POWERING TOMORROW

BRINGING EFFECIENCY TO LIFE

Presented by:

Ismael Kipkoech
Peninah Gituku
Cynthia Adisa

Content

Overview

- In the quest for a greener and more cost-effective future, we embark on a mission to revolutionize the way households consume electricity. Leveraging the"Individual Household Electric Power Consumption" dataset, our business challenge is to conjure a predictive model.
- This magical model shall foresee the future, unveiling the secrets of each household's power consumption based on the mystical patterns hidden in historical data.

BUSINESS UNDERSTANDING

BUSINESS PROBLEM

Households face challenges in managing and optimizing their electricity consumption efficiently. The lack of insights and strategies for energy conservation often results in higher electricity costs, contributing to financial strain and environmental impact. Traditional approaches to energy management are mundane and lack the magic required to inspire lasting change.

SOLUTION

Our predictive model is set to offer households insights that transcend the ordinary. Unleashing the power of data, we enable users through this cutting-edge platform to harnesses the mystical power of predictive analytics to provide personalized insights and recommendations to optimize energy consumption.

OBJECTIVES

Cost Savings and Financial Empowerment

Quantify and communicate potential cost savings to users based on implemented energy efficiency measures.
Provide financial tips and strategies to help households allocate saved funds to other priorities, fostering financial empowerment.

Real-Time Energy Monitoring

Create an advanced predictive analytics model that utilizes machine learning algorithms to analyze historical and real-time energy consumption data

Actionable Insights

Through real-time data analysis and predictive algorithms, users can receive personalized recommendations to optimize energy usage e.g tailored suggestions for adjusting identifying energy-intensive appliances, and proposing optimal times for running them

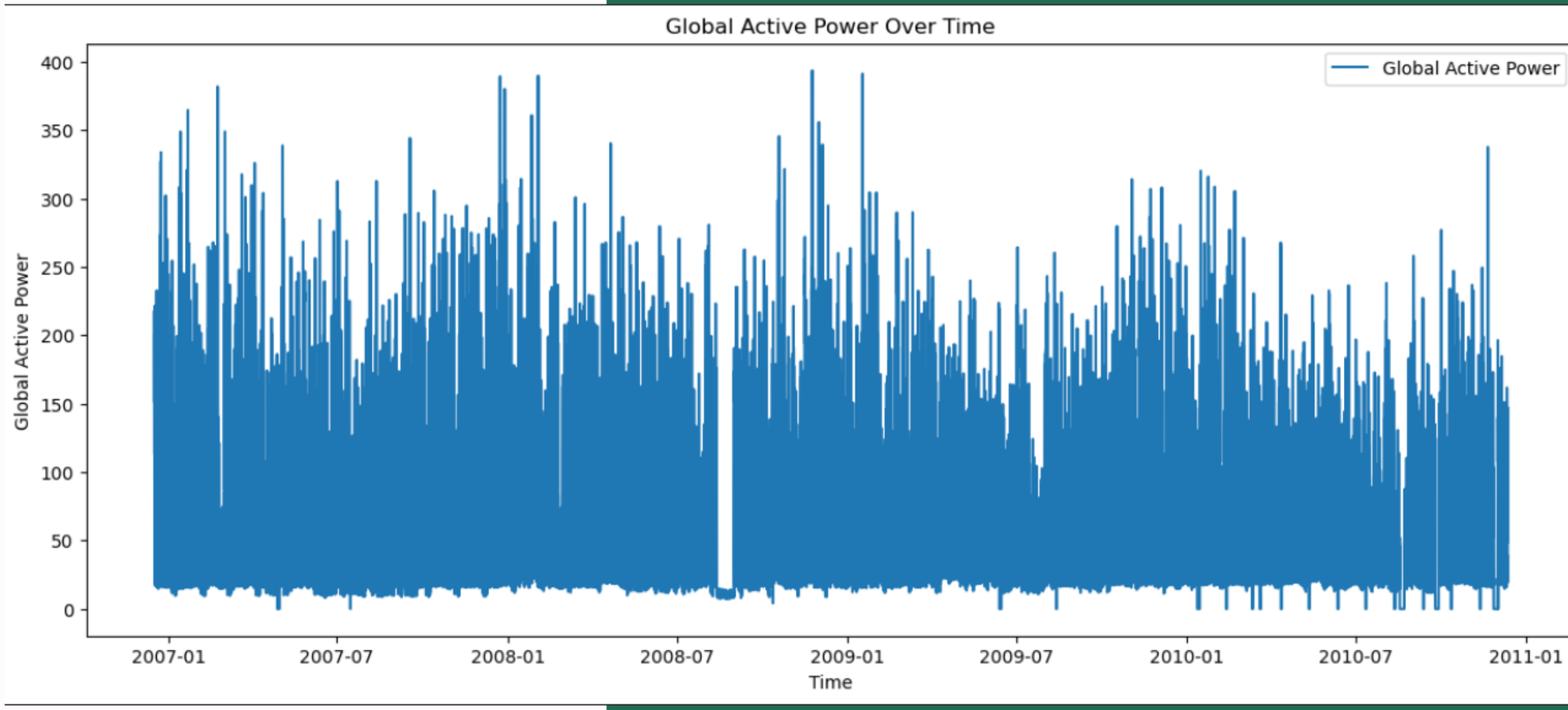
DATA UNDERSTANDING

- This dataset contains 2075259 measurements gathered between December 2006 and November 2010 (47 months).

- It contains measurements of electric power consumption in a household with a one-minute sampling rate over a period of almost four years.

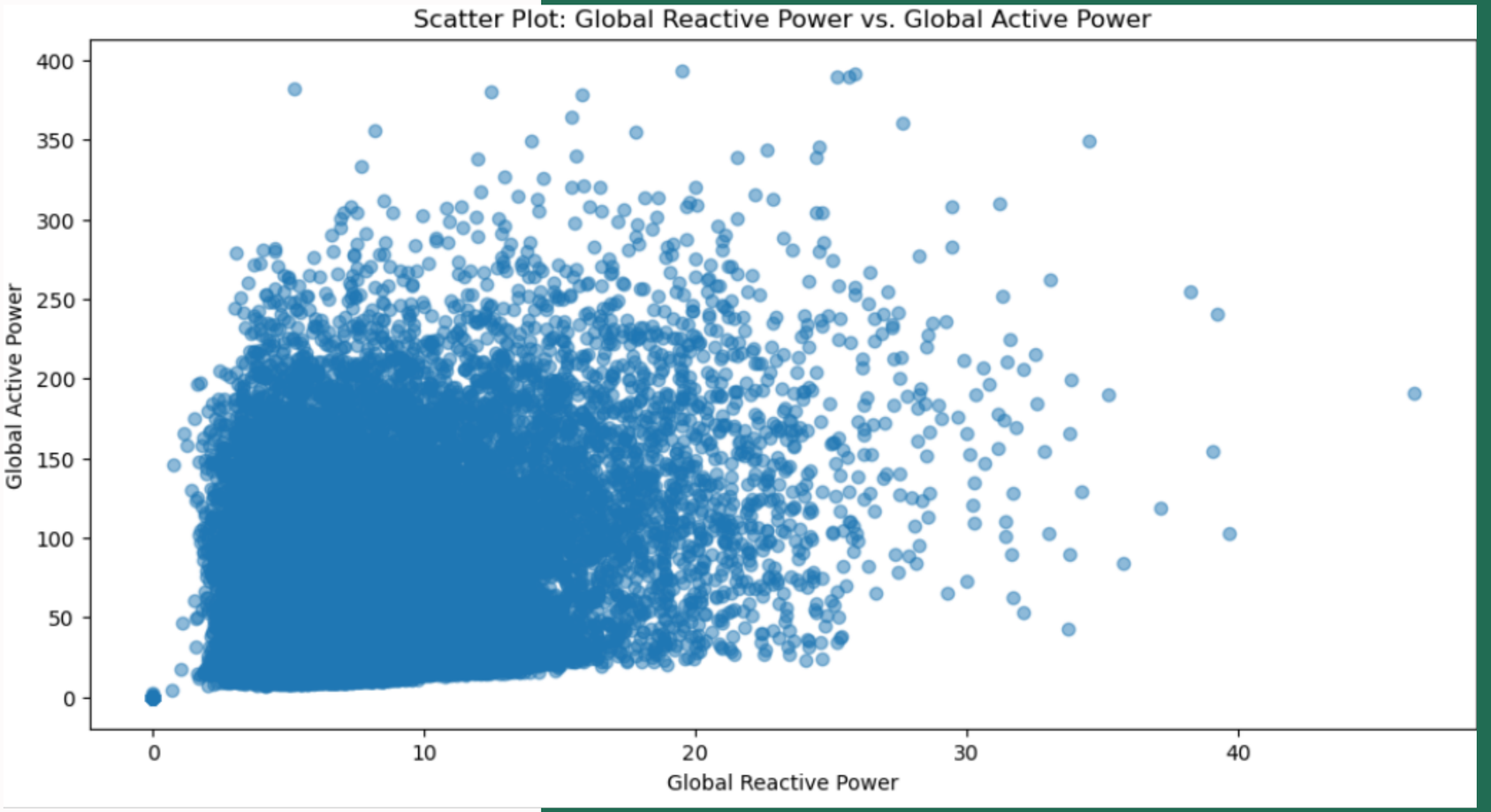
VISUALISATIONS

The line plot visually represents the global active power consumption over the entire time period covered by the dataset.



VISUALISATIONS

The "Scatter Plot of Global Active Power vs. Global Reactive Power" is a visual representation that explores the relationship between two variables: global active power and global reactive power.



METHODS OF HANDLING DATA

Handling Missing Values

Dropping columns unecessary for our predictive model

Aggregation

Aggregate data over daily time intervals

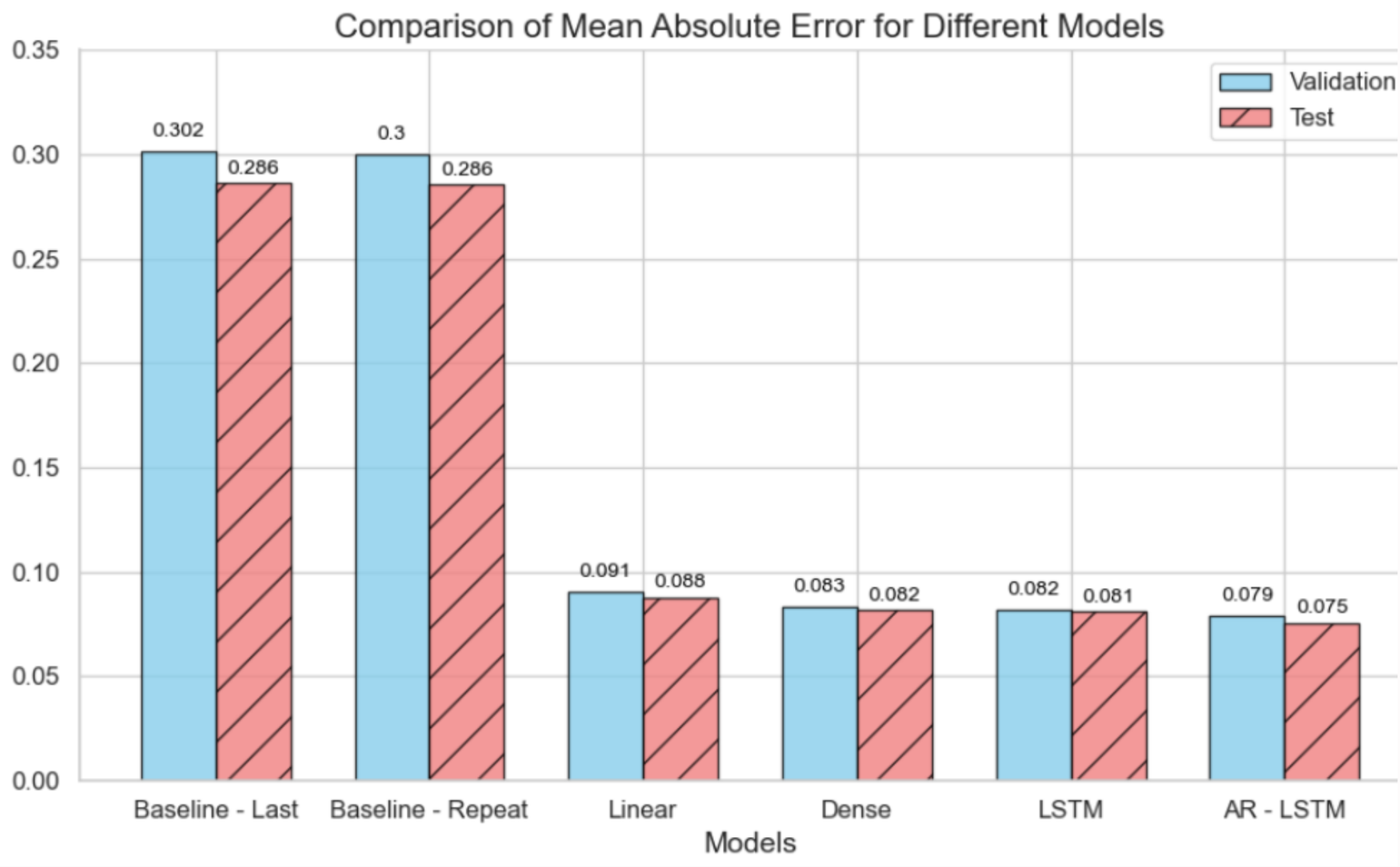
Decomposition

This decomposition helps identify the trend, seasonal patterns, and residual variations in the hourly global active power.

Scaling

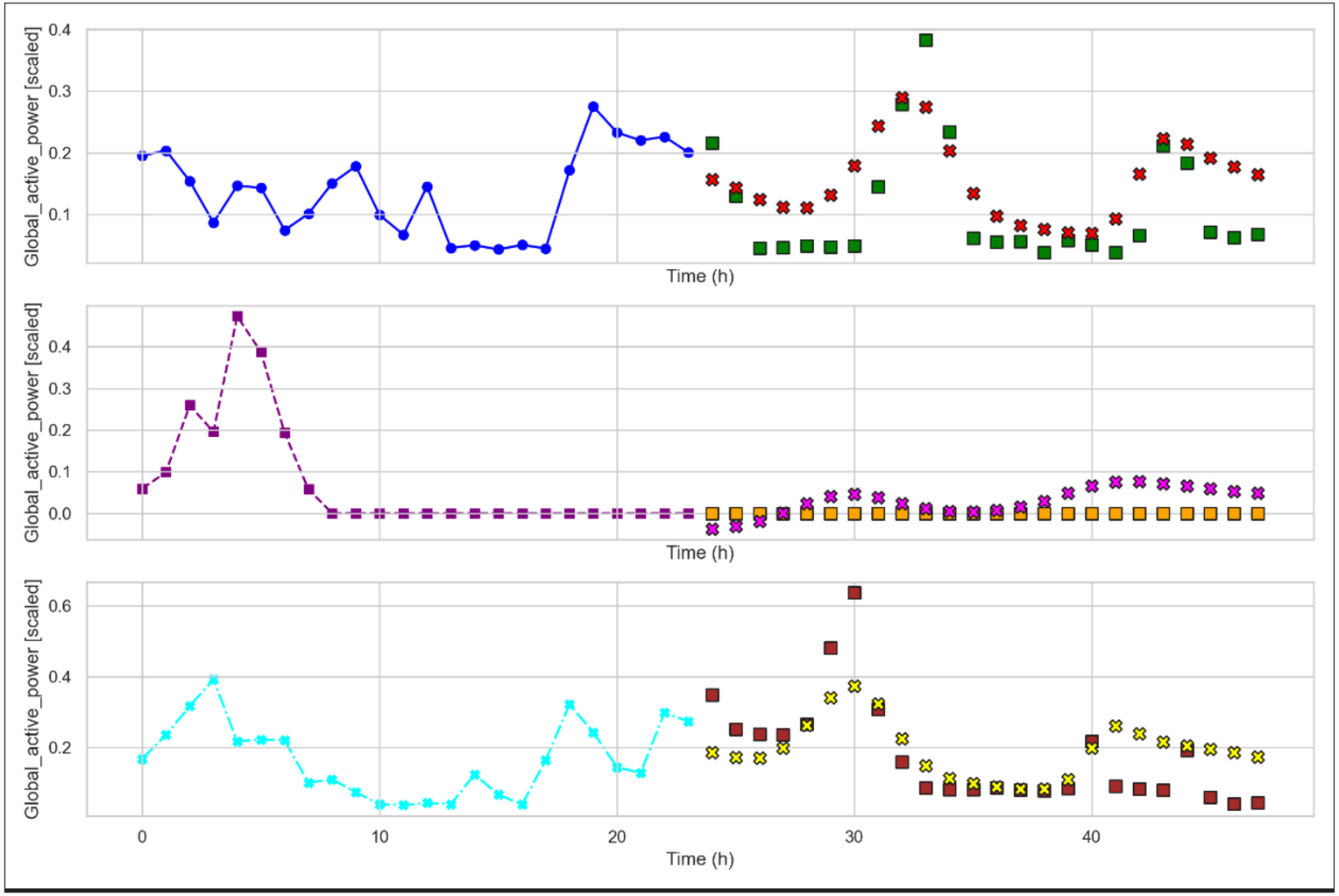
using StandardScaler that scales features to have a mean of zero and a standard deviation of one, which is useful for algorithms that assume a normal distribution.

Modelling



Results

The AR-LSTM model's supremacy(given it's low mean absolute error) suggests that it is a robust and advanced solution for businesses seeking to leverage predictive analytics for planning and strategizing. Implementing this model could lead to more efficient operations, reduced costs, and a competitive edge in navigating the complexities of the market



The parallel decline in both training and validation losses signifies the model's effectiveness in learning from the training data and generalizing its knowledge to unseen validation data. This convergence of trends indicates that the AR-LSTM model not only successfully adapts to the intricacies of the training dataset but also maintains a robust ability to make accurate predictions on new, previously unseen data. The consistency in the decrease of losses implies that the model avoids overfitting and possesses a reliable capacity for generalization, reinforcing its credibility and reliability in making predictions beyond the training dataset.

Conclusion

- The model's demonstrated supremacy, as evidenced by its lower Mean Absolute Error (MAE) compared to both alternative predictive models and traditional forecasting methodologies, positions it as a reliable and accurate tool for anticipating outcomes.
- By leveraging the AR-LSTM model, the stakeholder can enhance decision-making processes, optimize resource allocation, and improve overall operational efficiency. The superior forecasting performance suggests potential cost savings, reduced uncertainties and a more responsive approach to market dynamics.

THANK YOU!

Ismael Kipkoech
Peninah Gituku
Cynthia Adisa