

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

search queries in 2020

~612 million

unique search terms in 2020

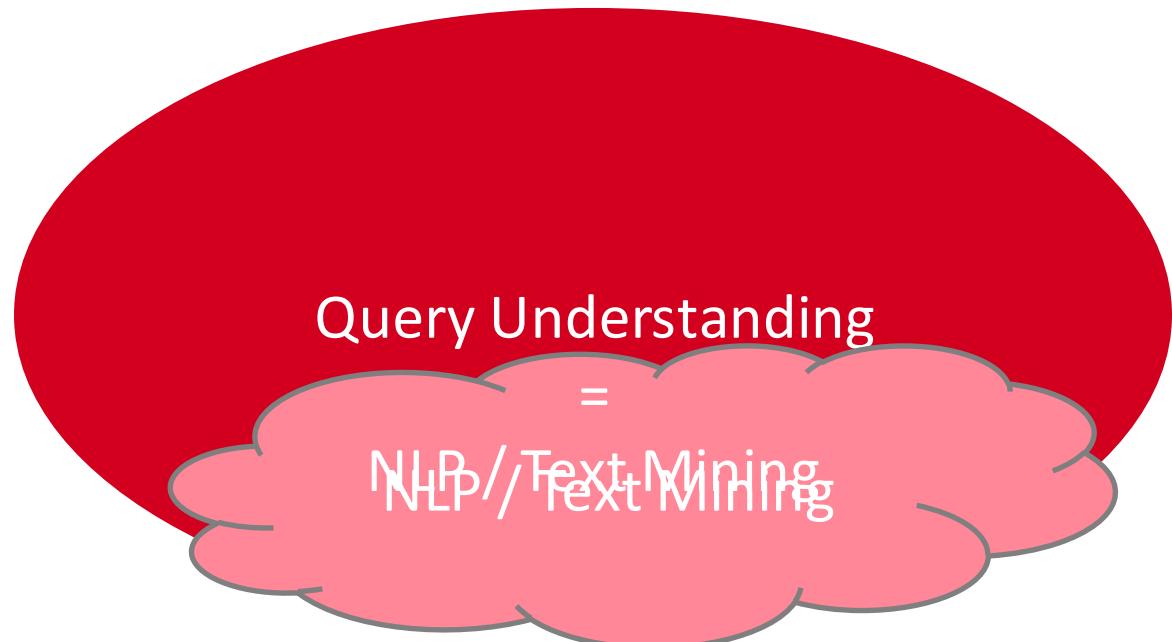
~40 million

MICES 2021

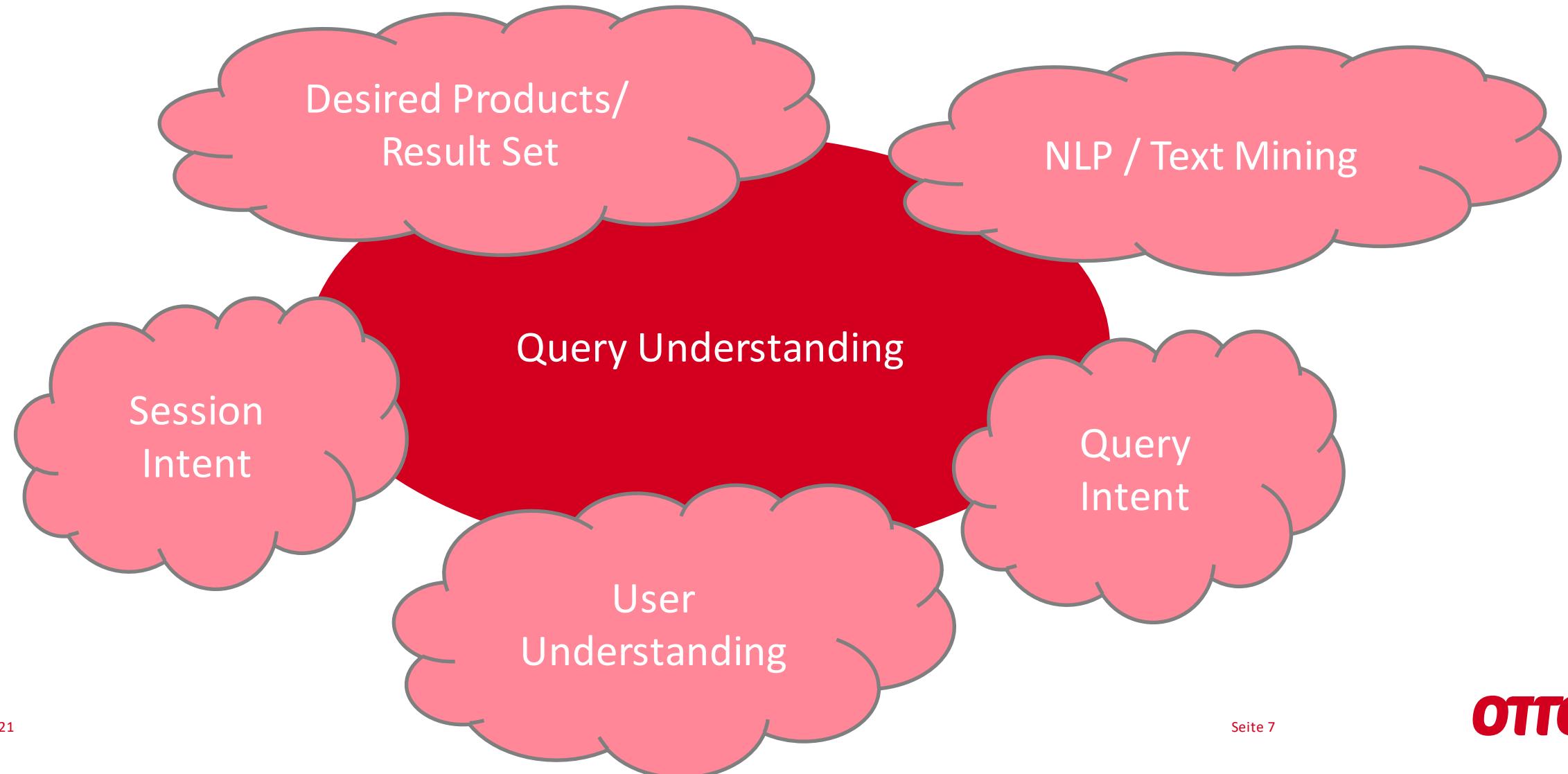
Judgements...

...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- Evaluated products are quickly outdated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

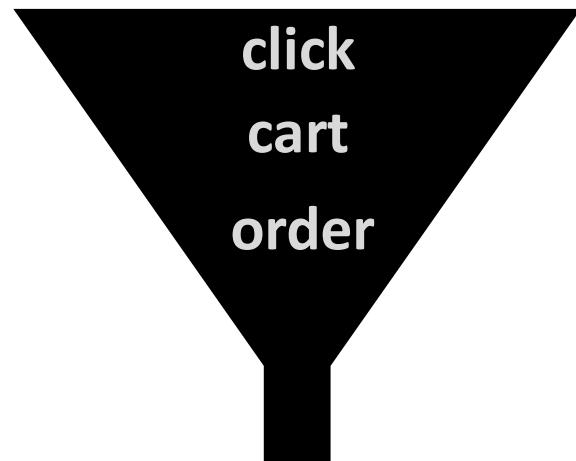
How do we define relevance?

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**

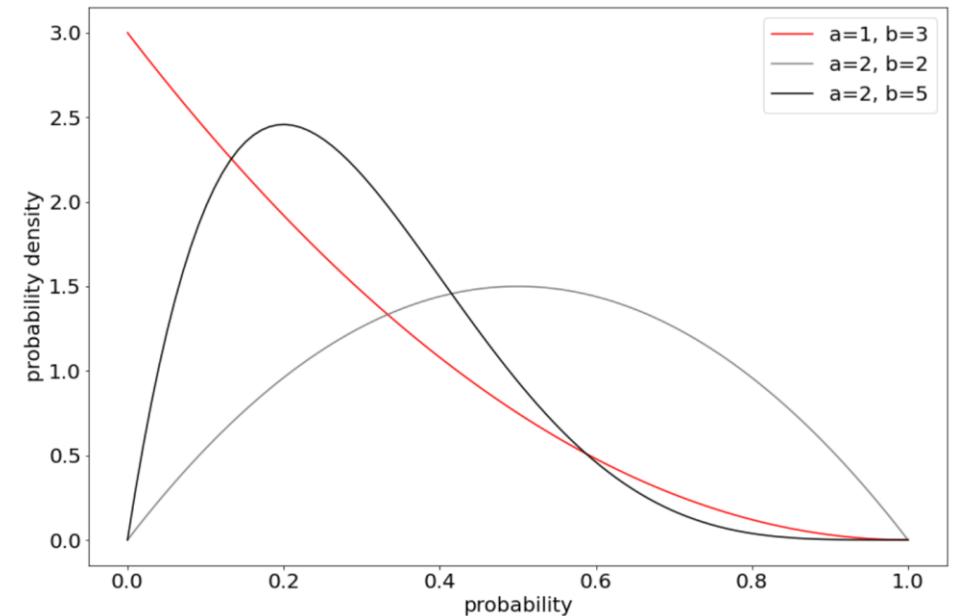


Judgement Calculation

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

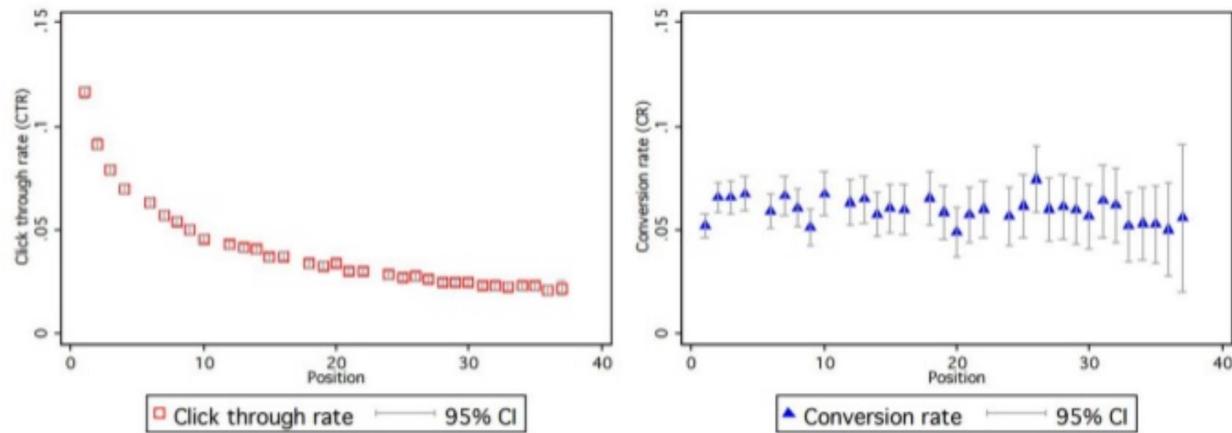
$$cp = \frac{\text{clicks}}{\text{views}} \rightarrow cp_{qd} = \frac{\alpha + \text{clicks}_{qd}}{\alpha + \beta + \text{views}_{qd}}$$



Positionbias

Strong bias towards prominent positions → inverse probability weighting

Effect of Ranking on Search and Choice (1)



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>]

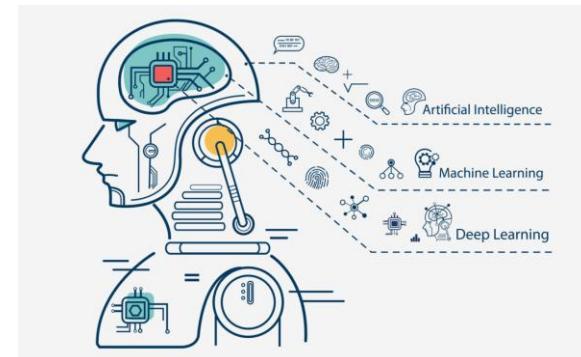
What can we use them for?

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
- ...



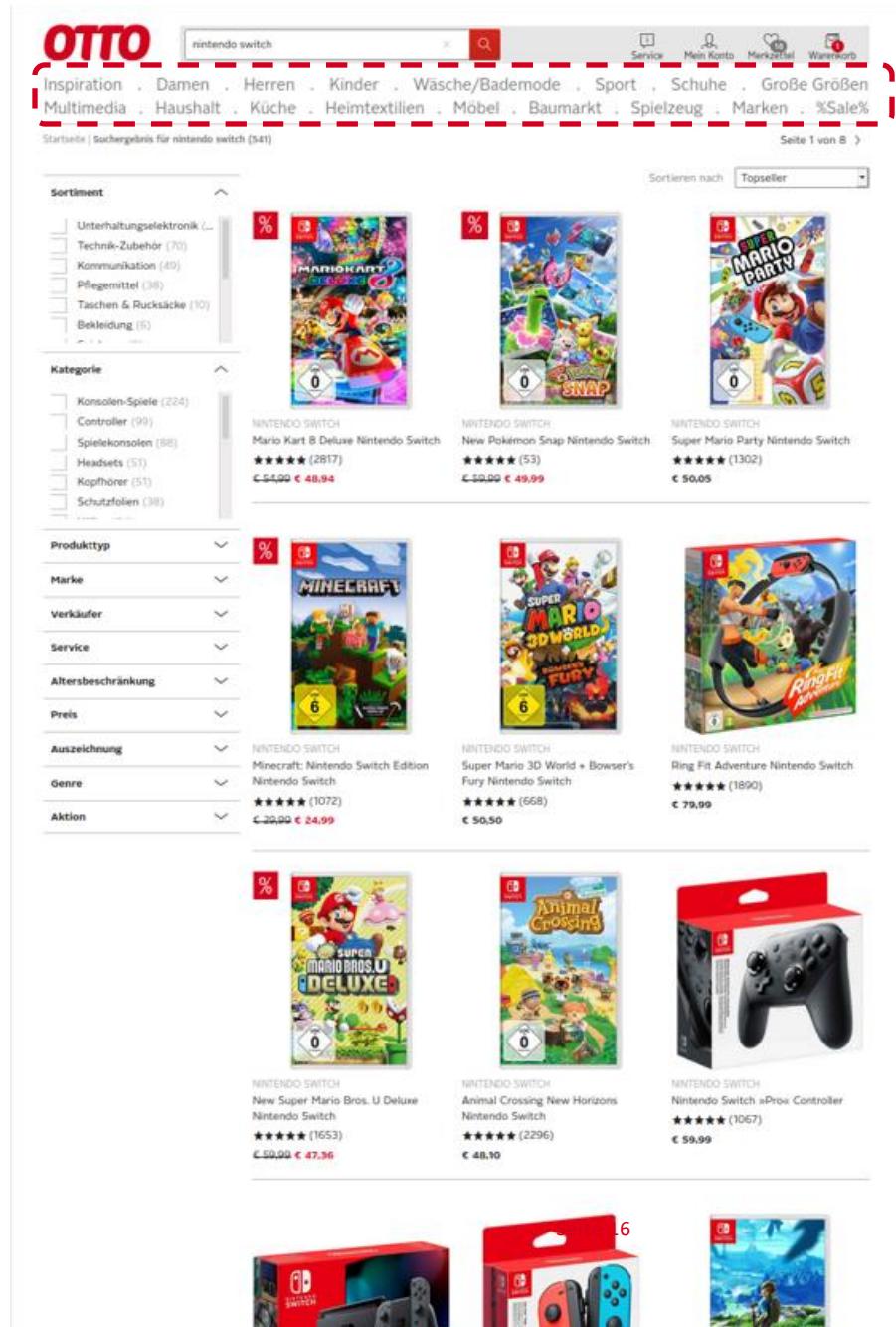
[<https://mangools.com/blog/identify-search-intent/>]



[<https://www.atriainnovation.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



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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

Produktyp

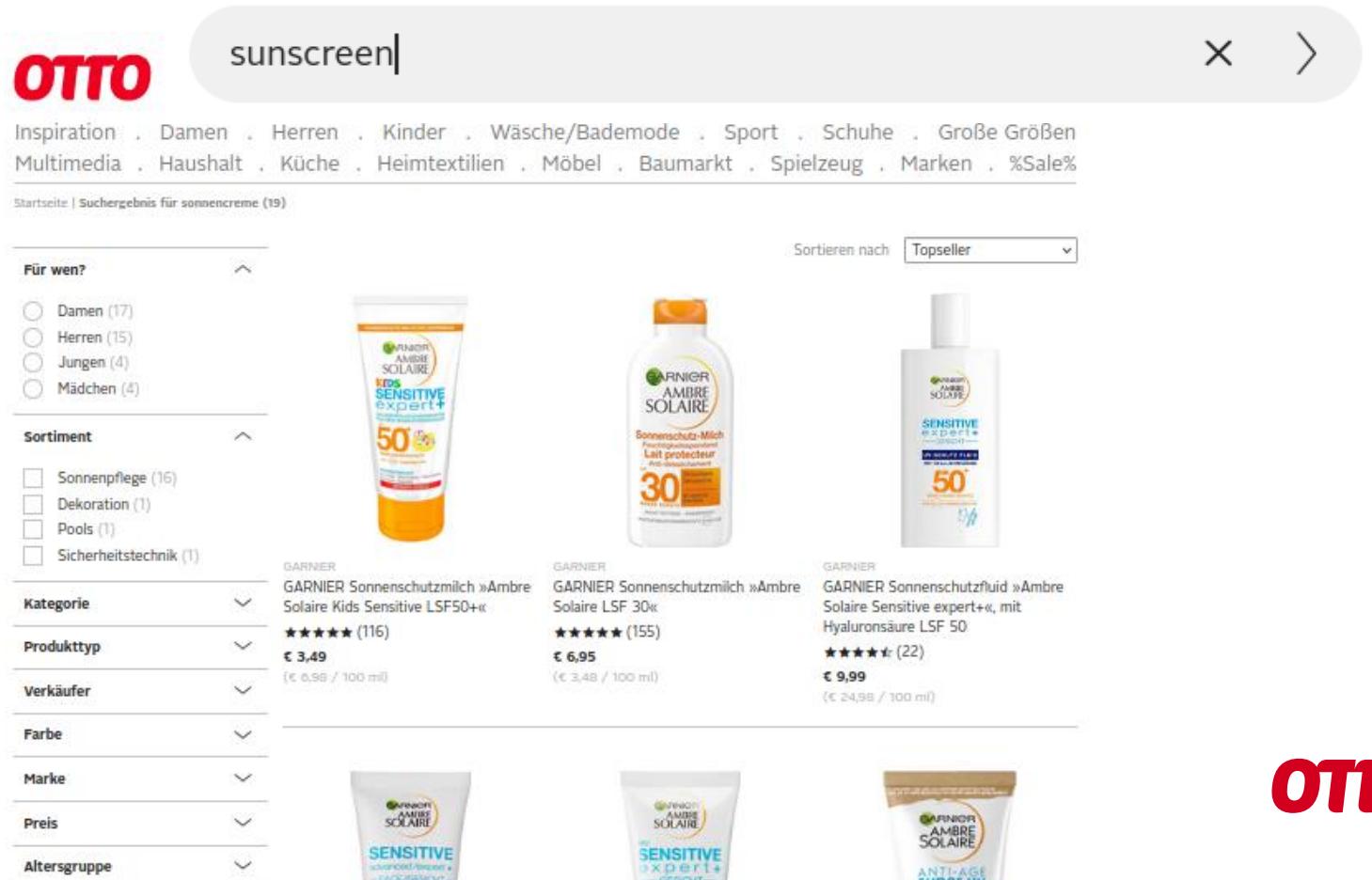
Verkäufer

Farbe

Marke

Preis

Altersgruppe



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 search bar at the top contains "couch". Below the search bar, the page title is "couch" and the page number is "Seite 1 von 71". The left sidebar contains filters for "Sortiment" (Möbel, Heimtextilien, Dekoration, Tierbedarf, Beleuchtung, Bekleidung), "Kategorie" (Sofas, Sessel, Hocker, Gartenmöbel-Sets, Tische, Sitzbänke), "Produkttyp", "Farbe", "Breite in cm", and "Verkäufer". The main content area displays three products: "EXXPO - SOFA FASHION" (blue sofa), "MR. COUCH" (blue sofa), and "ADA TRENDLINE" (black sofa). Each product has a "Nachhaltig" (sustainable) badge. The products are sorted by "Topseller". At the bottom, there are "Mehr aus der Serie" (More from the series) buttons for each product.

What we learned about understanding our customer through these experiments

Home affaire 3-Sitzer »Chesterfield Home«, mit edler Knopfheftung und typischen Armlehnhen

★★★★★ (77) | 1 Testurteil lesen



andas Ecksofa »LIVORNO«, mit Bettfunktion und Bettkasten

★★★★★ (35)



exxpo - sofa fashion Ecksofa, wahlweise mit Bettfunktion und Bettkasten



Farbe: silber



Funktion: Ottomane rechts

Ottomane rechts

Ausführung: ohne Bettfunktion-ohne Bettkasten

ohne Bettfunktion-ohne Bettkasten

Kostenlos Stoffmuster bestellen

lieferbar in 11 Wochen

Unsere Spedition liefert an den gewünschten Aufstellort in deinem Zuhause.

Dazu passende Services

Bezug: Struktur Details

Farbe: Hellgrau

Samtvelours



Struktur

Webstoff fein



Funktion: lange Ottomane links

lange Ottomane links

Kostenlos Stoffmuster bestellen

lieferbar in 2 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)

lieferbar in 4 Wochen
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Anzahl 1 In den Warenkorb

Artikel merken

OTTO

MICES 2021

What we learned about understanding our customer through these experiments

- Clicks are a good relevance signal for some queries

- but not for all

OTTO Service Mein Konto Merkzettel Warenkorb

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Startseite | Suchergebnis für teppich (44.943) Seite 1 von 625 >

Sortiment 



HOME AFFAIRE Teppich »Venedig«, Home affaire, rechteckig, Höhe 5 mm, Sisal-Optik, In- und Outdoor geeignet, Wohnzimmer €15,99 ab € 7,99

HOME AFFAIRE Hochflor-Teppich »Viva«, Home affaire, rechteckig, Höhe 45 mm, gewebt, Wohnzimmer €14,99 ab € 7,99

MY HOME Hochflor-Teppich »Vince«, my home, rechteckig, Höhe 31 mm, besonders weich durch Microfaser extra flauschig, Wohnzimmer €25,99 ab € 12,99

Nachhaltig

Farbe 

Produkttyp 

Kategorie 

Sortieren nach Topseller 



Sortiment 

Technik-Zubehör (11893) 

HP HP 17-by215ng Hero Notebook (43,9 cm/17,3 Zoll, Intel Pentium Gold, UHD Graphics, 512 GB SSD) € 449,00

• Intel®Pentium Gold 6405U 2,4 GHz
• 43,9 cm (17,3") HD+ SVA-Display (1600 x 900)
• 8 GB DDR4-RAM Arbeitsspeicher
• Festplatte: 512 GB SSD [zum Artikel](#)

Akkus (8599) 

Apple MacBook Air mit Apple M1 Chip Notebook (33,78 cm/13,3 Zoll, 256 GB SSD) UVP € 1.100,59 ab € 1.032,66

• Von Apple designter M1chip für einen gigantischen Leistungssprung bei CPU, GPU & maschinellem Lernen
• 13,3"Retina Display (33,78cm) mit großem P3 Farbraum für lebendige Bilder & unglaubliche Details
• 8 GB RAM Arbeitsspeicher, Festplatte: 256 GB SSD
• WLAN 6 der nächsten Generation für schnellere Verbindungen
• Mach mehr als je zuvor mit bis zu 18Std. Batterielaufzeit [zum Artikel](#)

Taschen & Rucksäcke (2966) 

Acer Acer Nitro 5 (AN517-52-58NB) Gaming-Notebook (43,94 cm/17,3 Zoll, Intel Core i5, 512 GB SSD, NVIDIA RTX 3060 Grafik) € 972,01

Sortieren nach Topseller 

OTTO Service Mein Konto Merkzettel Warenkorb

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Startseite | Suchergebnis für laptop (16.756) Seite 1 von 559 >

Sortieren nach Topseller 

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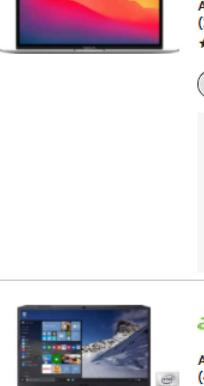
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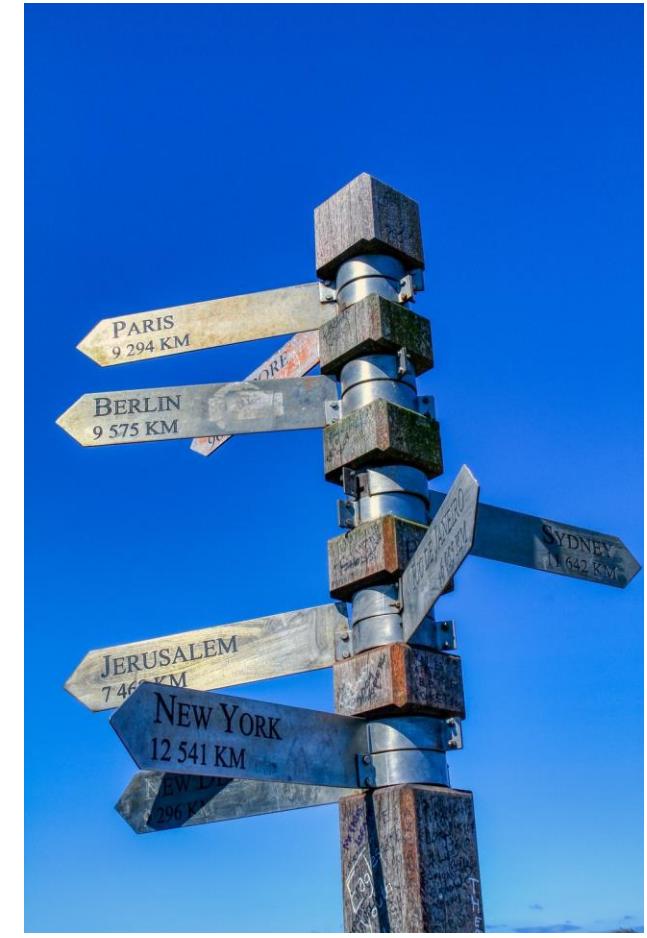
Netzteile (2966) 

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Sortieren nach Topseller 

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



[\[https://unsplash.com/\]](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 ☺

andrea.schuett@otto.de