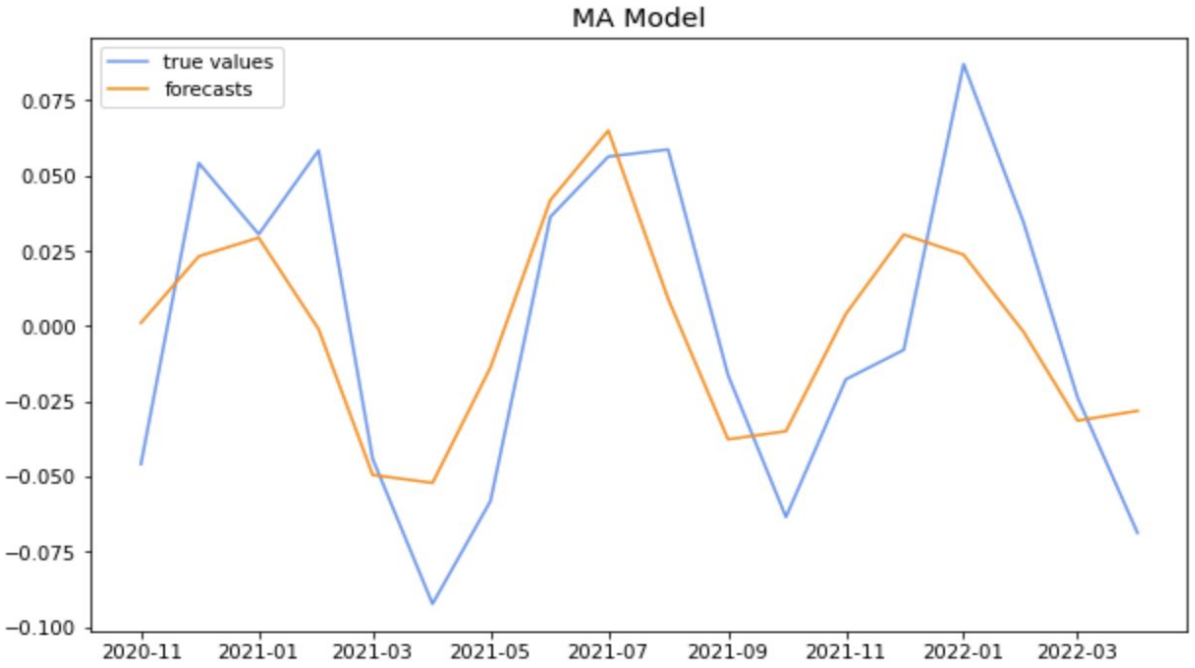


Autoregressive Model

This plot shows how our first model, Auto-Regressive model is performing in predicting energy production.

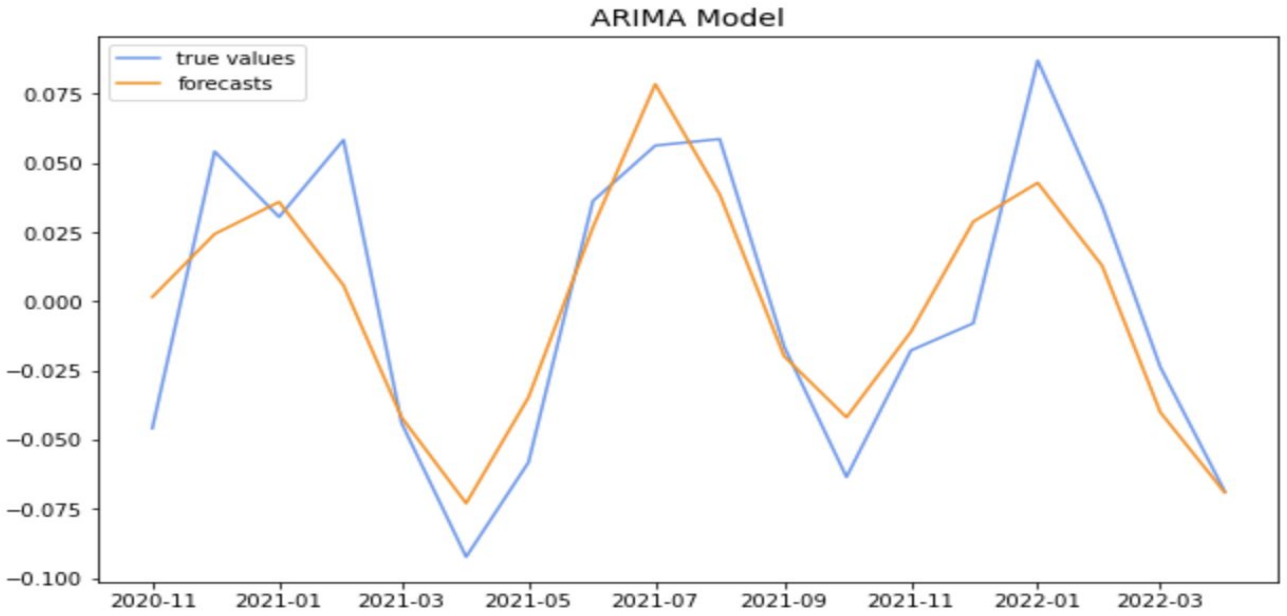
Moving Average Model

This plot shows how our second model, Moving Average model is performing in predicting energy production. Notice how it is different from the first?



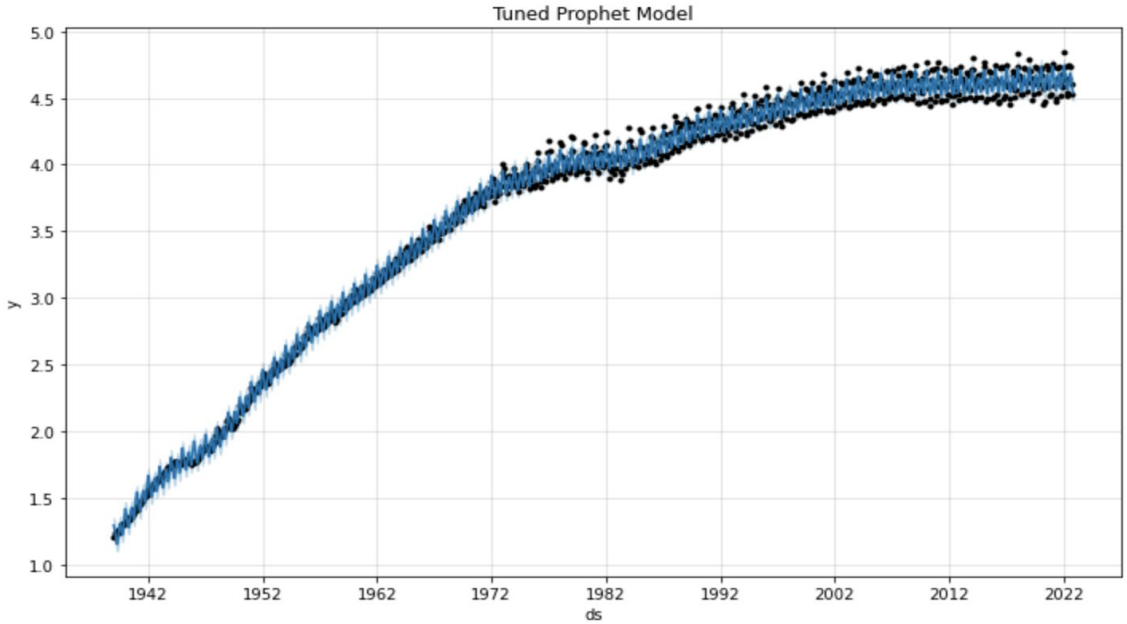
Autoregressive Moving Average Model

This plot shows how our third model, ARIMA model is performing in predicting energy production.



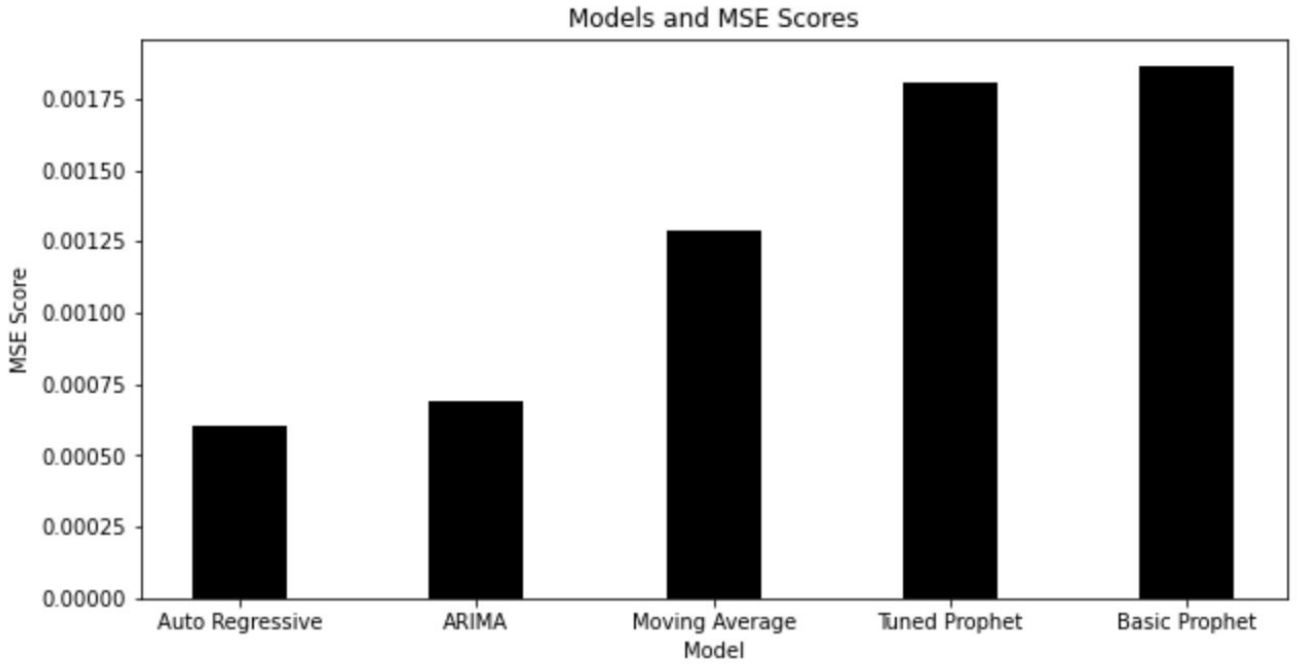
Facebook Prophet Model

This plot shows how our fourth and last model, Facebook Prophet model is performing in predicting energy production.



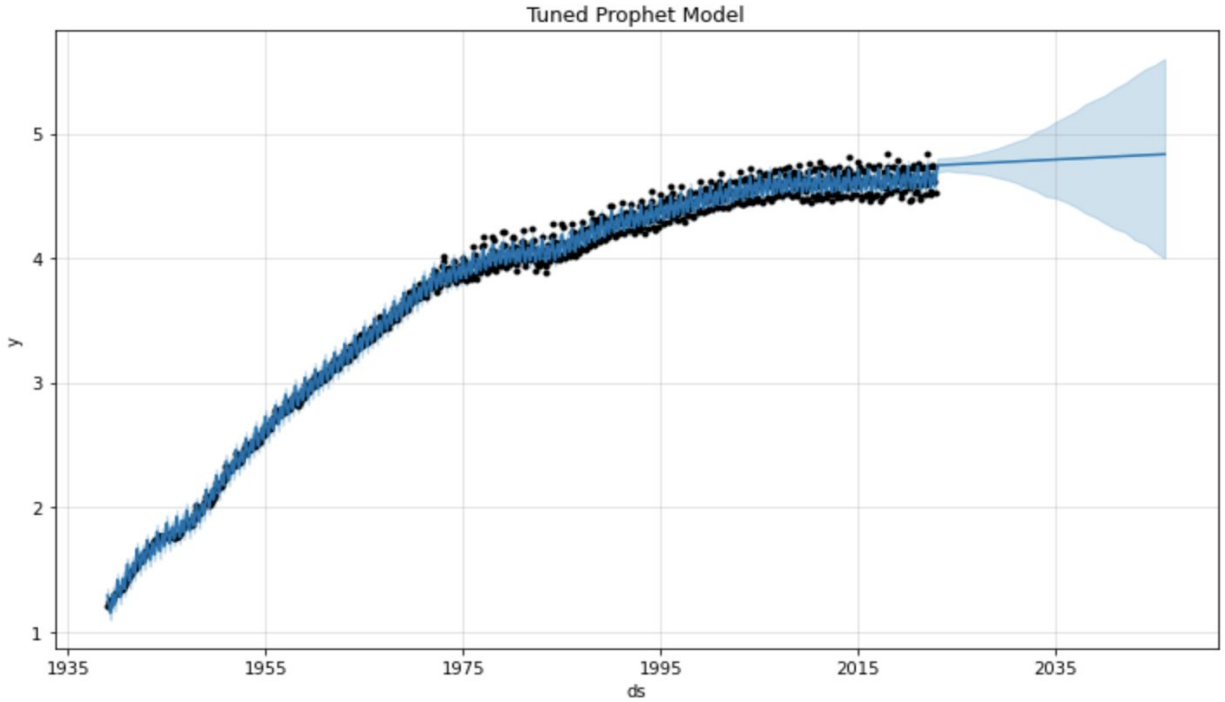
Models Comparison

The Mean Absolute Error (MSE) was used to compare the models built



Making Predictions

We made our Energy Production forecasts for the next 24 years using the Tuned Prophet model



Conclusion:

- In terms of MSE score, the Autoregressive model performed better than other models
- Energy production forecasting is vital in investments planning
- In terms of forecasting, the Tuned Prophet model performed better

Thank You
For Attending and Listening

Remember: Everything will be okay at the end. If it's not Okay, it's not the end!!!