

Understanding queries by analysing user interaction data

Judgements as gold standard

About



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OTTO and otto.de

- Founded in **1949**
- Number of **employees 4,900**
- Revenue in 2018/19 **3.2 billion Euro**
- On average **1.6 million visits** on otto.de per day
- Up to **10 orders per second**
- More than **3 million items** on otto.de
- More than **400 OTTO market partners**
- Approx. **6,800 brands** on otto.de
- Part of the **OTTO GROUP**, one of the world's biggest ecommerce companies
- Expansion of the business model towards becoming a **platform**



OTTO's headquarter in Hamburg

Our Product Search @otto.de in 2020

\emptyset search queries per day

~1.67 million

max. search queries per day

~4.8 million



search queries in 2020

~612 million

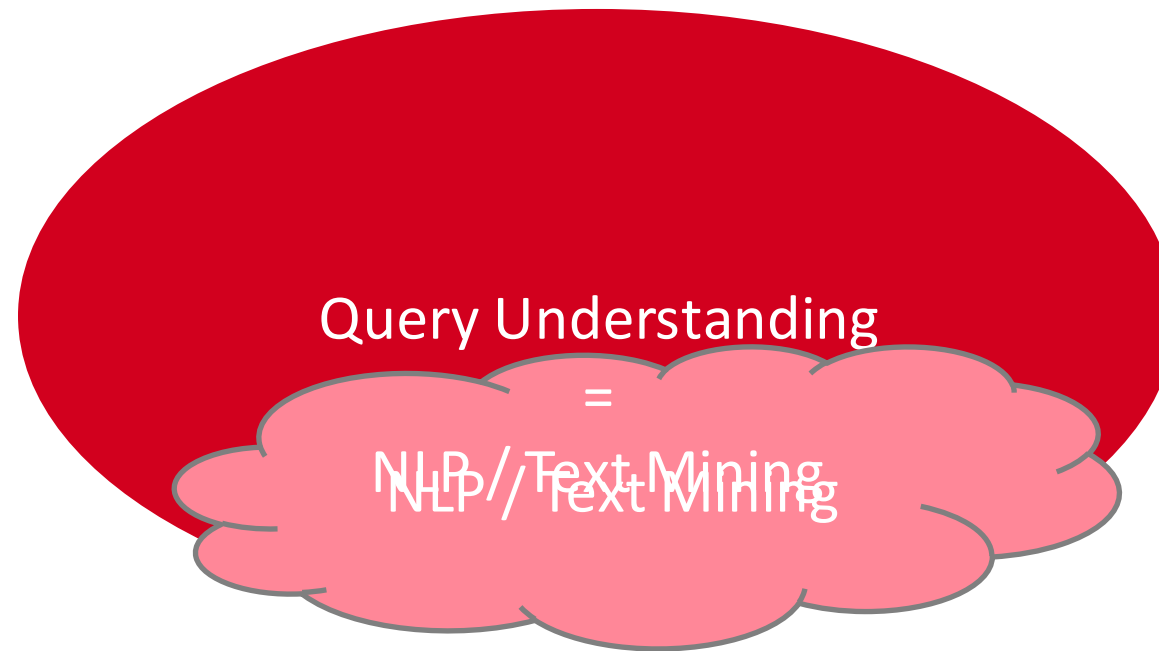
unique search terms in 2020

~40 million

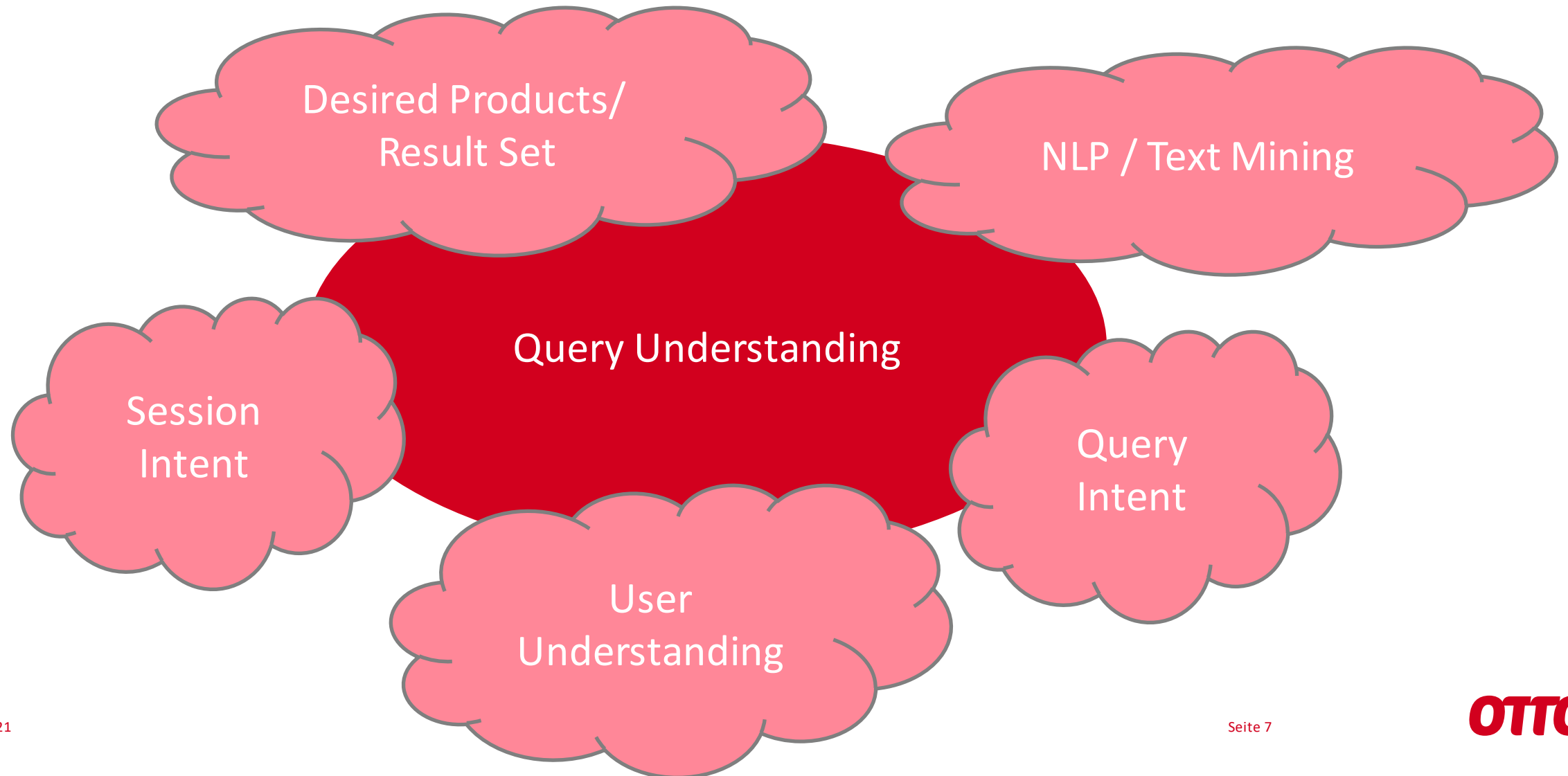
Judgements...

...as a base for query understanding?

What does Query Understanding have to do with Judgements?



What does Query Understanding have to do with Judgements?



What do Judgements have to do with Query Understanding?

For me: a lot!

- Judgements are applicable in many use cases



Where do we get Judgements from?

How do we estimate relevance?

- Common DS approach: Crowd Sourcing or asking experts
- Show them products or rankings and ask for relevance
- Covers topicality, but differs from relevance given a shopping intent (e.g. personal preference)
- Evaluated products are quickly outdated



[<https://unsplash.com/photos/8I423fRMwjM>]

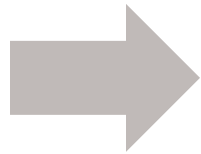


Implicit feedback from customer logs – use the big data we have

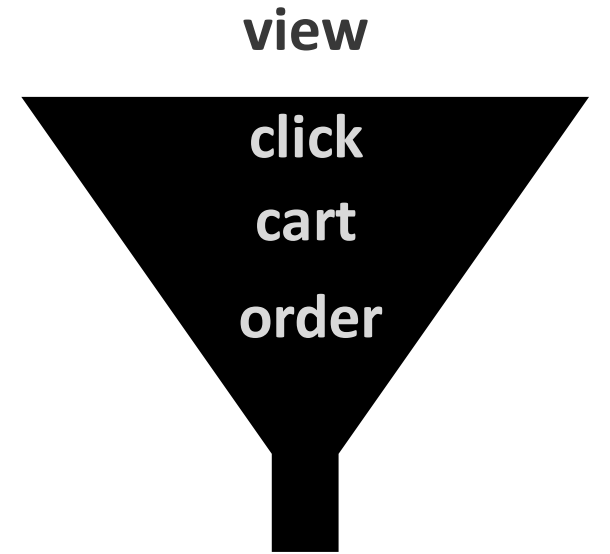
How do we define relevance?

Different customer interactions to choose from

- Deeper in the funnel
 - Reliability grows
- Higher in the funnel
 - Amount of data grows
 - Proximity to search event grows



Our assumption: increasing clicks will carry through the funnel and increase conversions



**keeping the product
and being happy with
it**

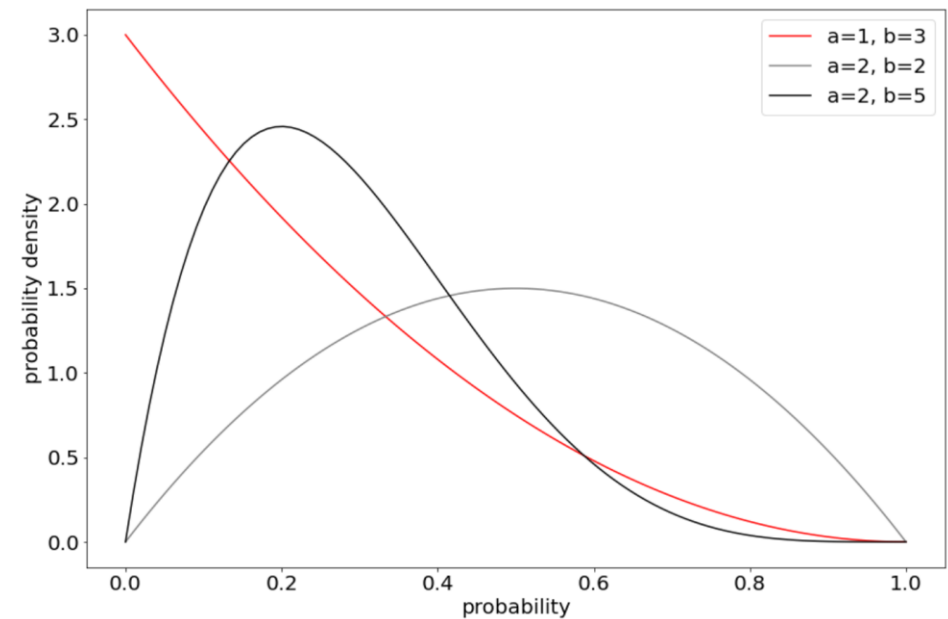


Judgement Calculation

Betadistribution as Probabilityestimation

query	product	clicks	views	click probability
trousers	A	1	1	1
trousers	B	90	100	0.9
blue dress	C	0	1	0
blue dress	D	0	1000	0

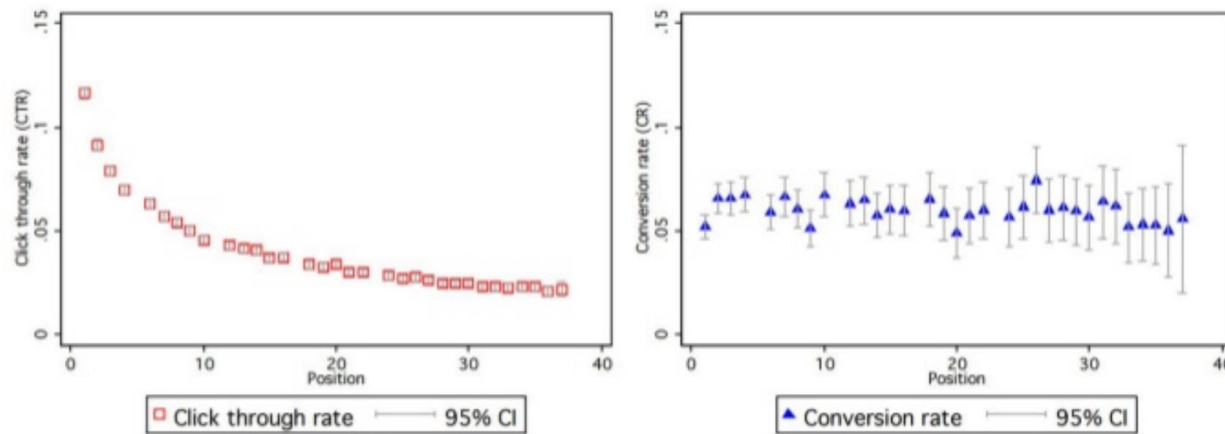
$$cp = \frac{clicks}{views} \rightarrow cp_{qd} = \frac{\alpha + clicks_{qd}}{\alpha + \beta + views_{qd}}$$



Positionbias

Strong bias towards prominent positions → inverse probability weighting

Effect of Ranking on Search and Choice (1)



$$cp_{qdp} = \frac{\alpha + clicks_{qdp}}{\alpha + \beta + views_{qdp}} * pos_debias_p$$

The effect of position on CTR and CR with **Random ranking** [1]

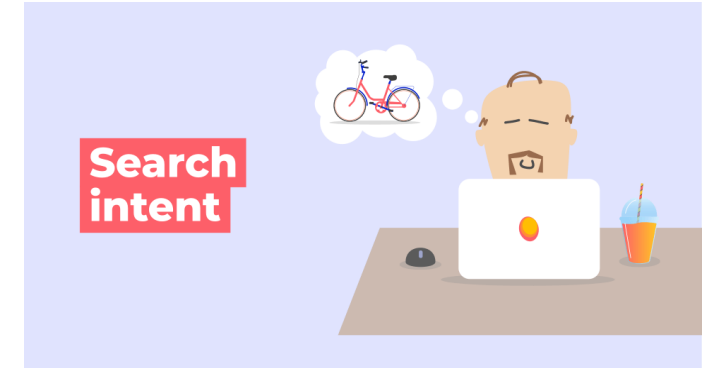
Left figure, CTR - position relation, Right figure: CR conditional on click outs vs position

[<https://www.slideshare.net/mohamedbaddar2/berlin-machinelearninggroup>]

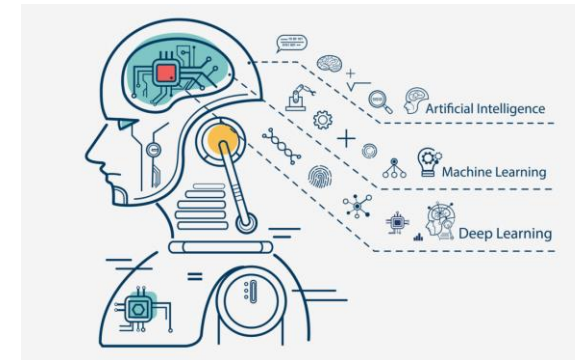
What can we use them for?

Judgements are applicable in many use cases

- Determining Query Intent
 - Determine if query has a specific assortment as goal
 - Determine desired assortment per query
- Determine current target of the User
 - Specific product
 - Purchase everyday items
 - a.s.o.
- Training a Learning to Rank model
- ...



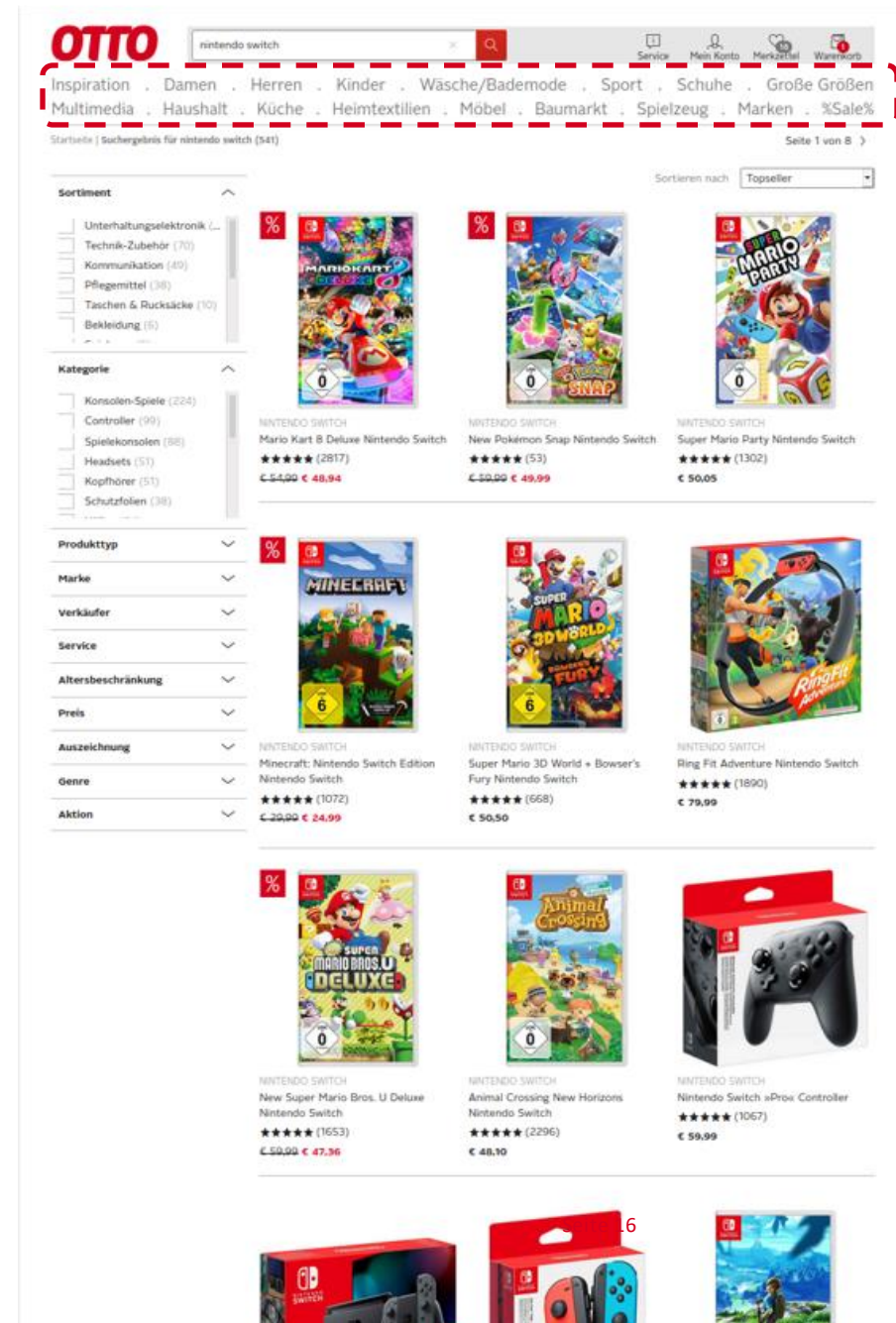
[<https://mangools.com/blog/identify-search-intent/>]



[<https://www.atrinnovation.com/en/machine-learning-in-industry/>]

Why start with LTR?

- Current search management not scalable
- Full-range trader: generalize models over many different assortments
- Responsibility for search and other result pages
- Start with a clearly defined and measurable problem and goal



How do we know our definition of relevance matches the users' intent?

- We wanted to make sure we train our model with the right thing
- So we designed an experiment to test how the judgements work if presented to the customer
- We have run 4 Experiments so far
- We are still on the way of finding the right definition of relevance for our customers



Experiment Learnings

What can we learn about query understanding from the deducted experiments?

What we learned about understanding our customer through these experiments

- Judgements show that availability matters a lot ...

OTTO sunscreen | × >

Inspiration · Damen · Herren · Kinder · Wäsche/Bademode · Sport · Schuhe · Große Größen
Multimedia · Haushalt · Küche · Heimtextilien · Möbel · Baumarkt · Spielzeug · Marken · %Sale%

Startseite | Suchergebnis für sonnencreme (19)

Sortieren nach: **Topseller** ▼

Für wen? ^

☐ Damen (17)
☐ Herren (15)
☐ Jungen (4)
☐ Mädchen (4)

Sortiment ^

☐ Sonnenpflege (16)
☐ Dekoration (1)
☐ Pools (1)
☐ Sicherheitstechnik (1)

Kategorie v

Produkttyp v


Verkäufer v

Farbe v


Marke v

Preis v


Altersgruppe v




GARNIER
GARNIER Sonnenschutzmilch »Ambre Solaire Kids Sensitive LSF50+«
★★★★★ (116)
€ 3,49
(€ 0,98 / 100 ml)




GARNIER
GARNIER Sonnenschutzmilch »Ambre Solaire LSF 30«
★★★★★ (155)
€ 6,95
(€ 3,48 / 100 ml)




GARNIER
GARNIER Sonnenschutzfluid »Ambre Solaire Sensitive expert+«, mit Hyaluronsäure LSF 50
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What we learned about understanding our customer through these experiments

GARNIER Sonnenschutzfluid »Ambre Solaire Sensitive expert+«, mit Hyaluronsäure LSF 50

★★★★☆ (22)



 **lieferbar in 4 Wochen**

Aufgrund der aktuellen Situation kommt es im Moment leider zu längeren Lieferzeiten als gewohnt.

€ 9,99 € 24,98 / 100 ml

inkl. MwSt. zzgl. Versandkosten

UP 1 Jahr Liefer-Flat für 9,90 €

Verkäufer: **OTTO**

[AGB](#) | [Datenschutz](#) | [Impressum](#)

Anzahl
1



In den Warenkorb



Artikel merken

What we learned about understanding our customer through these experiments

- Judgements show that availability matters a lot – but not for all queries

The screenshot shows the OTTO website search results for the query "couch". The OTTO logo is in the top left. The search bar contains "couch" with a close button (X) and a right arrow. Below the search bar, there are navigation links: Inspiration, Da, Multimedia, Haushalt, Küche, Heimtextilien, Möbel, Baumarkt, Spielzeug, Marken, and %Sale%. Below these links, it says "Startseite | Suchergebnis für couch (5.094)" and "Seite 1 von 71".

On the left side, there are two filter sections:

- Sortiment**: A list of categories with checkboxes and counts: Möbel (4886), Heimtextilien (104), Dekoration (30), Tierbedarf (20), Beleuchtung (19), and Bekleidung (17).
- Kategorie**: A list of categories with checkboxes and counts: Sofas (4480), Sessel (138), Hocker (106), Gartenmöbel-Sets (77), Tische (49), and Sitzbänke (39).

Below the filters, there are three product cards, each with a "gesponsert" (sponsored) label and a red percentage sign:


- EXXPO - SOFA FASHION**: exppo - sofa fashion Ecksofa, wahlweise mit Bettfunktion und Bettkasten. UVP € 1.699,00 ab € 1.209,99. It has a color selection bar with four options.
- MR. COUCH**: Mr. Couch Ecksofa »Cooper«, 5 Jahre Hersteller-Garantie auf Kaltschaumpolsterung, Nachhaltigkeit, Exklusivkollektion. UVP € 3.249,00 ab € 1.999,99. It has a color selection grid with 12 options.
- ADA TRENDLINE**: ADA trendline Ecksofa »Ralph«, mit Recamiere, inkl. Armlehn- und Sitztiefenverstellung. UVP € 2.599,00 € 2.299,99. It has a color selection bar with four options.

Each product card has a "Mehr aus der Serie" (More from the series) link. At the bottom of the page, there are three more product cards, each with a red percentage sign.

What we learned about understanding our customer through these experiments

Home affaire 3-Sitzer »Chesterfield Home«, mit edler Knopfleftung und typischen Armlehnen

★★★★☆ (77) | [1 Testurteil lesen](#)



Nachhaltig

Bezug: **Samtvelours** [Details](#)

Farbe: **dunkelgrün**

Luxus-Microfaser
Luxus-Microfaser
Vintageoptik


Samtvelours

[Kostenlos Stoffmuster bestellen](#)

lieferbar in 7 Wochen
Unsere Spedition liefert an den gewünschten
[Aufstellort in deinem Zuhause.](#)

andas Ecksofa »LIVORNO«, mit Bettfunktion und Bettkasten

★★★★☆ (35)



Nachhaltig

Bezug: **Struktur** [Details](#)

Farbe: **Hellgrau**

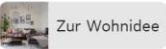
Samtvelours
Struktur

Webstoff fein


Funktion: **lange Ottomane links**

[Kostenlos Stoffmuster bestellen](#)

lieferbar in 2 Wochen
Unsere Spedition liefert an den gewünschten
[Aufstellort in deinem Zuhause.](#)



exxpo - sofa fashion Ecksofa, wahlweise mit Bettfunktion und Bettkasten



Nachhaltig

Farbe: **silber**

Funktion: **Ottomane rechts**

Ausführung: **ohne Bettfunktion-ohne Bettkasten**

[Kostenlos Stoffmuster bestellen](#)

lieferbar in 11 Wochen
Unsere Spedition liefert an den gewünschten
[Aufstellort in deinem Zuhause.](#)

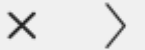
Dazu passende Services

What we learned about understanding our customer through these experiments

- Judgements can only represent that information seen by the user

GARNIER Sonnenschutzfluid »Ambre Solaire Sensitive expert+«, mit Hyaluronsäure LSF 50

★★★★☆ (22)



Altersgruppe



lieferbar in 4 Wochen

Aufgrund der aktuellen Situation kommt es im Moment leider zu längeren Lieferzeiten als gewohnt.

€ 9,99 € 24,98 / 100 ml

inkl. MwSt. zzgl. Versandkosten

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AGB | Datenschutz | Impressum

Anzahl
1



In den Warenkorb

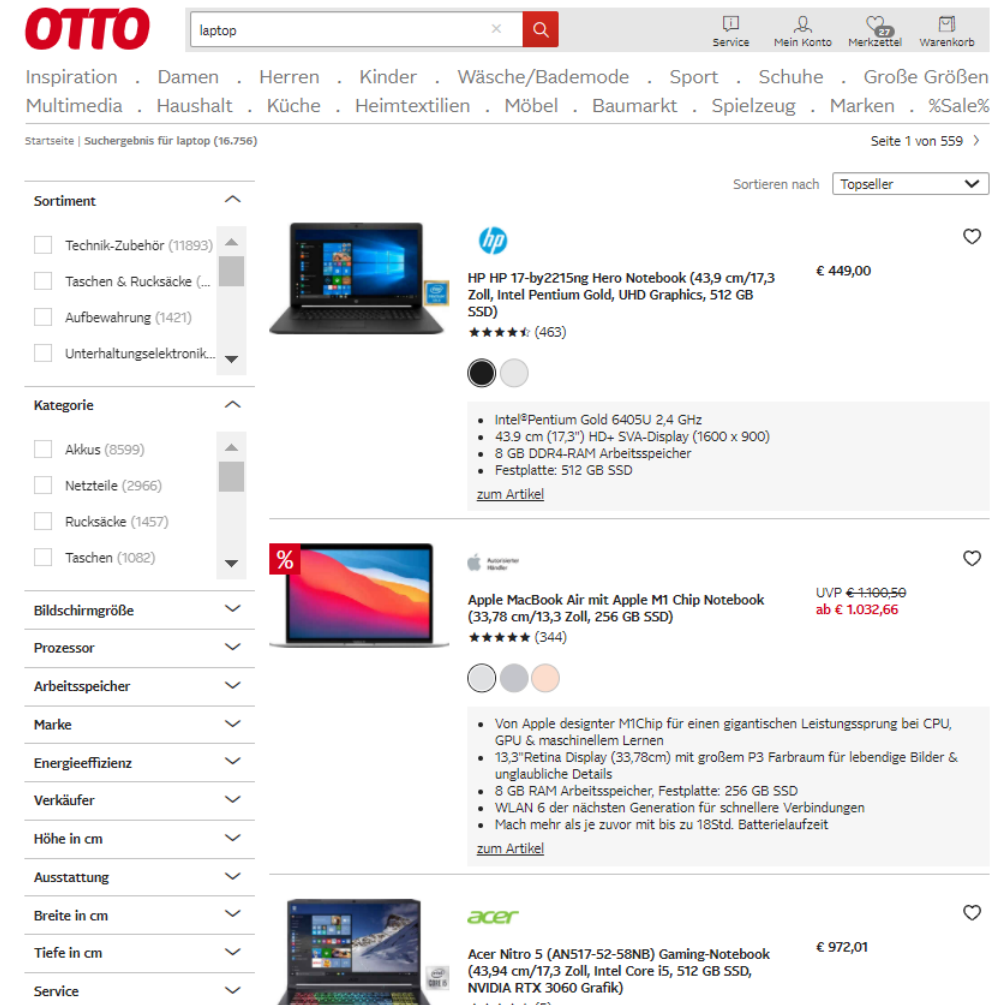
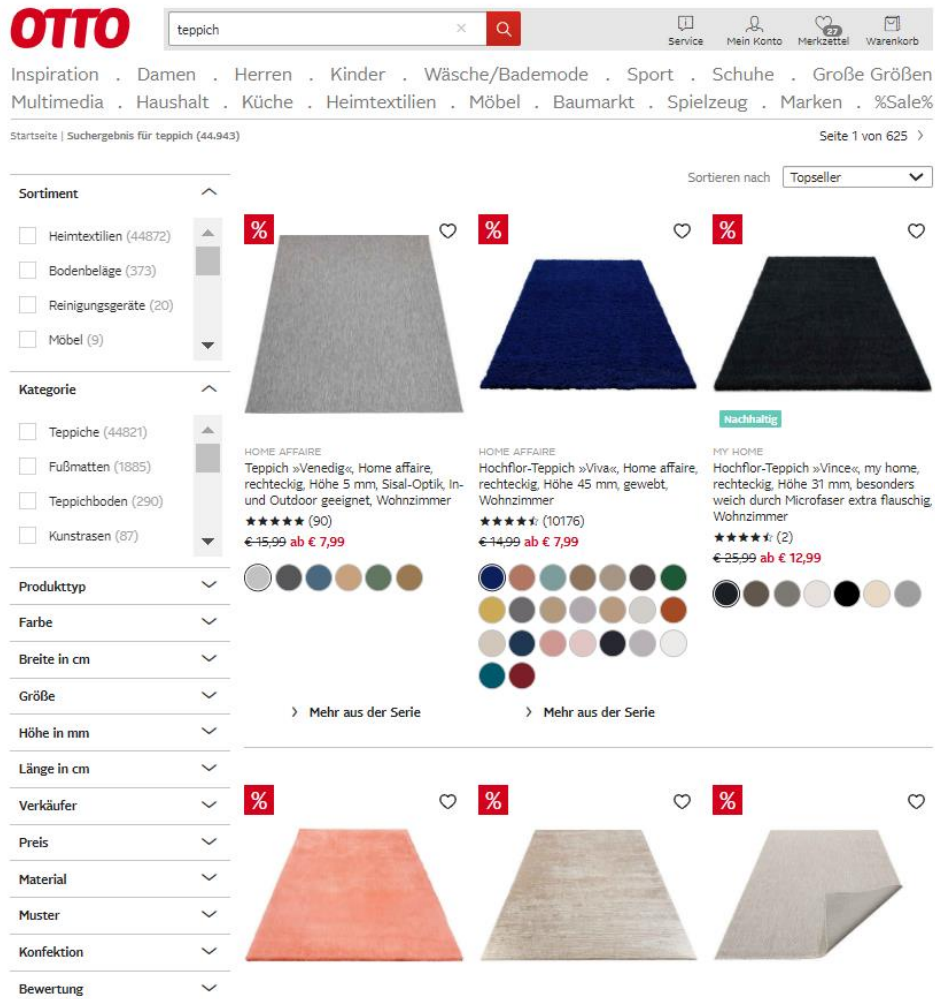


Artikel merken



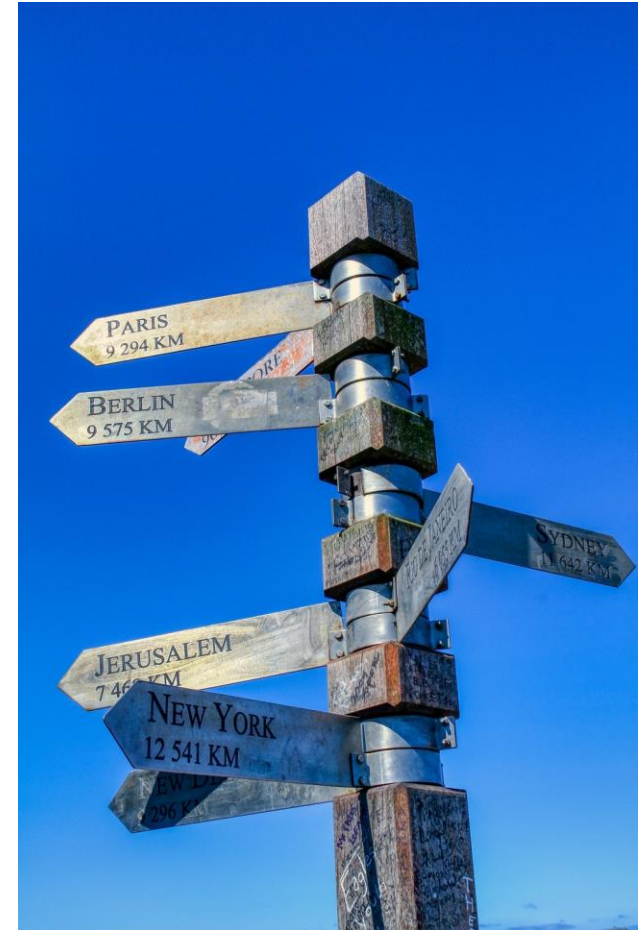
What we learned about understanding our customer through these experiments

- Clicks are a good relevance signal for some queries
- but not for all



And what next?

- Understand which Judgements represent the users needs
 - Use different user-signals, e.g. add2carts/orders or involvement with SERP/article page
- Create more user understanding with our judgements
 - Include qualitative feedback in experiments
- Use judgements for an LTR model
- Use judgements for query understanding
 - Query segmentation
 - Improve selection
 - Query categorization



[<https://unsplash.com/>]

Your job is just one step ahead!

otto.de/jobs

- Search Engineer
- Java Developer/Cloud-OPs
- Data (Ingest) Engineer
- Data Scientist

For the topics:

- Query & Intent Understanding
- Data Ingest
- Ranking
- Search Core Retrieval
- ...



Thank You!

I am looking forward to your questions during the panel discussion 😊

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