



How to predict power online (fast)

Optimized Forecasting Solutions for Energy Traders at ETCSEE 2024



What we've learned



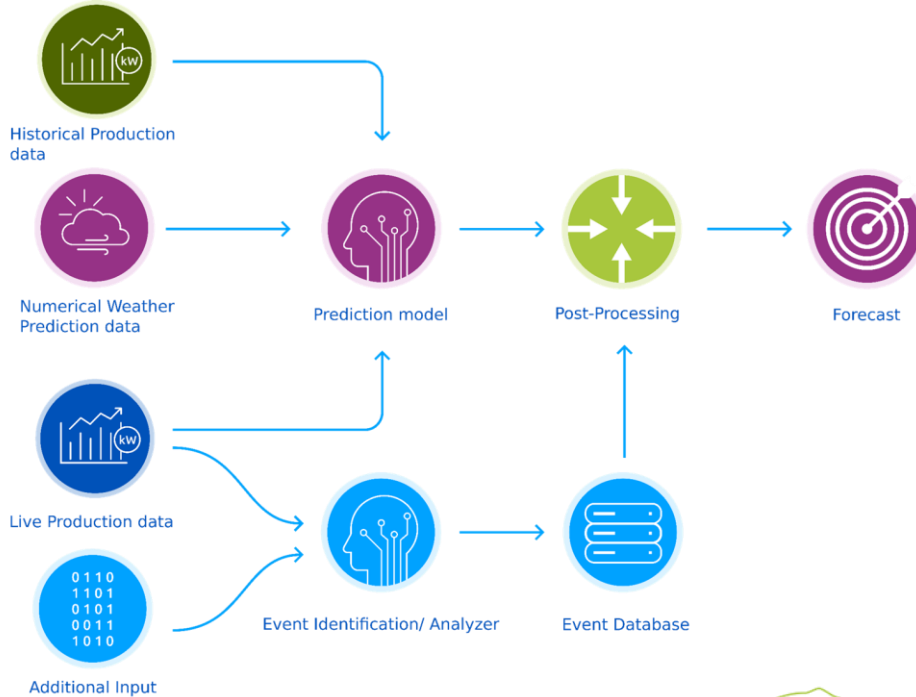
Weather Report?



Deep Learning!

Generating Forecasts

Data flow chart



Power yield forecasting for wind and solar power

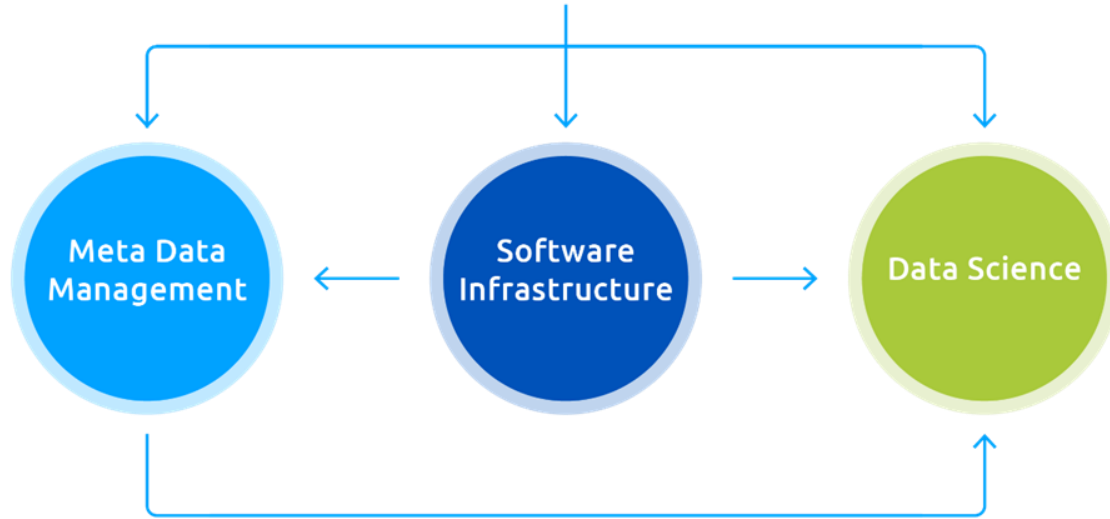


For various time horizons

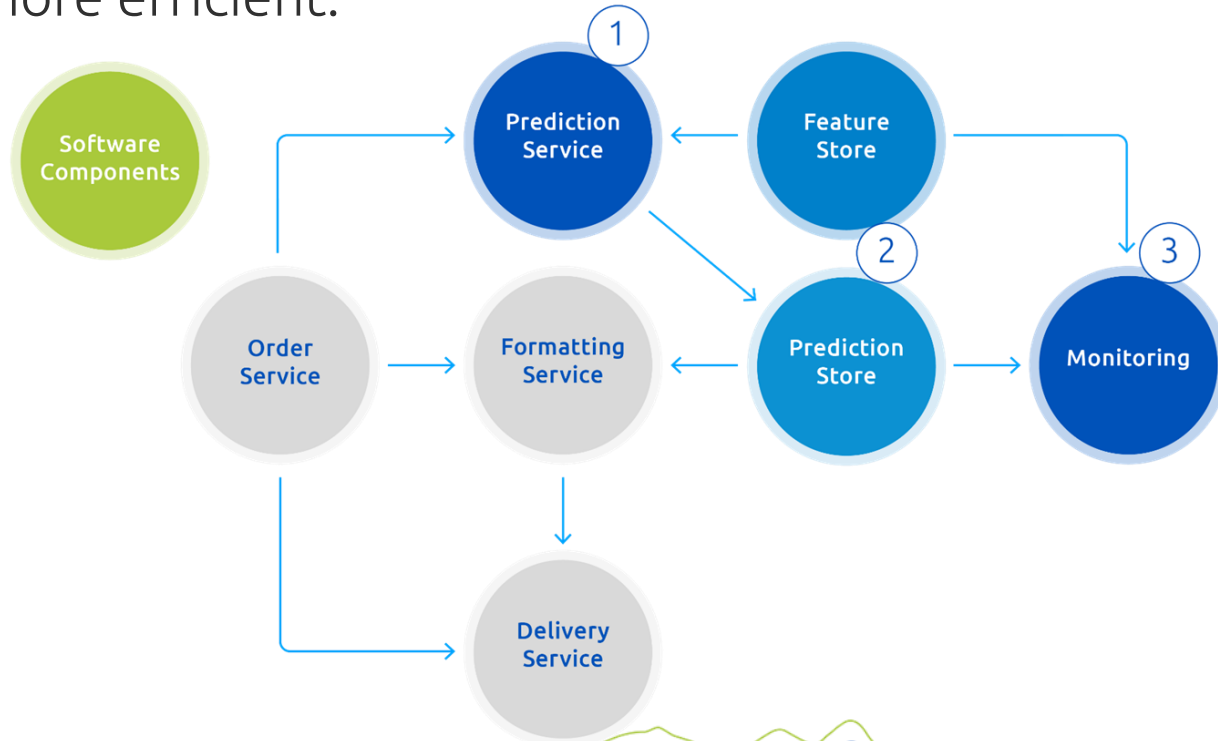
- **IntraDay**
- **Day-Ahead**
- **Long-term Predictions**

What is crucial
from here?

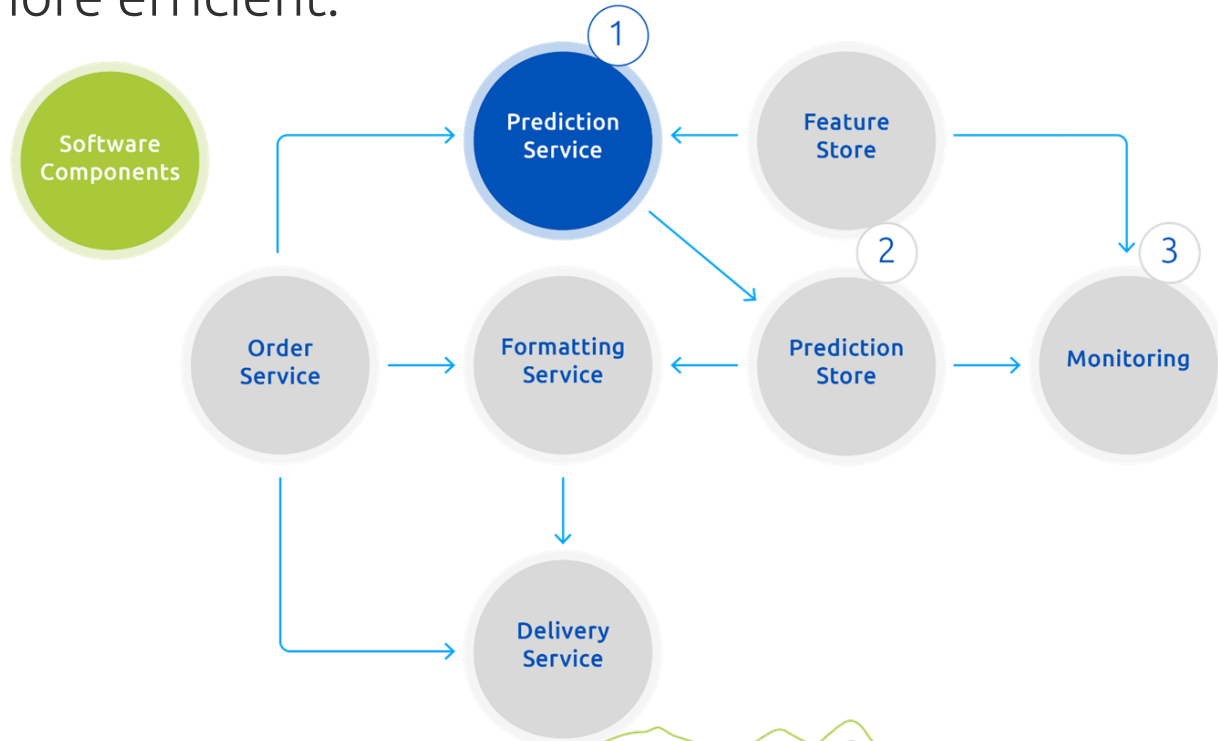
Which components do we need?



How to approach to be more efficient.

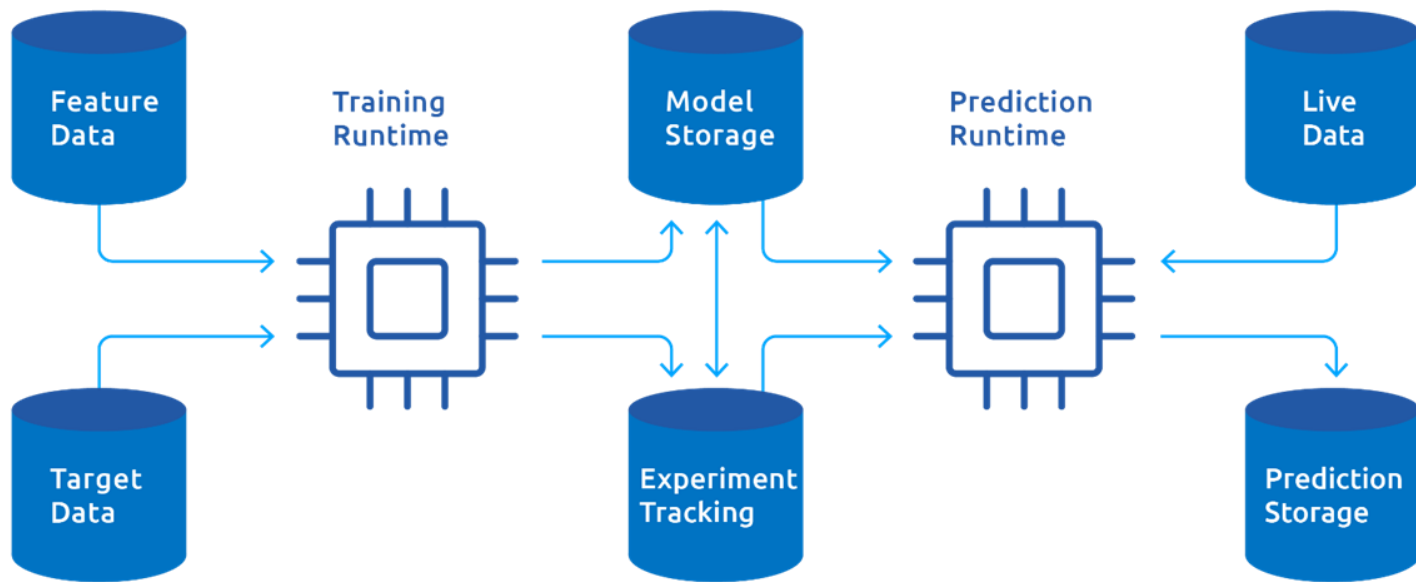


How to approach to be more efficient.



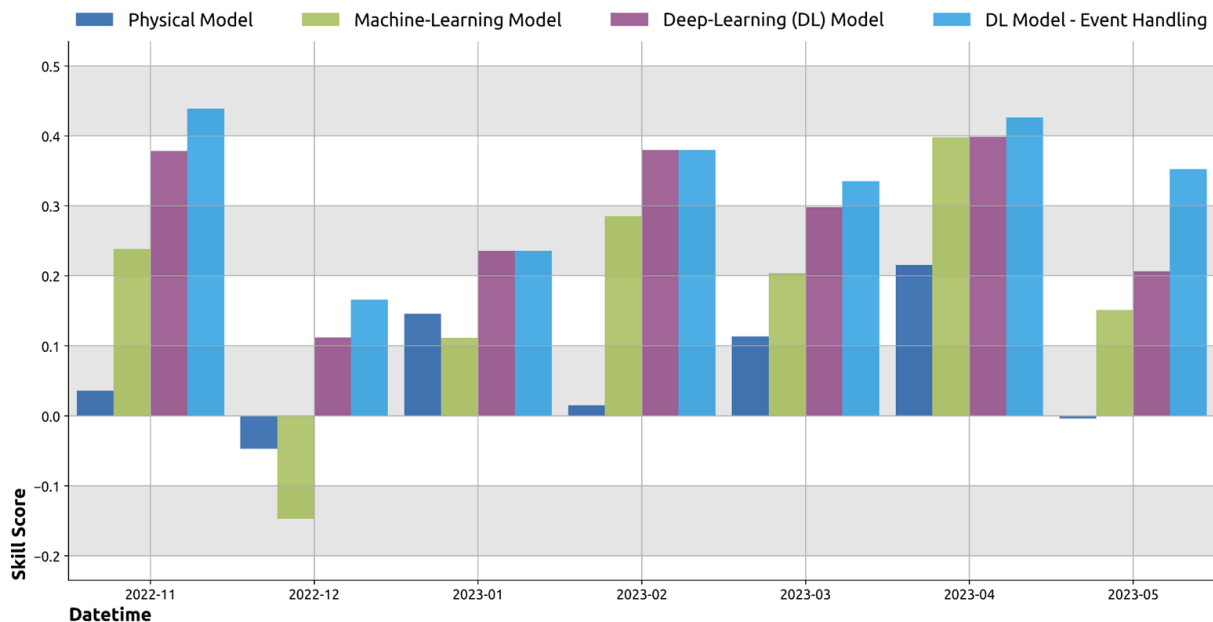
Prediction Service

The heart of Machine Learning



Solar Predictions

Skill Score, Financial Benefits



Balancing Costs

Germany* ~125 €/MWh

Installed Power: 10 MW

FINANCIAL BENEFITS



→ Physical Model
→ 2,090 €/Month



→ Machine-Learning Model
→ 5,600 €/Month



→ Deep-Learning (DL) Model
→ 7,800 €/Month

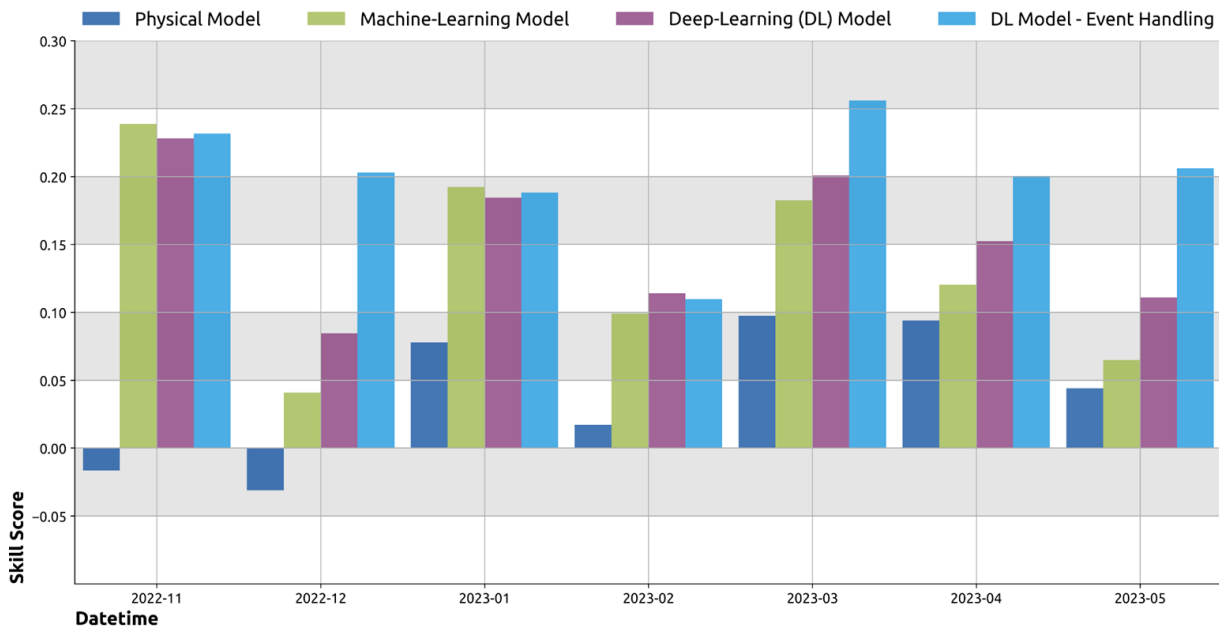


→ DL Model -
Event Handling
→ 9,200 €/Month

* 15min balancing energy price taken from www.smard.de

Wind Predictions

Skill Score, Financial Benefits



Balancing Costs
Germany* ~125 €/MWh

Installed Power: 10 MW

FINANCIAL BENEFITS



→ **Physical Model**
→ 3,000 €/Month



→ **Machine-Learning Model**
→ 13,600 €/Month



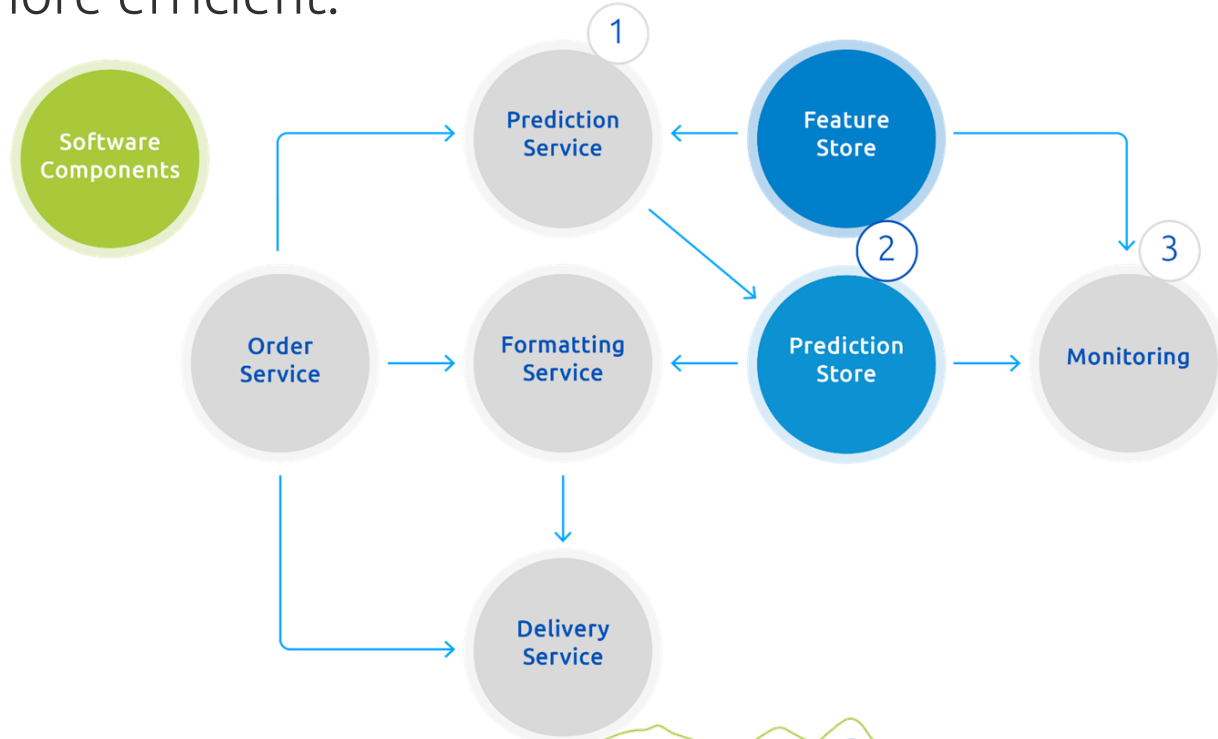
→ **Deep-Learning (DL) Model**
→ 15,400 €/Month



→ **DL Model -
Event Handling**
→ 20,100 €/Month

* 15min balancing energy price taken from www.smard.de

How to approach to be more efficient.



Feature & Prediction store

The path of data

1 | Source



2 | Standardized Storage

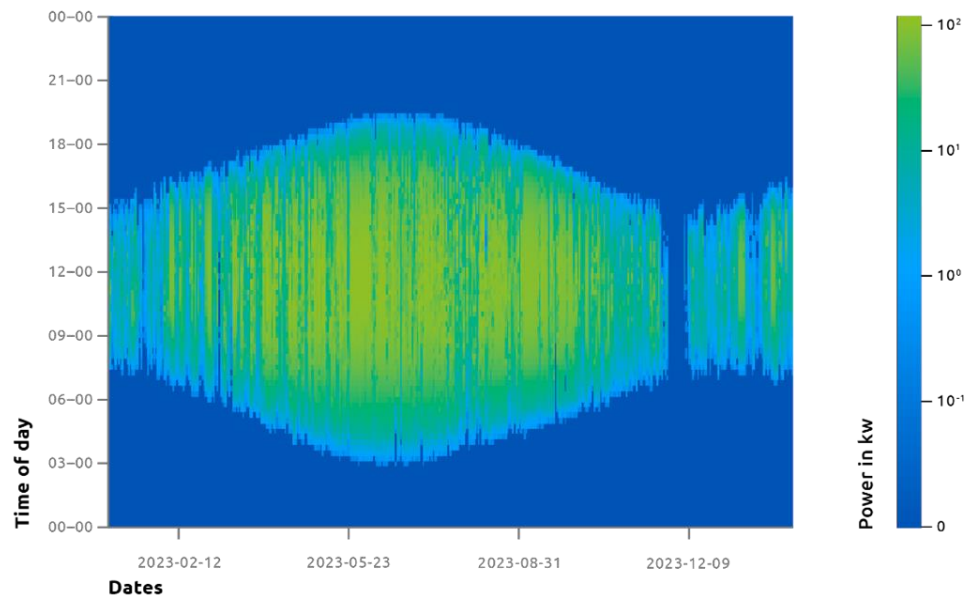


3 | Feature Store



Data Exploration

Towards a Feature Store

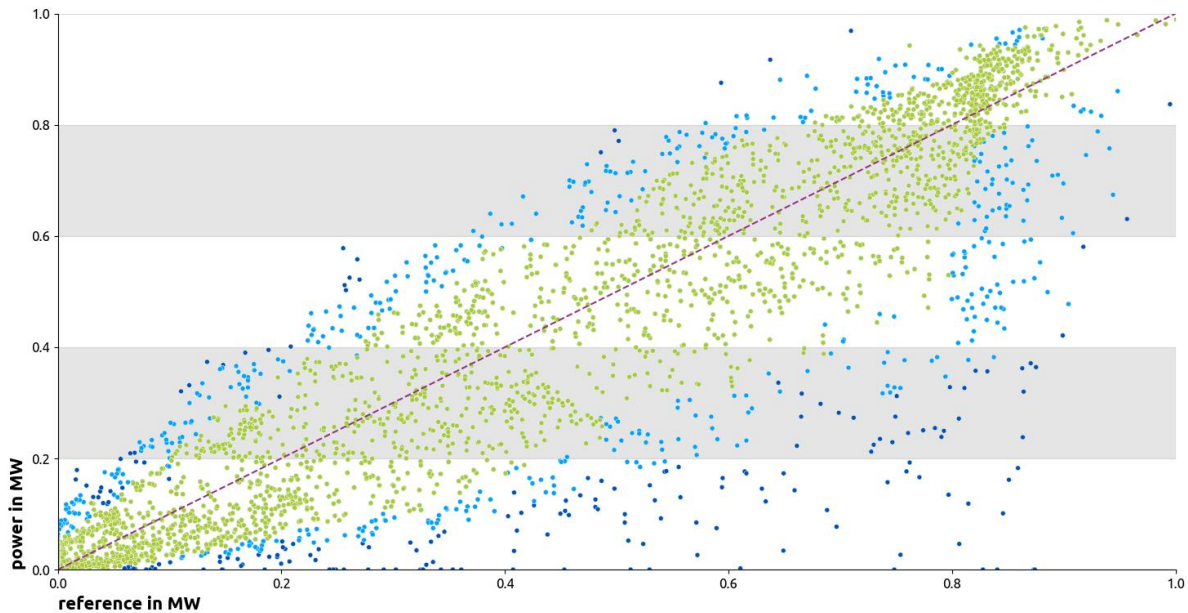


Solar Heatmap

- Understanding the data
- Detecting irregularities
- Defining further actions

Data Cleaning

Towards a Feature Store



Cleaning methods



→ Physical plausibility



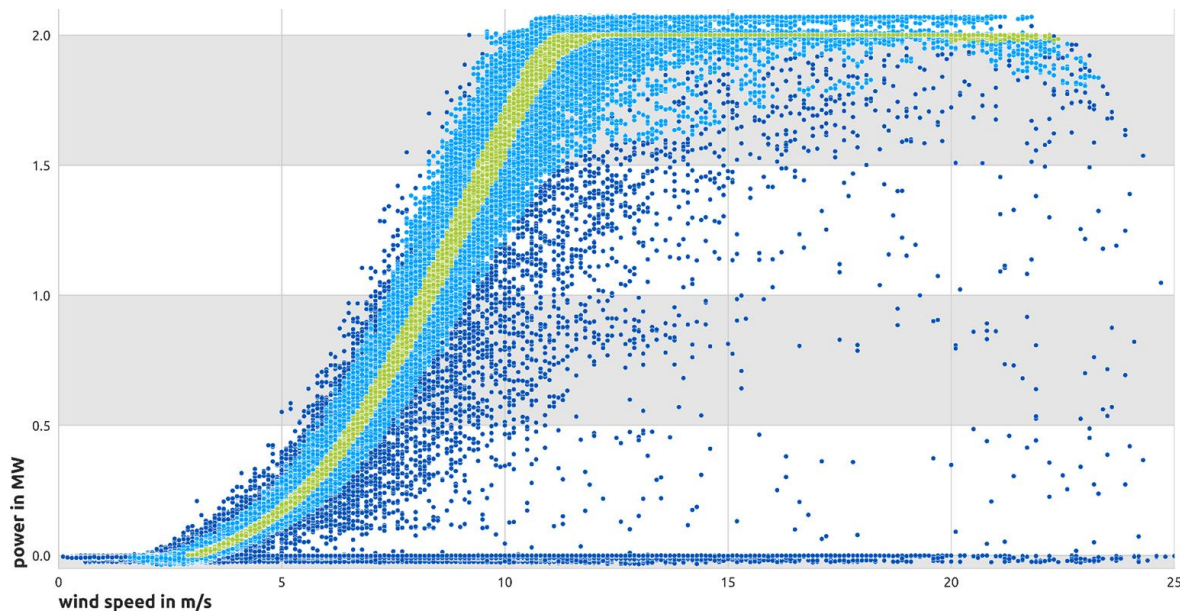
→ Statistical relevance



→ Outlier detection

Data Cleaning

Towards a Feature Store



Exemplary wind plant: 2 MW

Cleaning methods



→ Physical plausibility

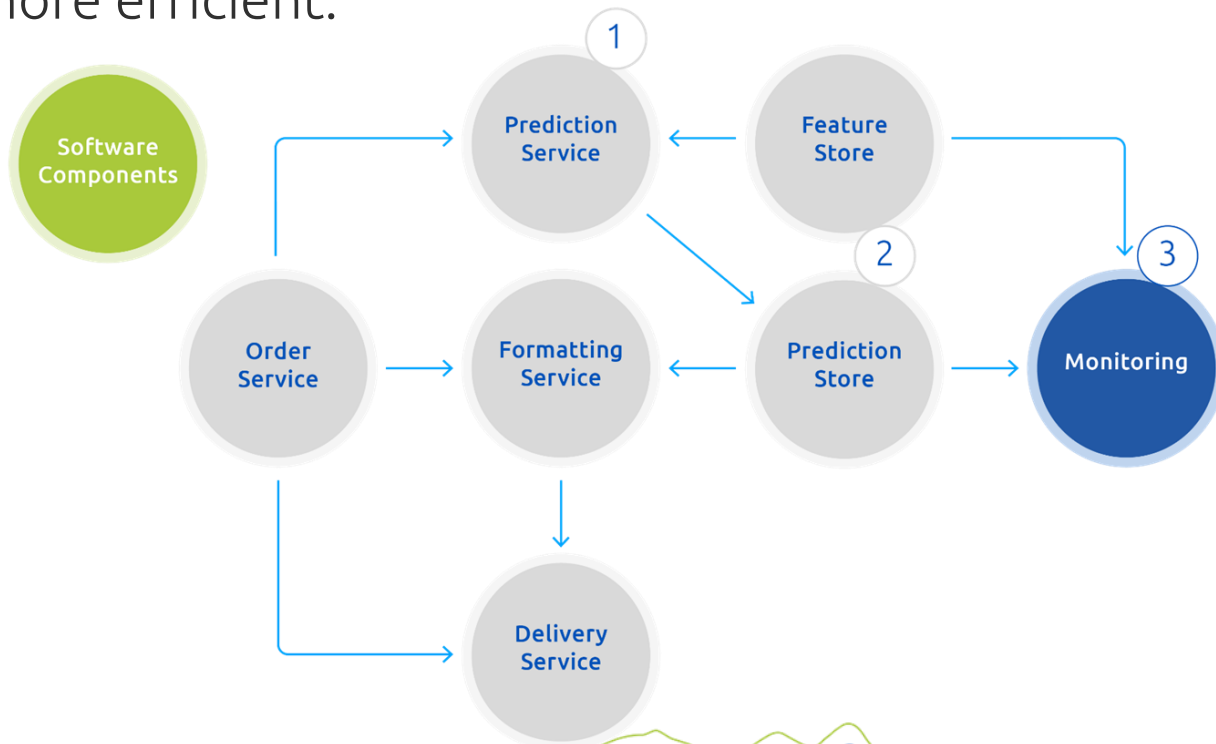


→ Statistical relevance



→ Outlier detection

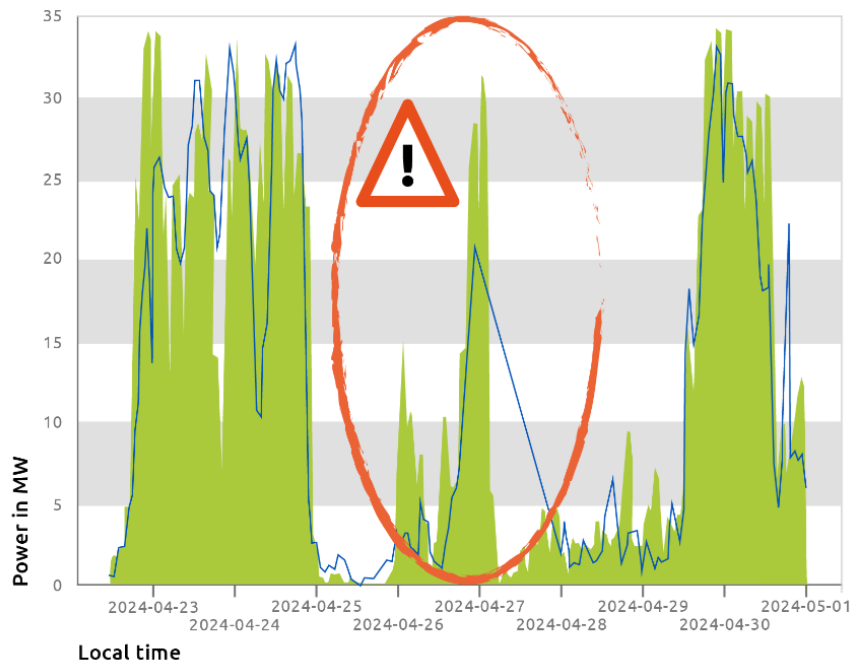
How to approach to be more efficient.





Monitoring

Fix your models!



Before things go wrong:

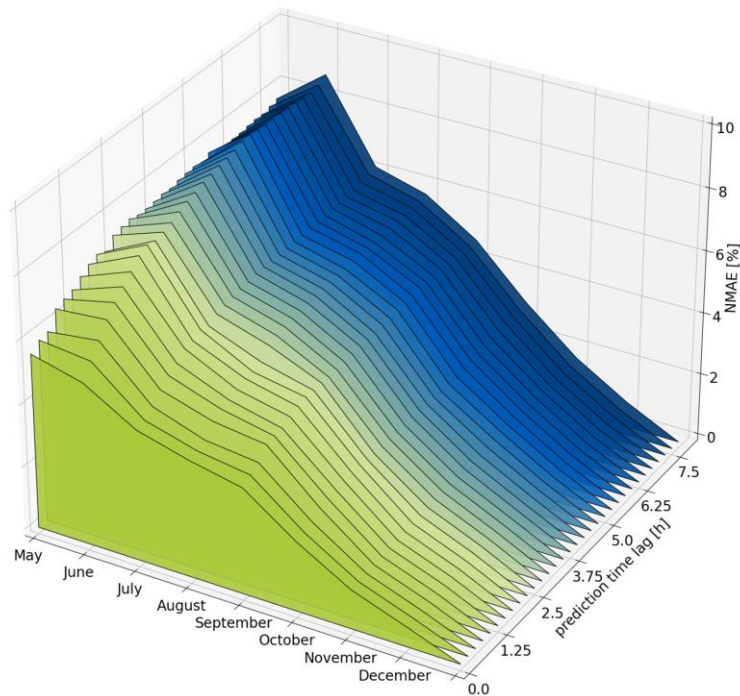
→ Define metrics

→ Get alerted

→ Fix the problem

Reporting

Know your qualities

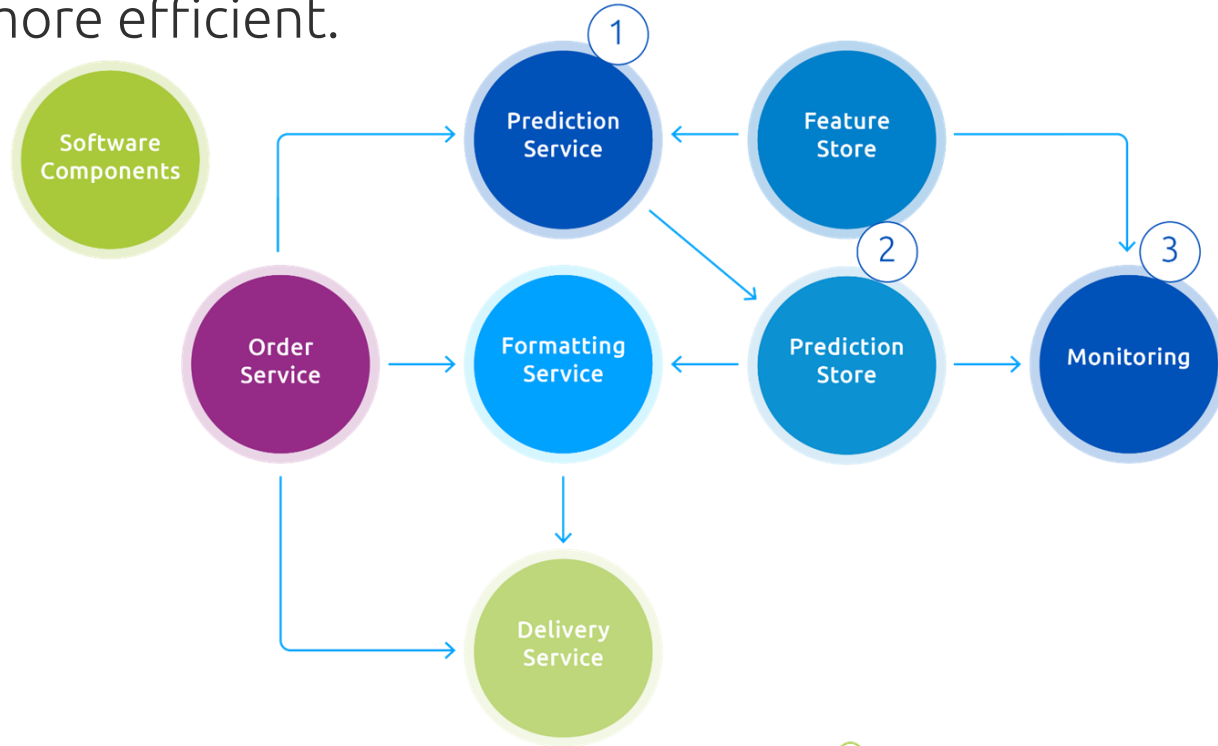


Evaluate forecast quality:

- Define metrics
- Define optimization focus
- Check if goals are fulfilled

Conclusion

to be more efficient.





Learn about why and how

and use it. With us.

Let's connect on LinkedIn

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