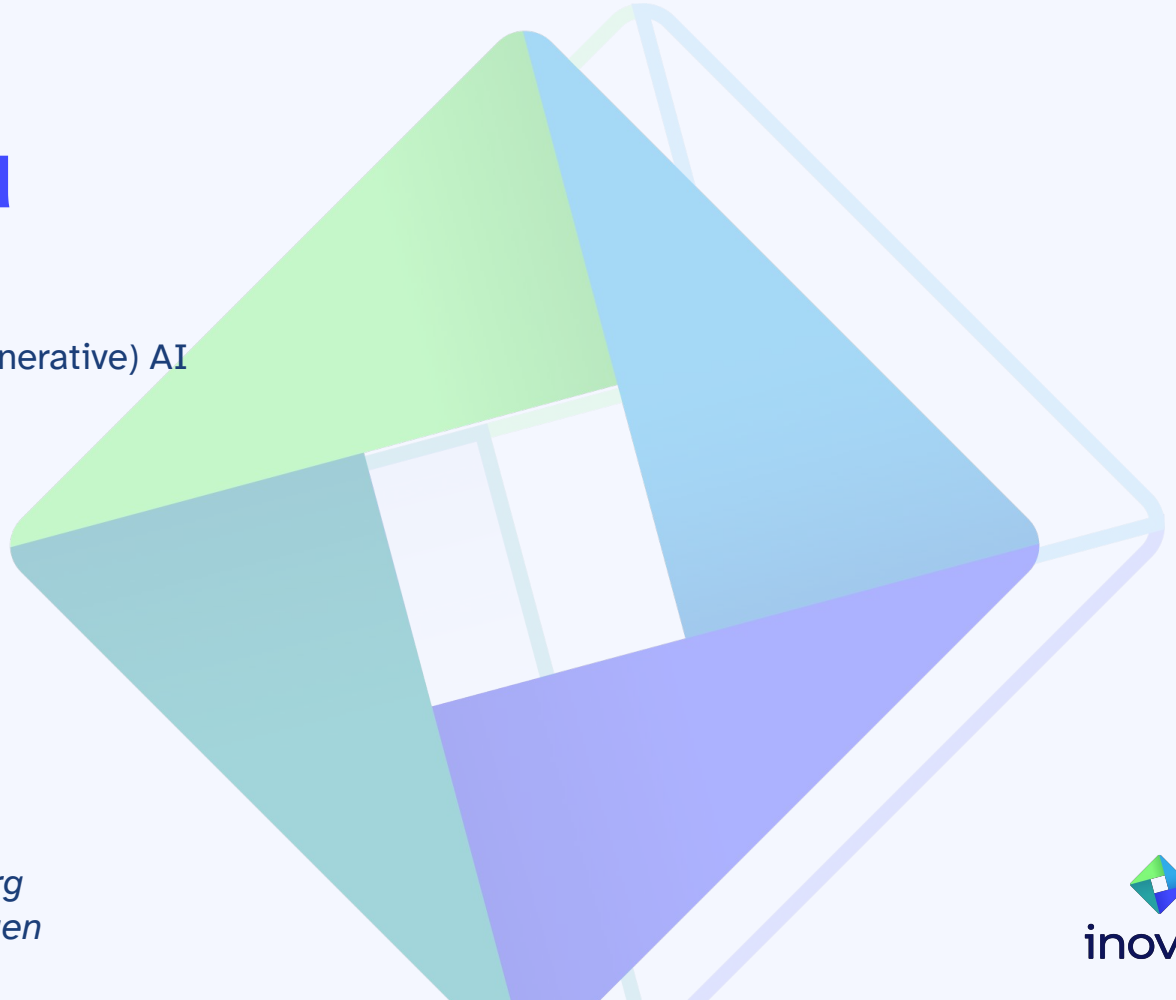


Human-Centered Explainable AI

Empowering Users in the Age of (Generative) AI

Team inovex

Karlsruhe · Köln · München · Hamburg
Berlin · Stuttgart · Pforzheim · Erlangen





Dr. Robin Senge

/// Head of Machine Learning @inovex
/// Machine Learning, Uncertainty Quantification, Forecasting

 Robin Senge



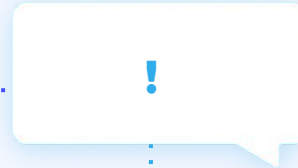
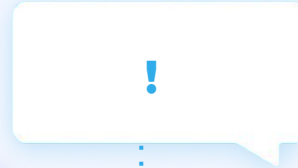
Alina Döring

/// UI/UX Designerin @inovex
/// Human-AI-Interaction

 Alina Döring



Empfänger der
Erklärung



Sender der
Erklärung

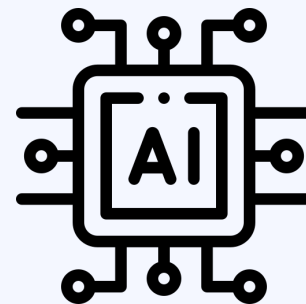
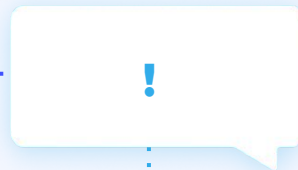
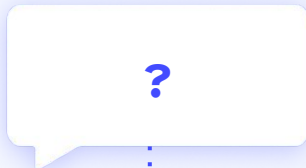
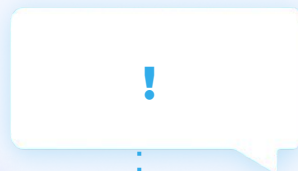
**Erklärungen sind eine
interaktive Form der
Wissensweitergabe.**



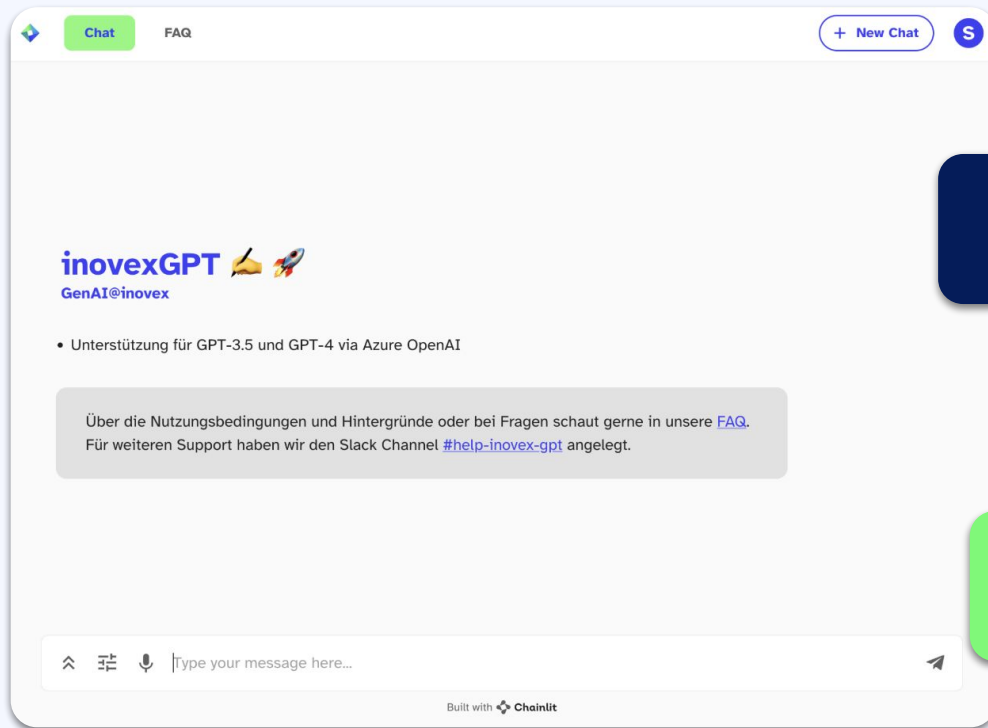


Wir “googlen”





Wir nutzen Technologie, um unsere Kunden glücklich zu machen. Und uns selbst.



Seit November 2023 für
unsere ~500 Kolleg:innen
verfügbar

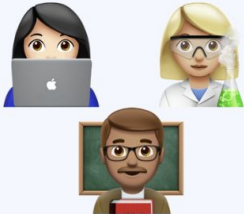
Durchschnittlich 10-12k
Requests pro Woche

Basiert auf Azure OpenAI
und einem Custom Frontend

Monatliche Kosten im
Bereich von 1k und 1.5k€

Open Grid Europe - Chat with your data.

“Chat with
your data!”





Kundennutzen

-  Zugang zu Unternehmens- und Prozessdaten mit Chatbots
-  KI-Agent agiert mit externen Systemen
-  Von der Idee zum Proof of Concept in zwei Wochen

Technologien



Home / Referenzen / Open Grid Europe

 Chat Readme

In Zusammenarbeit mit
einen niederschwellige
Wochen umgesetzt und
Verdichterstationen in



04:54:19 PM

Wie hoch ist die Temperatur der Verdichtermaschine 1 in Herbstein?

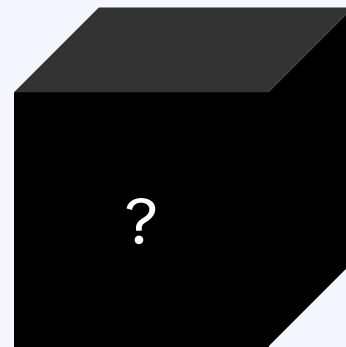
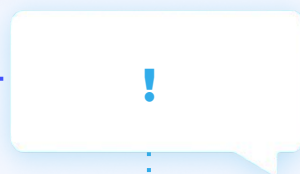
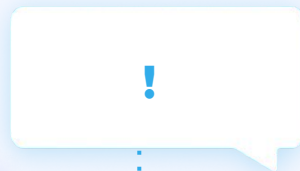
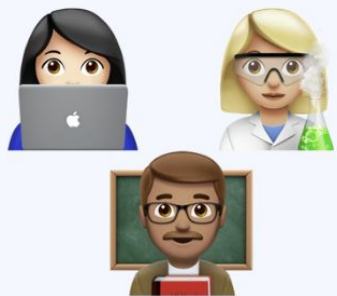
Took 1 step ▾



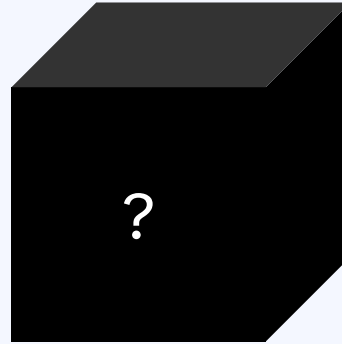
04:55:36 PM

Die Temperatur der Verdichterstation 1 in Herbstein beträgt 28 Grad.

**Mensch und KI stehen
in einem interaktiven
Dialog.**



Input

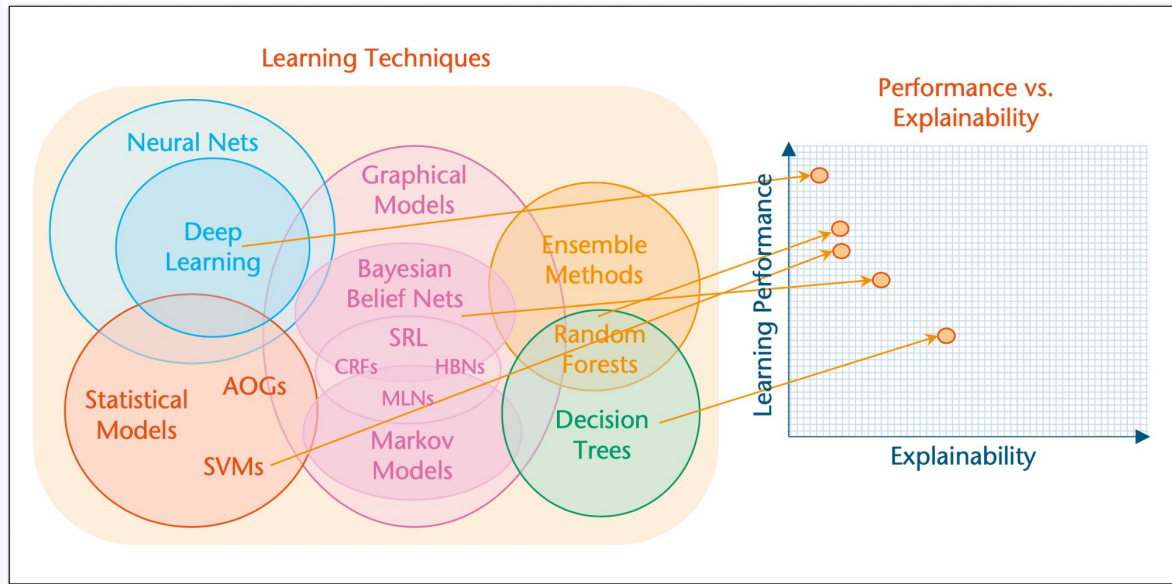


Output

KI als Blackbox

Die bisherige Lösung: Explainable AI

Der Traum: Globales Modellverständnis - Nachvollziehbarkeit jeder Prognose.



Explainable AI - etwas realistischer

globales Modellverständnis → Vertrauen in eine lokale Prognose

Beispiele: SHAP, LIME, Anchors, LRP, DTD, PDA, etc.

Feature Importance

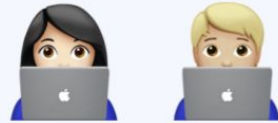
Messen des Einflusses von
Eigenschaftswerten auf eine
Prognose

Local Approximation

Lokale Approximation mit
erklärbaren einfachen Modellen

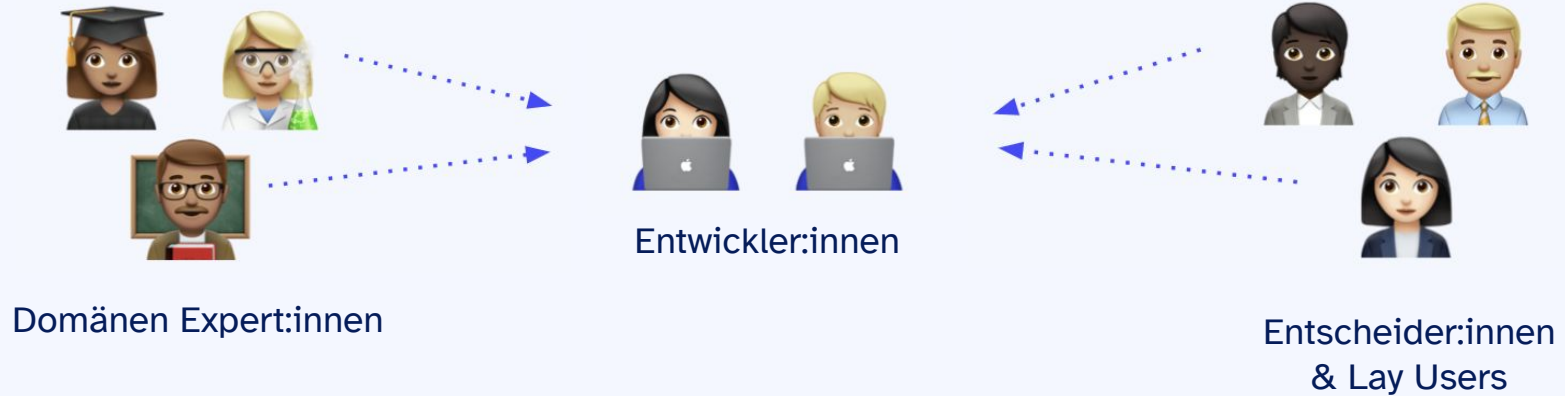
Wir gehen mit einem Beispiel-basierten Dialog-Ansatz.

Die Nutzergruppen...



Entwickler:innen

Die Nutzergruppen erweitern sich



**Wie übersetzen wir
diesen Dialog in die
Praxis?**

KI im Handel (unvollst.)

Customer facing

Welches Produkt hat die Kundin gerade aus dem Regal genommen?

Welches Produkt biete ich der Kundin als nächstes an?

Was antworte ich einer Kundin, die sich über die Produktqualität beschwert?

Wie formuliere ich einen Beschreibungstext für mein Produkt?

Welche meiner Kundinnen sind mit meinem Service nicht zufrieden?



inovex



Von SounderBruce - Eigenes Werk, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=56922594>

KI im Handel (unvollst.)

Supply chain facing

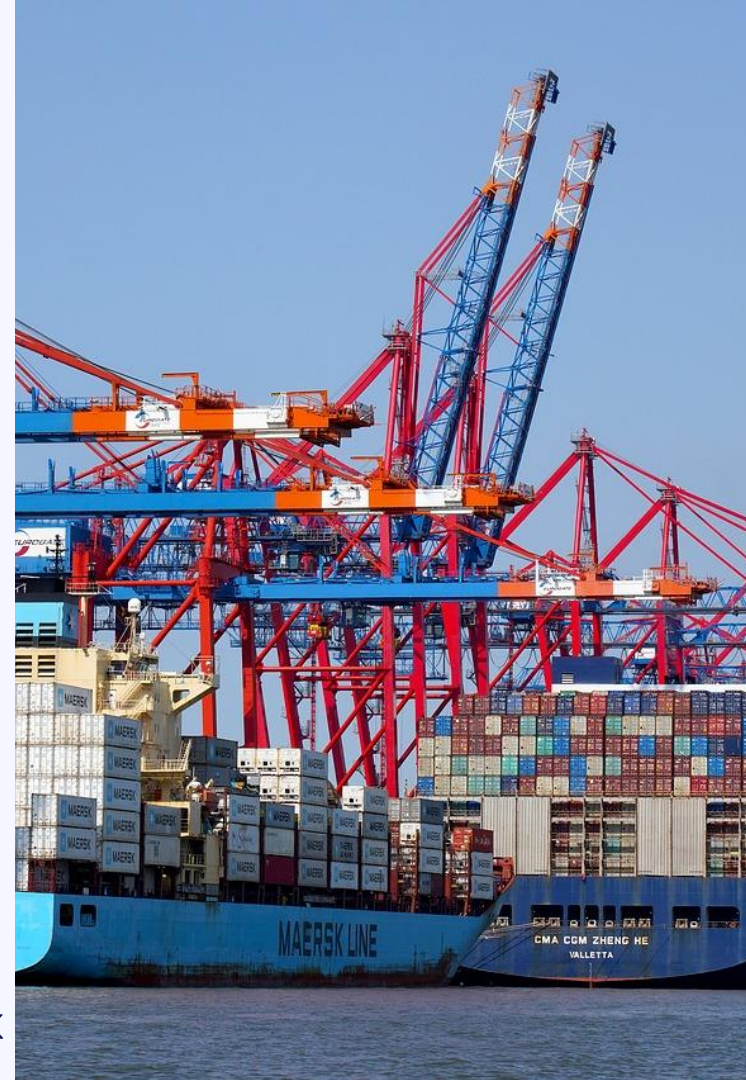
Mit welchem Preis werde ich meine Salatköpfe bis zum Ladenschluss los?

Wie viele Mitarbeiter:innen brauche ich samstags in meinem Lager?

Welcher Regel folgt die Preisgestaltung meiner Konkurrenz?

Habe oder hatte ich eine Out-of-Stock-Situation?

Wie viele Liter Milch muss ich bei meinem Lieferanten bestellen?

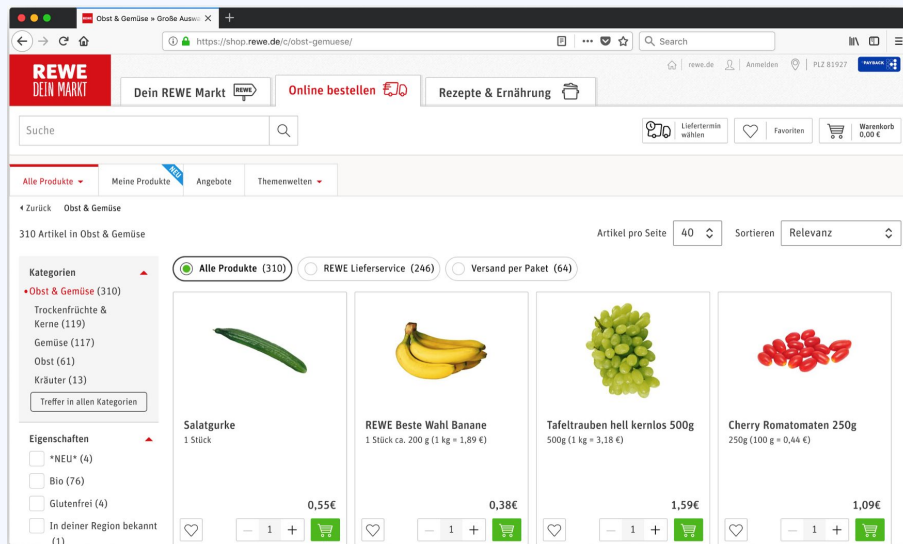




Wovon hängt mein Absatz ab?

- Preis
- Aktionen
- Werbung
- Kalender
- Geografische Information
- Demografische Information
- Wetter
- Konkurrenz
- Kannibalisierung & Verbundeffekte

Reduzierung von Ersatzartikeln bei **REWE**



-50% Ersatzartikel-Quote

bei gleichem Gesamtbestand
bei gleichen Abschriften



User-Centered Design Prozess



**Überblick
zuerst**



Apple Pink Lady 6 in a bowl

#1907459

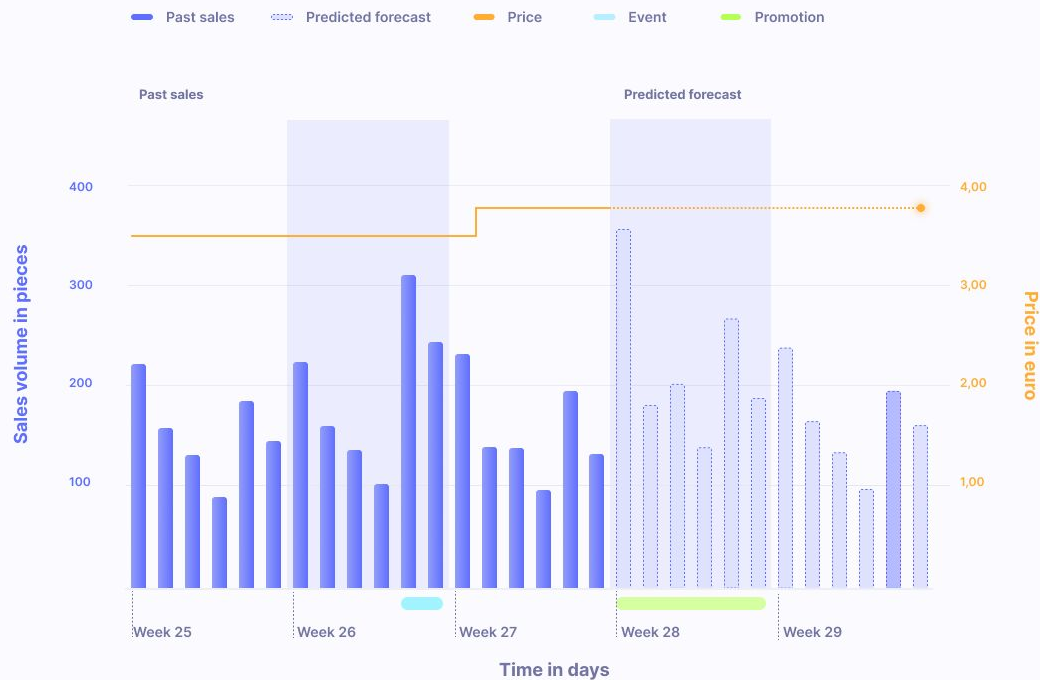


**Details
nach Bedarf**



Apple Pink Lady 6 in a bowl

#1907459



Current Prediction ⓘ

Forecast

198

Service-Level

95%: 223

90%: 209

Simulate alternative forecast

Current Scenario ⓘ

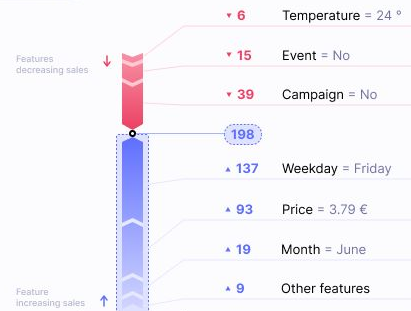
The scenarios show the 6 features that have the strongest influence on the demand forecast.

Sales	Weekday	Price	Month	Temp.	Event	Promotion
198	Friday 21.07.23	3.79 €	June	24°	No	No

Comparable scenarios ⓘ

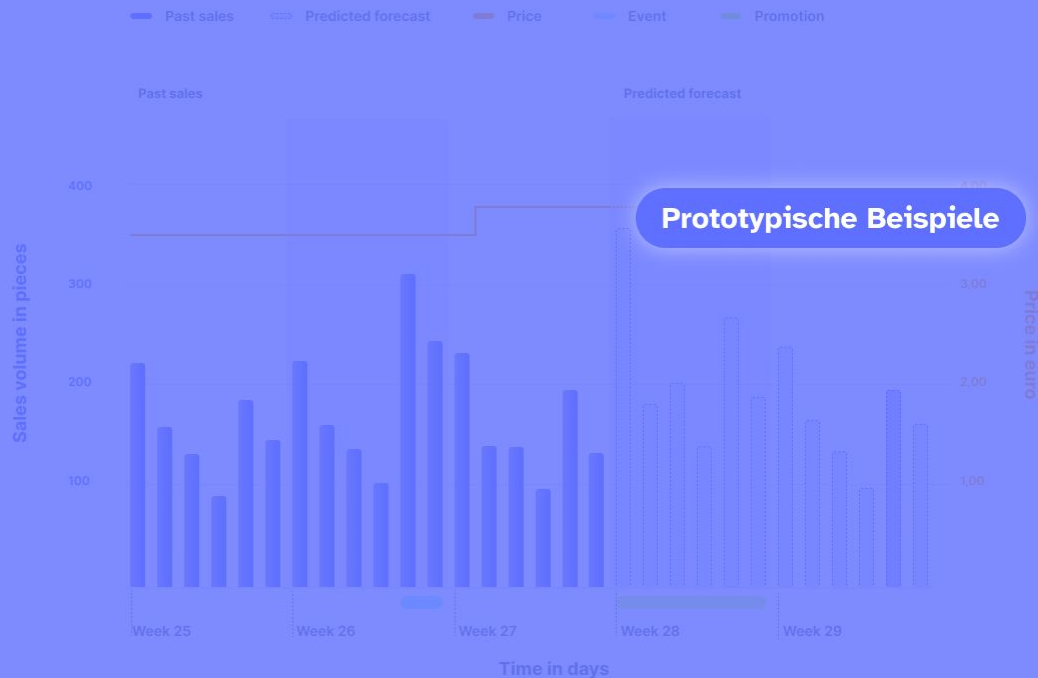
Sales	Prediction	Weekday	Price	Month	Temp.	Event	Promotion
197	203 -3% ↑	Friday 07.07.23	3.79 €	July ▾	23°	No	No
200	202 1% ↑	Friday 17.06.23	3.79 € ▾	July ▾	24° ▲	No	No

Feature Influence ⓘ



Apple Pink Lady 6 in a bowl

#1907459



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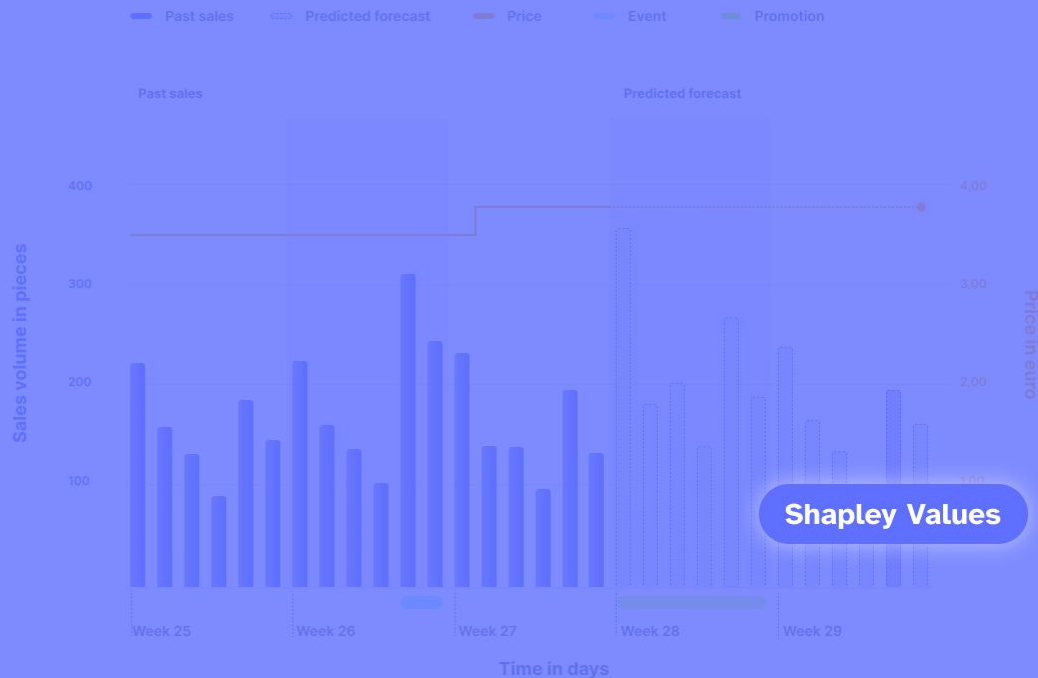
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Shapley Values ⓘ



Apple Pink Lady 6 in a bowl

#1907459



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Current Scenario ⓘ

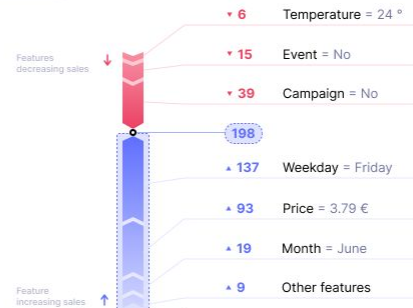
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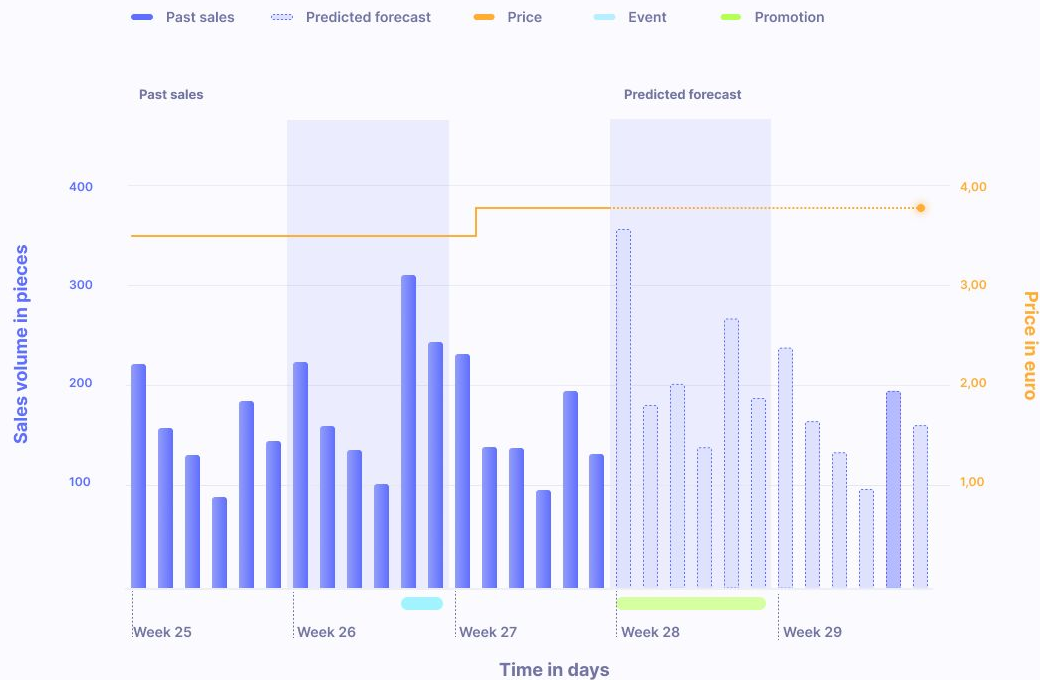


Exploration & Interaktion



Apple Pink Lady 6 in a bowl

#1907459



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Forecast

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Simulate alternative forecast

Current Scenario ⓘ

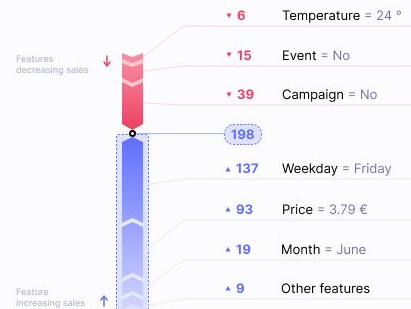
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198	Friday 21.07.23	3.79 €	June	24°	No	No

Comparable scenarios ⓘ

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Feature Influence ⓘ



Back

Features

Weekday ☒

Month ☒

Price ☒

Temperature ☒

Event ☒

Promotion ☒

Show more features 

Adjust features

Adjust forecast

Initial prediction



Sales Weekday Price Month Temp. Event Promotion

198

Friday
21.07.23

3.79 €

June

24°

No

No

Weekday

Friday



Month

June



Promotion

No



Event

No



Price

3.79 €



Temperature

24°



Predicted forecast

198

Pieces



Revenue: 750.42€ when the article price is at 3.79 €

[Back](#)

Features

Weekday ☐ Month ☐ Price ☐ Temperature ☐ Event ☐ Promotion ☐ [Show more features](#) 

Adjust features

Initial prediction

Sales	Weekday	Price	Month	Temp.	Event	Campaign
198	Friday 23.06.23	3.79 €	June	24°	No	No

Generated prediction

Sales	Weekday	Price	Month	Temp.	Event	Campaign
198	Friday	3.79 €	June	22° ▾	No	No
198	Friday	3.79 €	May ▾	21° ▾	No	No
198	Friday	3.79 €	June	24°	No	No
198	Friday	3.49 €	May ▾	25° ▲	No	No

Comparable past sales

197	203 3% ↑	Friday 24.06.22	3.79 € ▾	June ▲	23° ▾	No	No
200	202 1% ↑	Friday 17.06.22	3.79 € ▾	June ▲	24°	No	No
195	199 -3% ↓	Friday 01.07.22	3.79 € ▾	July ▲	24°	No	No

Adjust forecast

Predicted forecast

198 Stk.Revenue: **750,42€** when the article price is 3,79 €

Recommendations for action

Scenario 1

Scenario 2

Scenario 3

[Back](#)

Features

Weekday ☐ Month ☐ Price ☐ Temperature ☐ Event ☐ Promotion ☐ [Show more features](#) [Adjust features](#)[Adjust forecast](#)Initial prediction 

Sales	Weekday	Price	Month	Temp.	Event	Campaign
-------	---------	-------	-------	-------	-------	----------

198

Friday 23.06.23	3.79 €	June	24 °	No	No
--------------------	--------	------	------	----	----

Generated predictions 

Sales	Weekday	Price	Month	Temp.	Event	Campaign
-------	---------	-------	-------	-------	-------	----------

320

Friday	3.79 €	June	22° ▾	*Yes	No
--------	--------	------	-------	------	----

320

Friday	3.49 € ▾	May ▾	21° ▾	No	*Yes
--------	----------	-------	-------	----	------

320

Friday	*2.99 € ▾	June	24°	No	No
--------	-----------	------	-----	----	----

325

Friday	3.49 € ▾	May ▾	25° ▲	No	*Yes
--------	----------	-------	-------	----	------

315

Friday ▾	3.49 € ▾	May ▾	23° ▾	*Yes	No
----------	----------	-------	-------	------	----

Comparable past sales **313****317**
1% ↑

Friday 25.06.21	3.79 € ▾	June ▲	23° ▾	*Yes	No
--------------------	----------	--------	-------	------	----

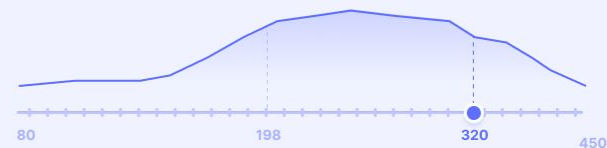
325**322**
~1% ↓

Friday 18.06.21	3.49 € ▾	June ▲	24°	*Yes	No
--------------------	----------	--------	-----	------	----

330**320**
~3% ↓

Friday 11.06.21	3.19 € ▾	July ▲	24°	No	*Yes
--------------------	----------	--------	-----	----	------

Predicted Forecast

320 PiecesRevenue: **1.212,80 €** when the article price is at 3.79 €

Recommendations for action

Scenario 1

Scenario 2

Scenario 3

Back

Features

Weekday ☒ 

Month ☒ 

Price ☒ 

Temperature ☒ 

Event ☒ 

Promotion ☒ 

Show more features 

Adjust features

Adjust forecast

Initial prediction 

Sales	Weekday	Price	Month	Temp.	Event	Campaign
198	Friday 23.06.23	3.79 €	June	24°	No	No

Generated predictions 

Sales	Weekday	Price	Month	Temp.	Event	Campaign
320	Friday	3.79 €	June	22° ▾	* Yes	No
320	Friday	3.49 € ▾	May ▾	21° ▾	No	* Yes
320	Friday	* 2.99 € ▾	June	24°	No	No
325	Friday	3.49 € ▾	May ▾	25° ▲	No	* Yes
315	Friday ▾	3.49 € ▾	May ▾	23° ▾	* Yes	No

Comparable past sales 

313	317 +1% ↑	Friday 25.06.21	3.79 € ▾	June ▲	23° ▾	* Yes	No
325	322 -1% ↓	Friday 18.09.21	3.49 € ▾	June ▲	24°	* Yes	No
330	320 -3% ↓	Friday 11.06.21	3.19 € ▾	July ▲	24°	No	* Yes

Predicted Forecast

320

Pieces



Hypothetische Beispiele

Example 1: Predicted forecast with adjusted price of 3.79 €

Recommendations for action

Scenario 1

Scenario 2

Scenario 3



Dr. Robin Senge

/// robin.senge@inovex.de
/// +49 (0) 173 318 11 24

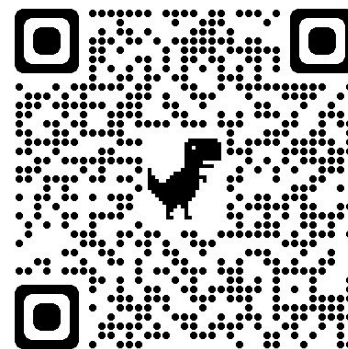
 Robin Senge



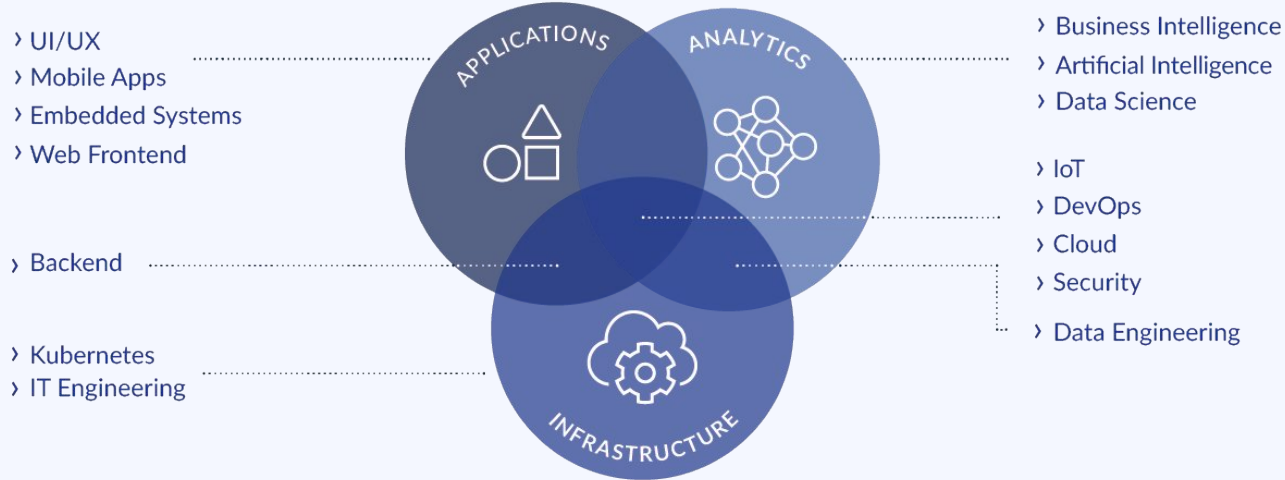
Alina Döring

/// alina.doering@inovex.de

 Alina Döring



Unser Angebot



- › Transformation / Strategy Consulting for AI & Cloud
- › Product Discovery
- › Proof of Concept
- › Process Optimization
- › Change Management

- › Agile
- › Digital Quality
- › Security
- › Research & Development
- › Training & Workshops

- › Generative AI / NLP / CV
- › AI & Analytics Platforms / Data Mesh
- › Predictive Maintenance
- › (I)IoT & Embedded & Smart Energy
- › E-Health & Medical (Device) Software

- › Databricks
- › AWS
- › Google Cloud Platform
- › Microsoft Azure
- › ... more on [inovex.de](https://www.inovex.de) ...