



MODEL BUILDERS LTD
HOME OF DATA SCIENCE SOLUTIONS

SPAIN ENERGY SHORTFALL

ABOUT US

Project: Spain
energy shortfall

Conclusion



Model Builders LTD

- Model Builders, builds digital products and offer digital services that let our clients do things efficiently.
- Our team works with the clients to deliver tailor made digital solutions.
- Our values shape the way we engage and work with our clients, delivering outstanding user experiences and supported cutting edge technologies.

company

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Industries

- Agriculture
- Banking
- Energy
- Insurance
- Others



Services

- Custom Software
- Data and Analytics
- Model Building
- Strategy and Advisory
- Transformation



Our incredibly team aim to exceed clients and colleagues expectations.

13+

Years on the market



35

People on board



50+

Projects delivered



13+

Years on the market



35

People on board



50+
Projects delivered



Our Team



Selaelo
Chief Executive Officer and
Chief Data Scientist



Ronewa
Chief Technology Officer
and Software Engineer



Phillemon
Data and Analytics
Manager



Enocentia
Data and Machine
Learning Engineer



Njabulo
Data Scientist and
Digital Designer



Musa
Research Data Scientist





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company

Overview:

Prediction of shortfall of energy for Spain between energy generated by fossil fuels and renewable energy

Problem Statement

Analysis

Findings

Solution

Statement

Spain has the best sustainable energy supply. The country optimizes its fossil fuel and renewable energy resources.

The country is facing energy shortfalls and the government is considering to expand its renewable energy investment. The shortfall varies with different weather.

Building a model that forecasts 3 hourly demand shortfall in energy. The model will help the government on how much capacity of the expansion needs to be carried out.

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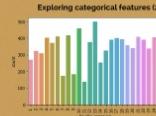
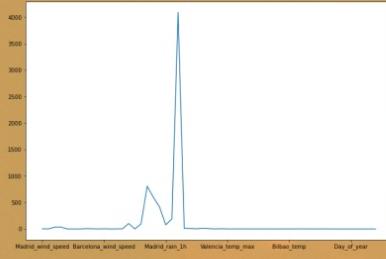
Solution

Data analysis: Outliers in features

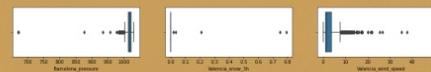
Introducing the data

- The training dataset comprises of 49 columns including the unnamed column and 8763 rows.
- The test dataset comprises of 48 columns including the unnamed column and 2920 rows.
- They both consist of both numerical and categorical variables.

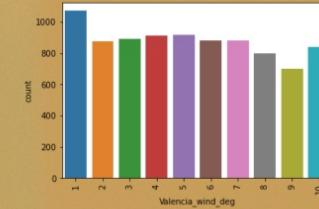
Identifying outliers using Kurtosis



Outliers Box and whisker



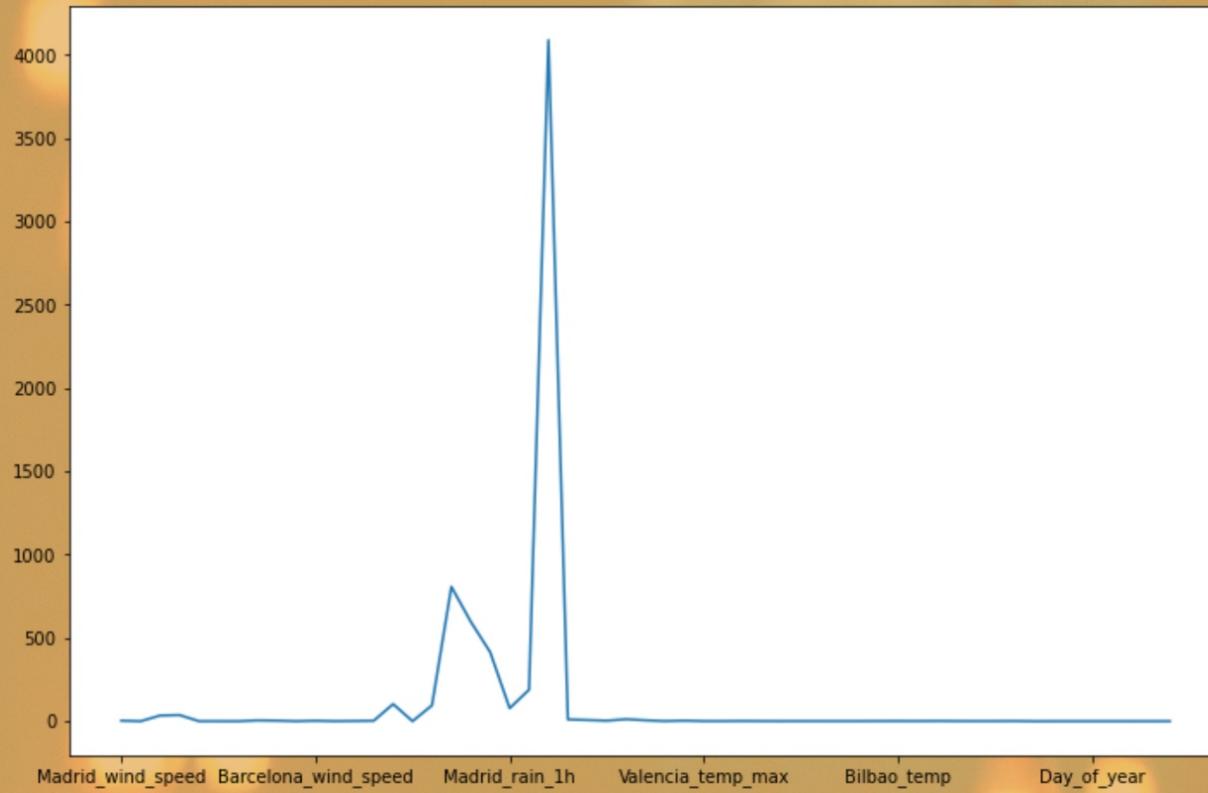
Exploring categorical features



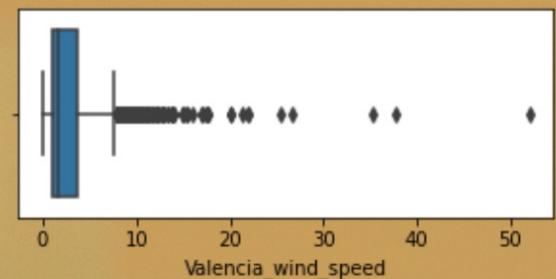
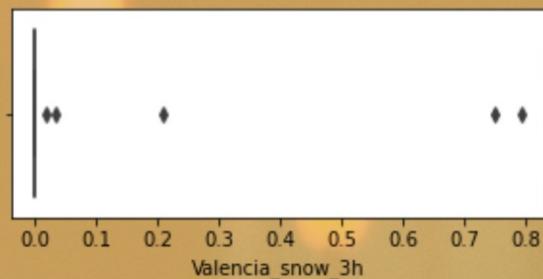
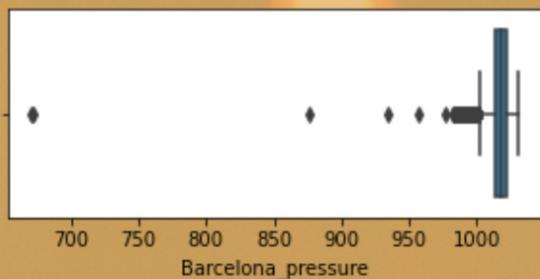
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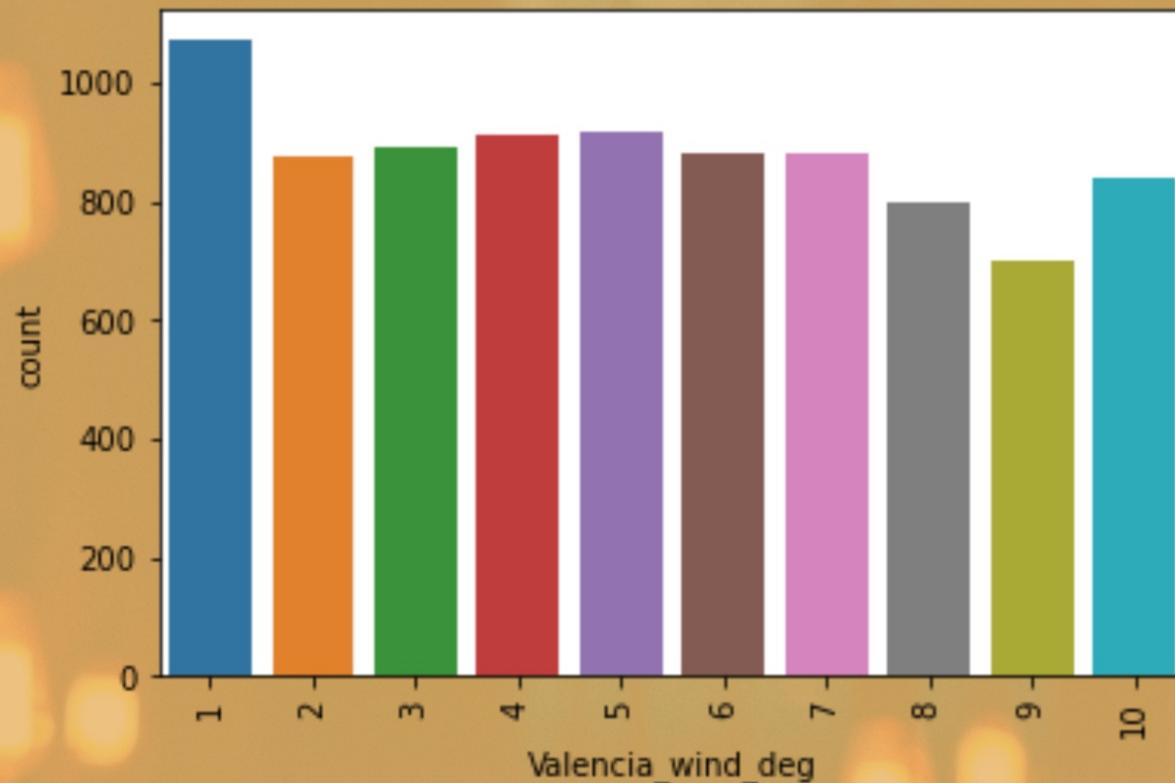
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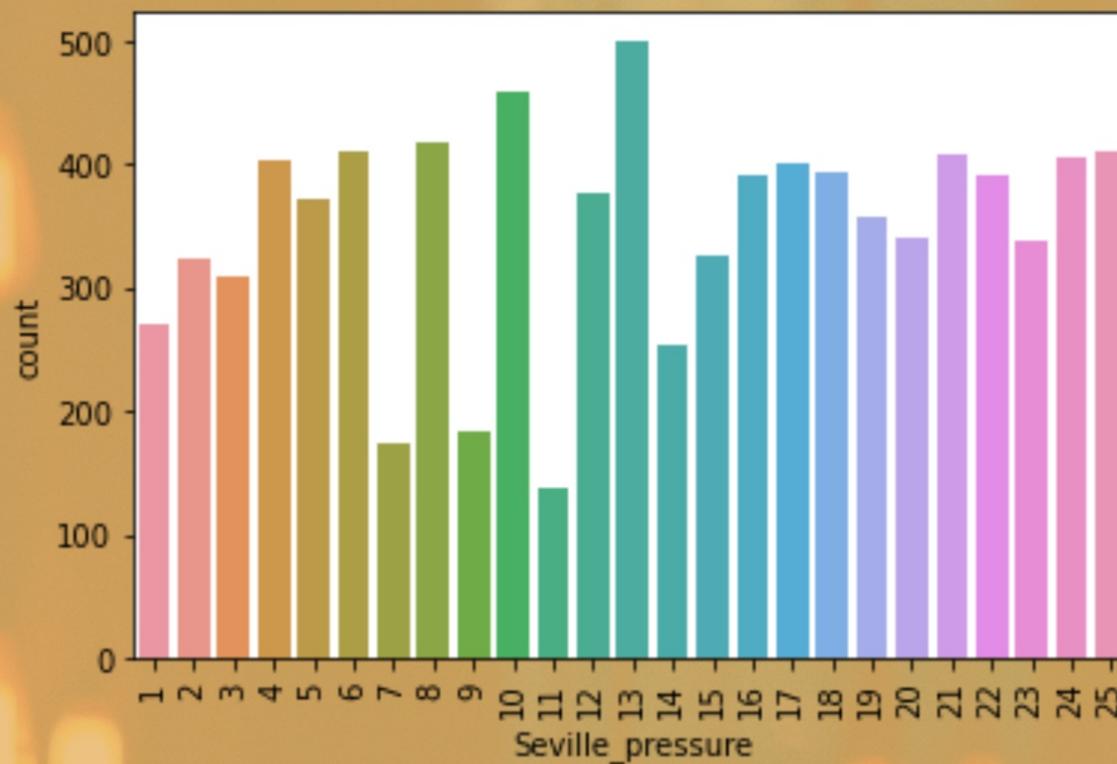
Outliers Box and whisker



Exploring categorical features



Exploring categorical features (2)



Overview:

Prediction of shortfall of energy for Spain between energy generated by fossil fuels and renewable energy

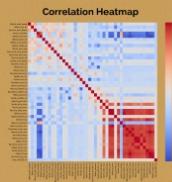
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Findings 1



Measuring different Models RMSE

Test RMSE	
Decision tree	4598.823057
Linear regression	4733.646037
Random Forest	3909.857228
XGB	3128.892584

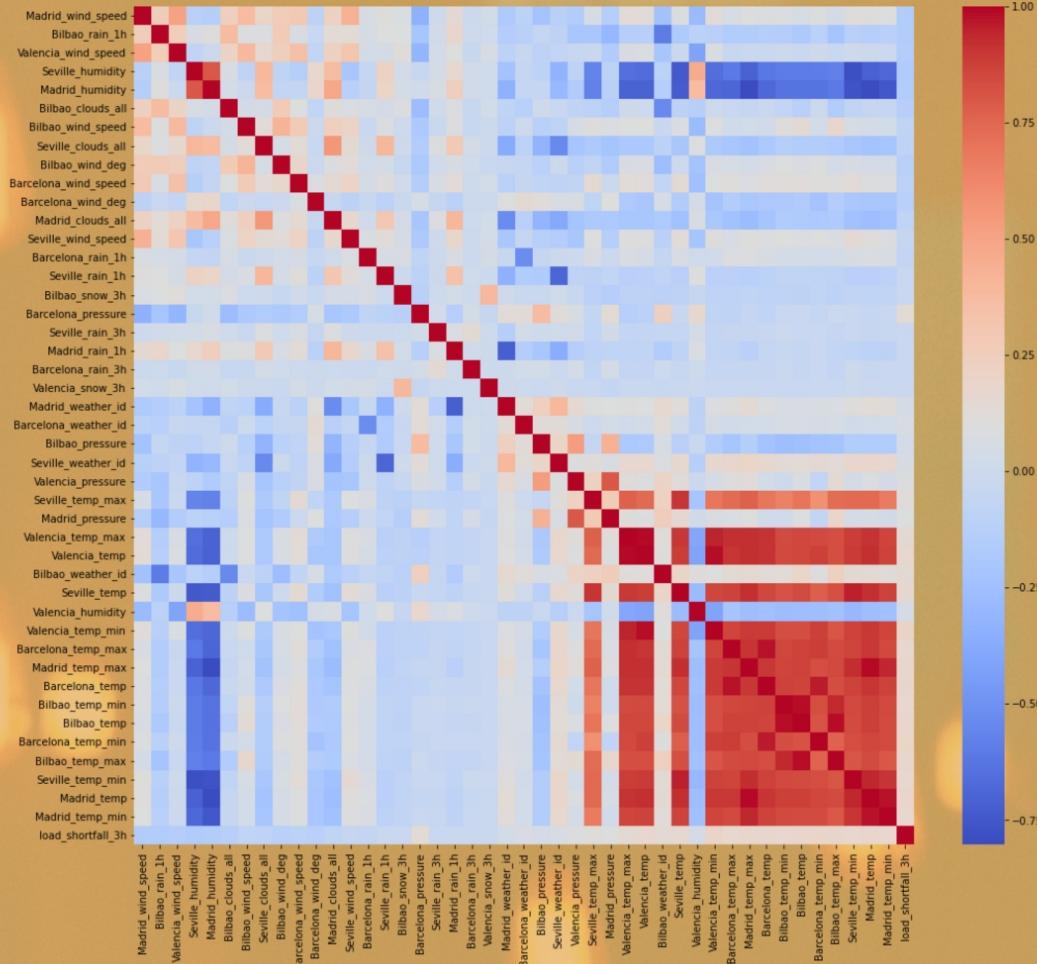
Measuring using R^2

Test R^2	
Decision tree	0.242736
Linear regression	0.197684
Random Forest	0.454840
XGB	-0.328481

Model's Performance measured using MAE

Test MAE	
Decision Tree	3642.892440
Linear model	3737.628636
Random Forest	3081.561786
XGB	4845.984417

Correlation Heatmap



Measuring different Models RMSE

Test RMSE	
Decision tree	4598.823057
Linear regression	4733.646037
Random Forest	3909.857228
XGB	3128.892584

Measuring using R²

Test R²

Decision tree 0.242736

Linear regression 0.197684

Random Forest 0.454840

XGB -0.328481

Model's Performance measured using MAE

Test MAE	
Decision Tree	3642.892440
Linear model	3737.628636
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The best performing model is Random Forest and we will carry our predictions using it.

	time	load_shortfall_3h
0	2018-01-01 00:00:00	6453.816895
1	2018-01-01 03:00:00	5772.473145
2	2018-01-01 06:00:00	6193.776367
3	2018-01-01 09:00:00	7481.478027
4	2018-01-01 12:00:00	8567.219727
...
2915	2018-12-31 09:00:00	8685.877930
2916	2018-12-31 12:00:00	12217.605469
2917	2018-12-31 15:00:00	10881.833008
2918	2018-12-31 18:00:00	11981.509766
2919	2018-12-31 21:00:00	11885.083984

2920 rows × 2 columns

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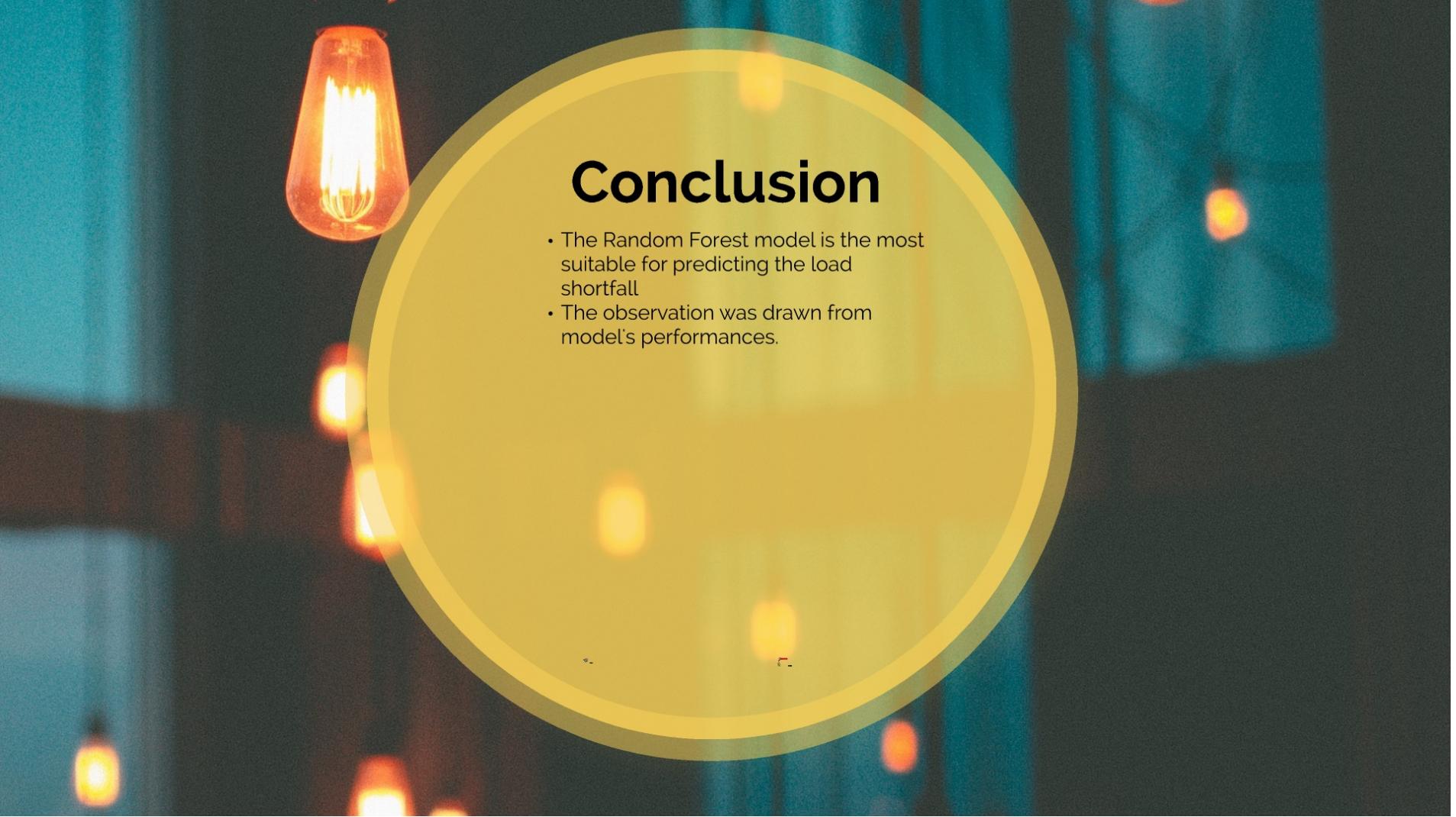
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Conclusion

- The Random Forest model is the most suitable for predicting the load shortfall
- The observation was drawn from model's performances.

Conclusion

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- The observation was drawn from model's performances.

THANK YOU!



QUESTIONS





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