

ON THE CONVERGENCE OF INTELLIGENT DECISION AIDS

Benedikt Loepp

Benedikt Loepp

ABSTRACT

ABSTRACT

On the one hand, users' decision making in today's web is supported in numerous ways, with mechanisms ranging from manual search over automated recommendation to intelligent advisors. The focus on algorithmic accuracy, however, is questioned more and more. On the other hand, although the boundaries between the mechanisms are blurred increasingly, research on user-related aspects is still conducted separately in each area. In this position paper, we present a research agenda for providing a more holistic solution, in which users are supported with the right decision aid at the right time depending on personal characteristics and situational needs.

KEYWORDS

1 PROBLEM STATEMENT

1 PROBLEM STATEMENT

The spectrum of decision aids (DA) for users who are confronted with situations in which they can choose from large sets of alternatives ranges from manual search and filtering [31], over automated recommendation algorithms [43], to intelligent advisory compo-

2 RESEARCH AGENTS

...king recommender research
...systems' interface

2 RESEARCH AGENDA

2 RESEARCH AGENDA

Taking recommender research as an example, it has been pointed out that the systems' interfaces should adapt to personal and situational characteristics [7], and become less dependent on behavioral data [16]. The effects, e.g., of domain knowledge or personality, on the boundaries of this area, diverging that the decision-making strategies used, in online shopping, is usually much less straightforward than in offline shopping. In the context of recommender systems, the effects of domain knowledge or personality on the boundaries of this area, diverging that the decision-making strategies used, in online shopping, is usually much less straightforward than in offline shopping. In the context of recommender systems, the effects of domain knowledge or personality on the boundaries of this area, diverging that the decision-making strategies used, in online shopping, is usually much less straightforward than in offline shopping.

the boundaries of this area, emerging task and decision-making processes, e.g. in online shopping, is usually much less straightforward than often anticipated under experimental conditions. In fact, ward thus often anticipated under several DAs, each with a different users use (and switch between) a final choice (48, 50). Thus, it is inevitable to take a broader perspective, far into future information work. As with respect to recomender systems (RS, it is important that users' mental models often do not correspond to actual implementations, and are subject to large inter-individual differences (45). To adequately design applications in which the recommender is only one of many components, we thus propose to

3 CONCLUSIONS

3 CONCLUSIONS

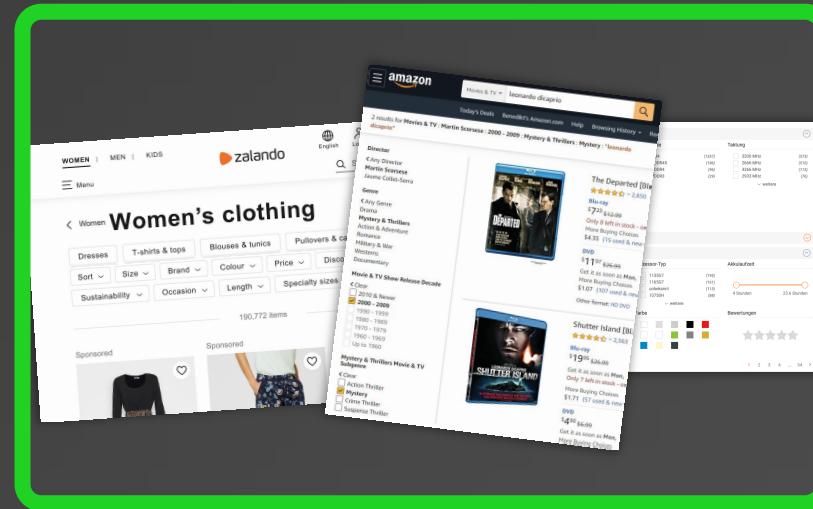
We wanted to bring attention to the problem that research on interactive, intelligent DA is often too narrow. We presented an agenda to overcome this problem, with respect to the methods to use in certain steps. Nonetheless, we hope that it may help start a discussion about more holistic solutions, not restricted to a specific research area, but assisting users on a global level.

Manual search and filtering

The image displays three overlapping web interfaces illustrating manual search and filtering capabilities:

- Zalando:** A clothing retailer's website showing a search for "Women's clothing". The interface includes a navigation bar with "WOMEN", "MEN", and "KIDS" categories. A search bar is present, and a filter sidebar on the left lists various clothing items (Dresses, T-shirts & tops, Blouses & tunics, Pullover & cardigans, Jack) and filters (Sort, Size, Brand, Colour, Price, Discount, Material, Sustainability, Occasion, Length, Specialty sizes, Show all filters). The main display shows 190,772 items and several sponsored product listings.
- Amazon:** A screenshot of the Amazon website showing search results for "leonardo dicaprio". The interface includes a navigation bar with "Movies & TV" and "leonardo dicaprio" search results. The search results page shows two results for "The Departed" and "Shutter Island" (both Blu-ray and DVD formats). The filters on the left include "Director", "Genre", "Movie & TV Show Release Decade", and "Mystery & Thrillers Movie & TV Subgenre".
- MediaMarkt:** A screenshot of the MediaMarkt website showing a product selection screen. The interface includes a navigation bar with "Technologie", "Taktung", "Prozessor-Typ", "Akkulaufzeit", "Farbe", and "Bewertungen" filters. The main display shows a list of products with various specifications and prices.

Manual search and filtering



Controllability
Transparency

Automated recommendation

Top Picks for Benedikt



Seven

91% Match 1995 16 2h 6m

A seasoned homicide detective and his new partner are on a desperate hunt for a killer whose gruesome crimes are based on the Seven Deadly Sins.



Brad Pitt, Kevin Spacey, Gwyneth Paltrow and Morgan Freeman star in one of the creepiest thrillers of the '90s.

Starring: Brad Pitt, Morgan Freeman, Gwyneth Paltrow
Genres: Crime Movies, Crime Thrillers, Thrillers
This movie is: Violent, Gritty

Ihr persönlichen Empfehlungen



Die Täuschung

Charlotte Link
★★★★★ (25)
eBook
6,99 €



Die Verlorenen

Simon Beckett
★★★★★ (268)
eBook
19,99 €



Bretonische Idylle

Jean-Luc Bannalec
★★★★★ (34)
eBook
14,99 €



Die Karte

Andreas Winkelmann
★★★★★ (191)
eBook
9,99 €



Beste Freundin -
Niemand lügt so gut

Claire Douglas
★★★★★ (59)
eBook

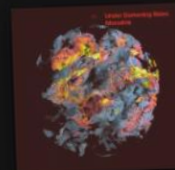


Die verstummte

Karin Slau
★★★★★
eBook

Recommended for today

Inspired by your recent activity.



Under Darkening S...
Monolink



Warm Shadow (IIUII)
Fink



Living Proof
The War On Drugs



Can't Be (Rone Re...
Agnes Obel, Rone



ALAYA Remixes EP
Future Islands

amazon.de Deliver to Benedikt Viersen 41747

Customer Service Best Sellers Electronics & Photo Benedikt's Amazon

Recommended for you, Benedikt

Streetwear 100 ITEMS

Running 96 ITEMS

Cycling 100 ITEMS

Running View All & Manage

Ogier Inner fleece thermal shirt, functional shirt, men's long sleeve with pockets... 4.5 stars 58 €22.99 - €23.99

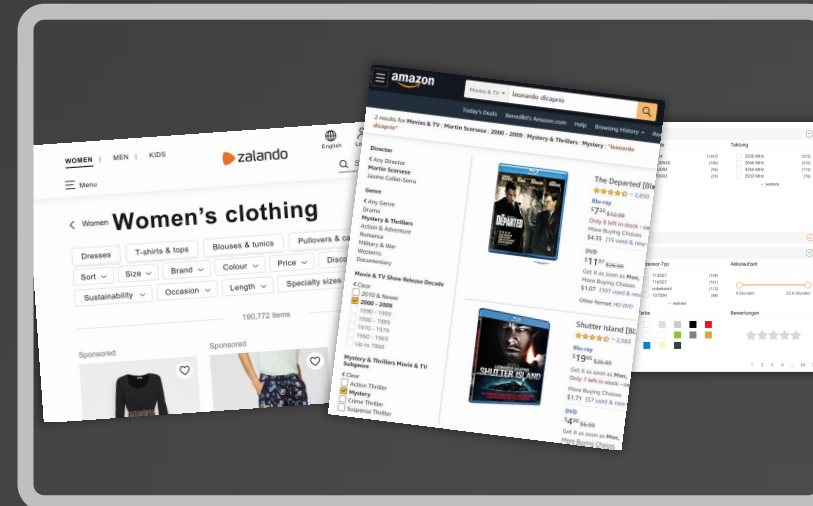
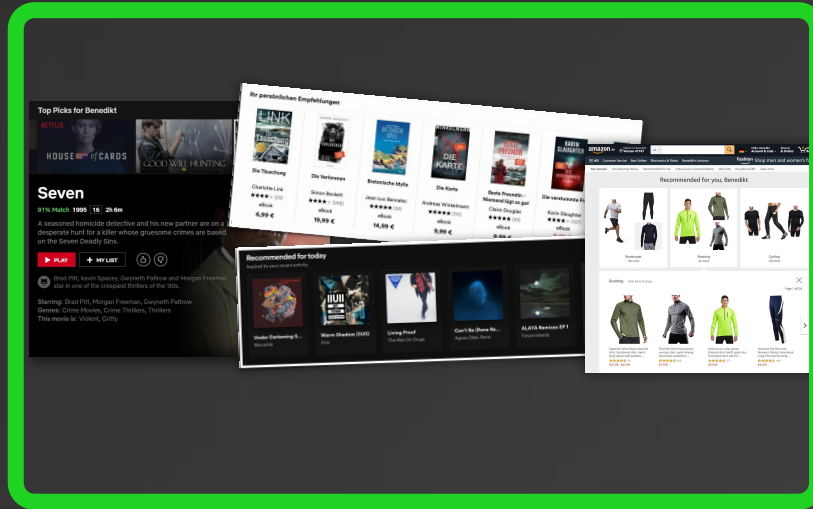
FELICON Men's long sleeve running shirt, quick-drying functional sweatshirt... 4.5 stars 600 €15.99

time to run Long sleeve thermal shirt banff, quick dry functional shirt top for... 4.5 stars 377 €29.99

Airtracks Pro Men and Women's Winter Functional Long Thermal Running... 4.5 stars 444 €43.95

Personalization
Interaction effort

Automated recommendation



Controllability
Transparency

Interactive recommending

Brazil (C)

Genres: Fantasy
Year: 1985
Ratings: 13957
Avg. rating: 4.03
Director: T. Gilliam

Brazil is a Terry Gilliam dystopic black comedy film that reflects the melancholy, dreamlike quality of a famous Brazilian song that's been translated into English. The film parodies the mostly disfunctional bureaucratic world we live in and takes us to a post-apocalyptic world in the future yet with our present day attitudes in mind. Read more...

Your Recommendations (B)

Golden Eyes, Shrek, Madeline, Forrest Gump, Amelie

Dystopia Technology Bureaucracy
Police State
Dream Black Comedy

Kunkel, Loepp, & Ziegler (MuC '15, IUI '17)

John's music →

U2, Pink Floyd, Queen, Gorillaz, Prodigy, Velvet Underground, Johnny Cash, Andrea Bocelli, Green Day, Tom Waits, Thin Lizzy, Orbital, Kraftwerk, Killers, Doors (a), Gary Jules, Cranberries, Kings Of Leon (c), Vampire Weekend

Context →

W top items 4 of 15
Alternative Rock, English Rock Music Groups, Guitar, Grammy Award Winners

f top friends 4 of 26
Phily O Donovan, John Kilbride, Corrado Carta, Nicola Hunt

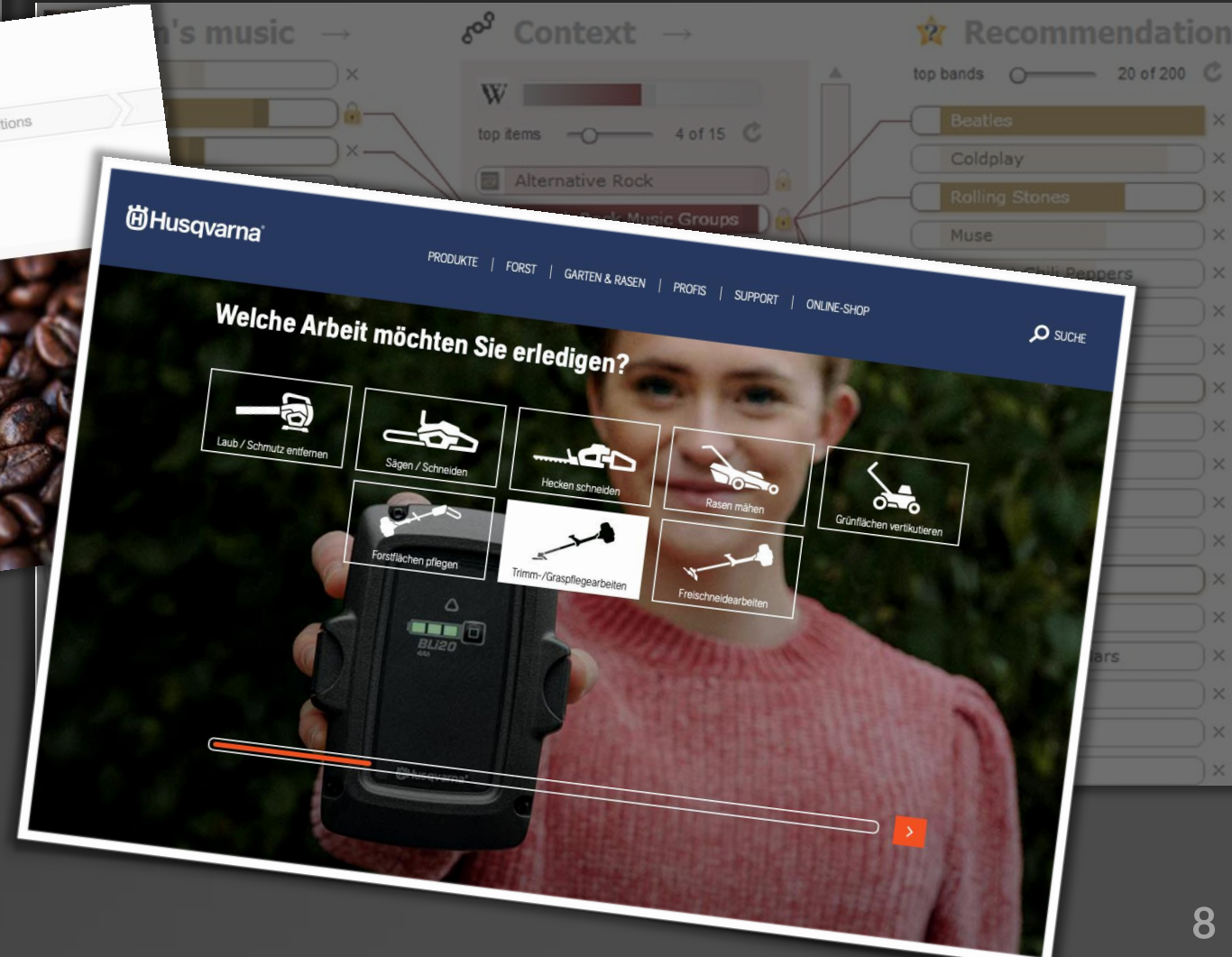
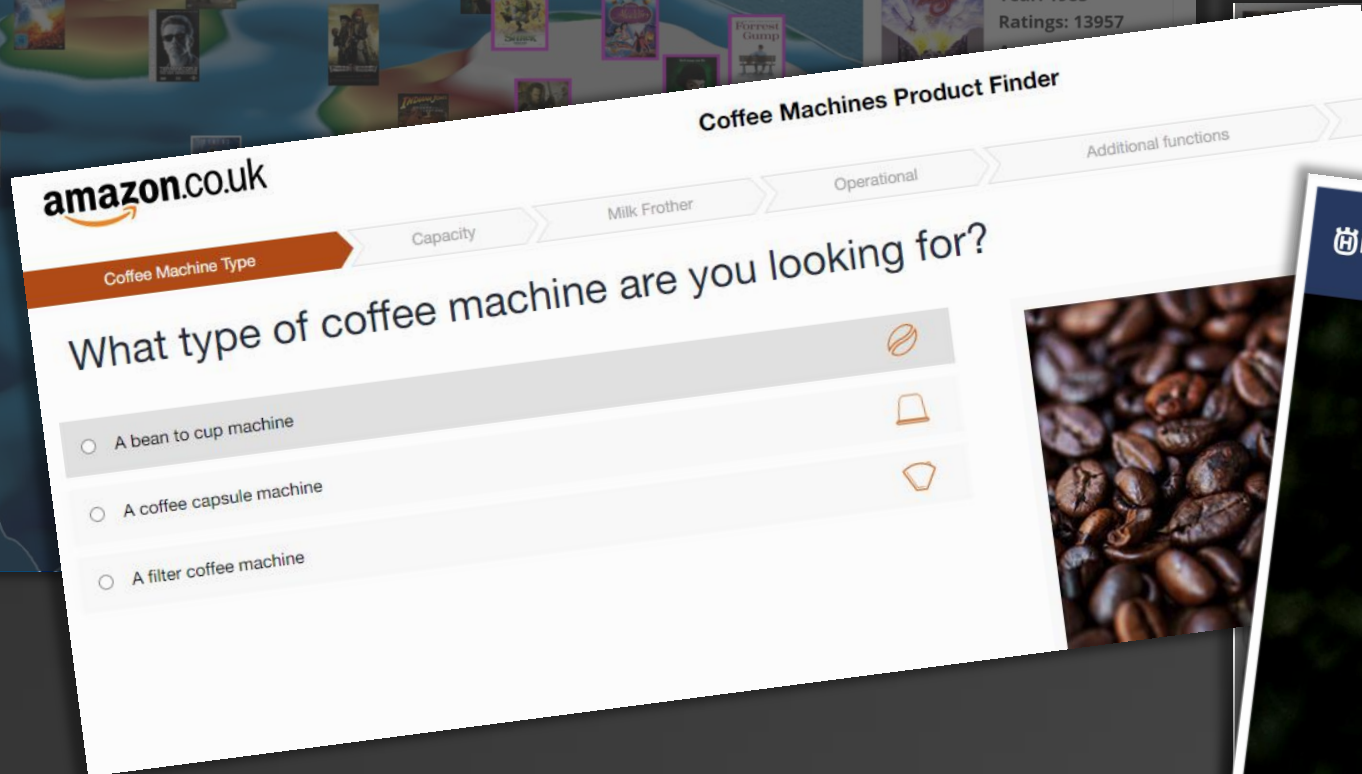
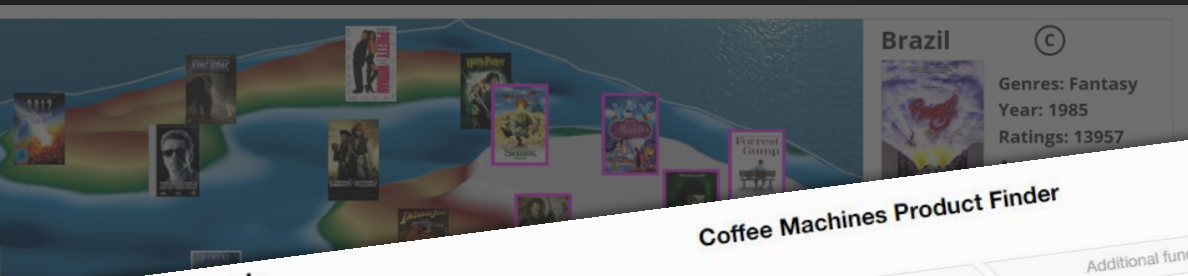
t top experts 9 of 18
@ckrechting, @Heroine_Bob

Recommendation top bands 20 of 200 (f)

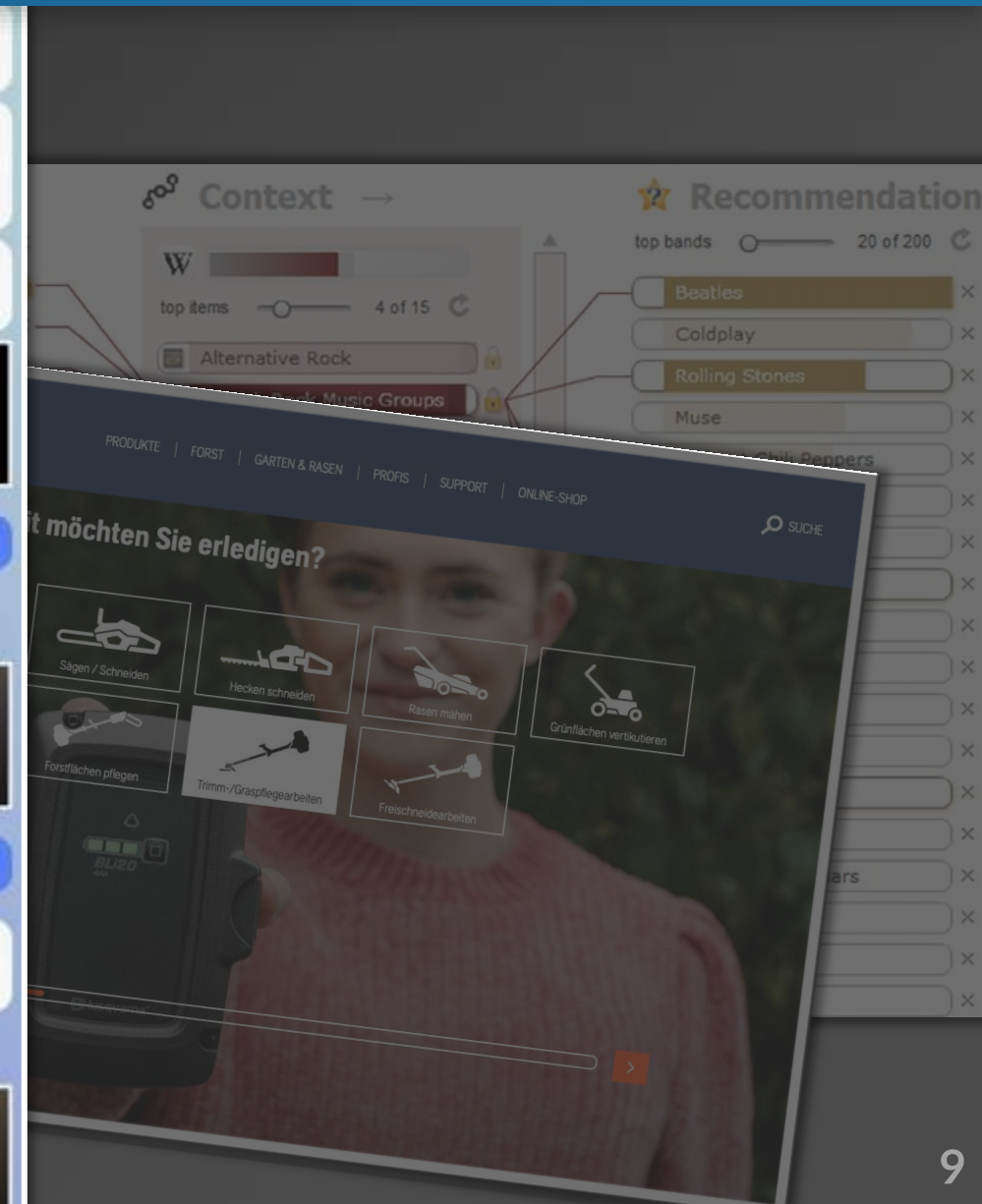
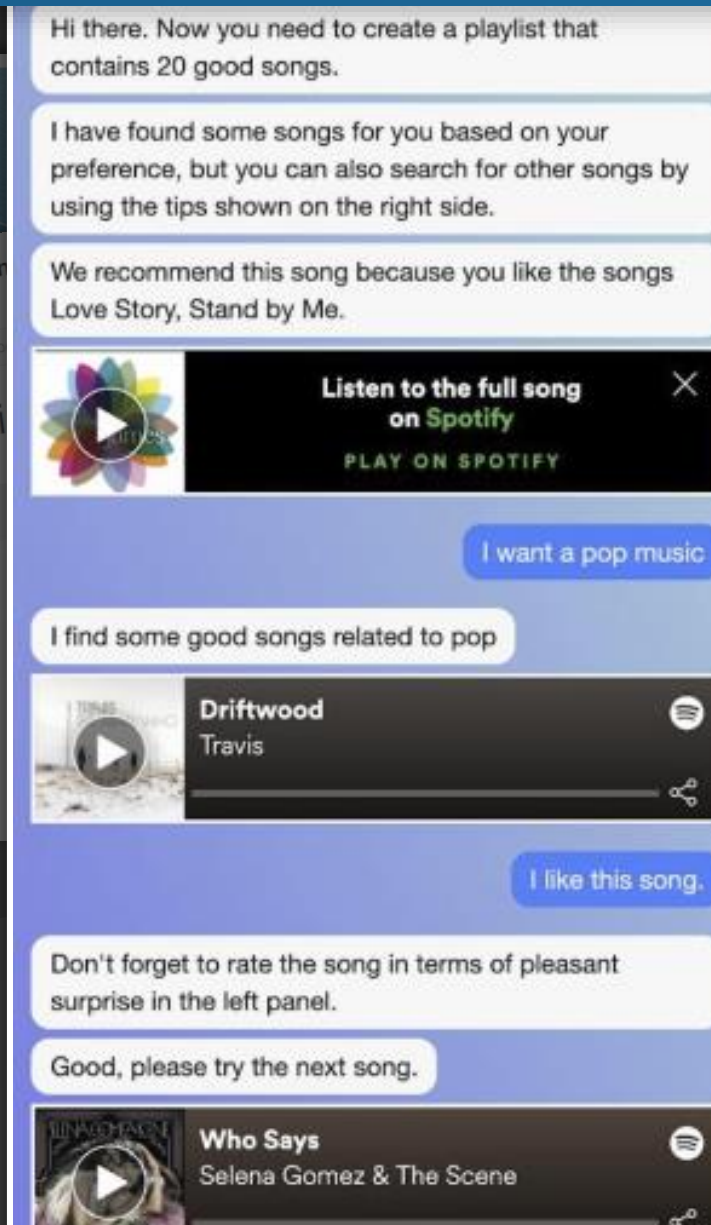
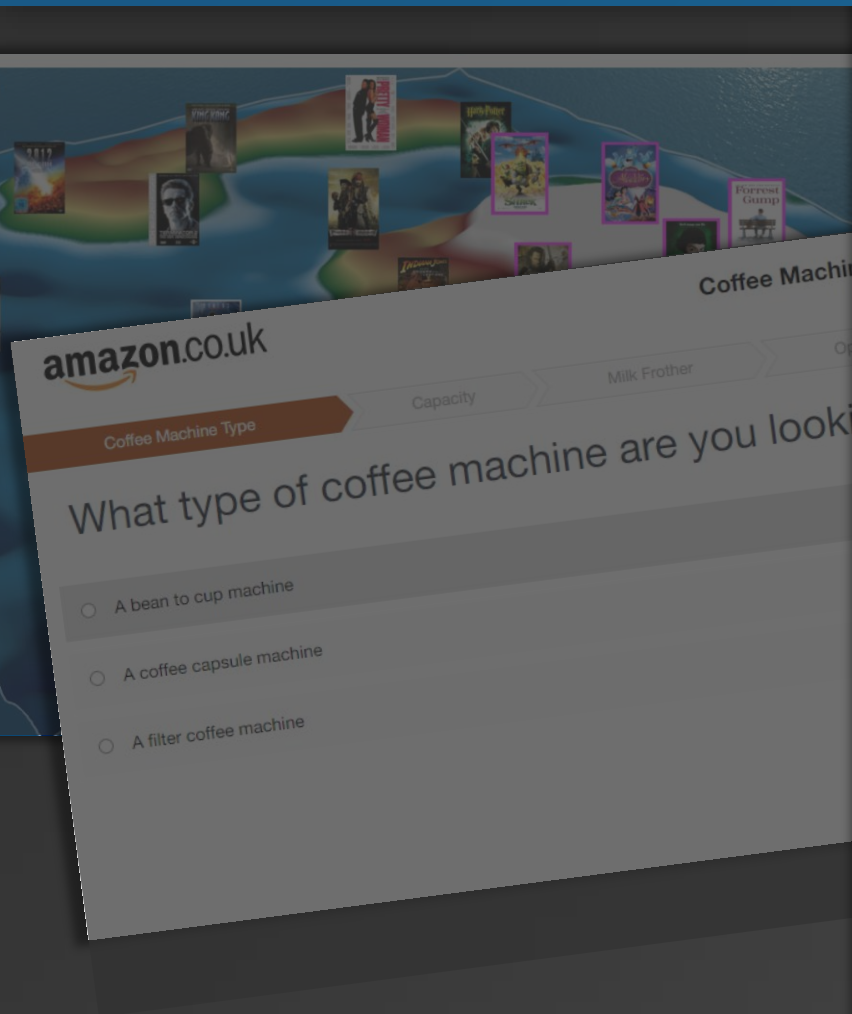
Beatles, Coldplay, Rolling Stones, Muse, Red Hot Chili Peppers, Nirvana, Daft Punk, Radiohead, Metallica, Michael Jackson, Lenny Kravitz, Foo Fighters, Oasis, Nine Inch Nails, 30 Seconds To Mars, Arctic Monkeys, Beatsteaks, Ok Go

Bostandjiev & O'Donovan, & Höllerer (RecSys '12)

... and other recent developments

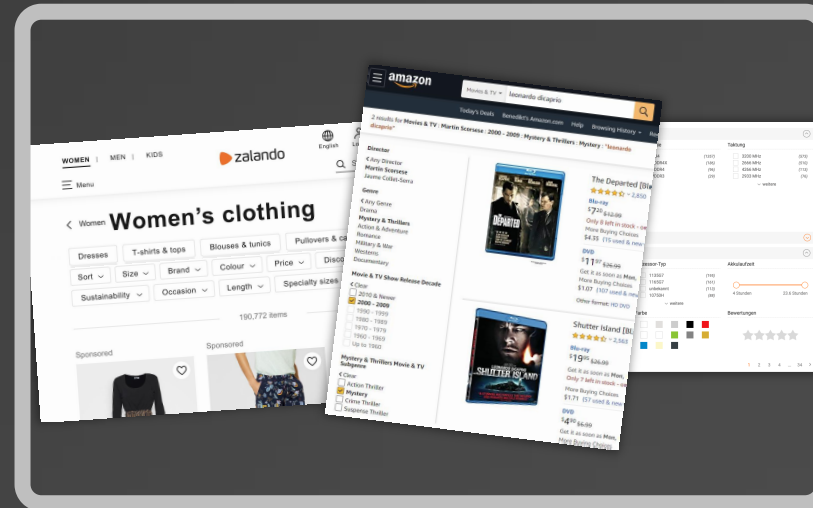
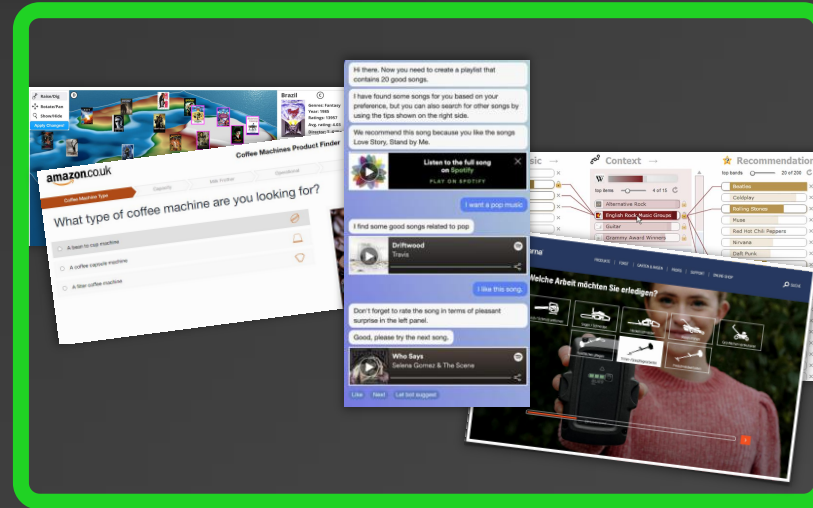
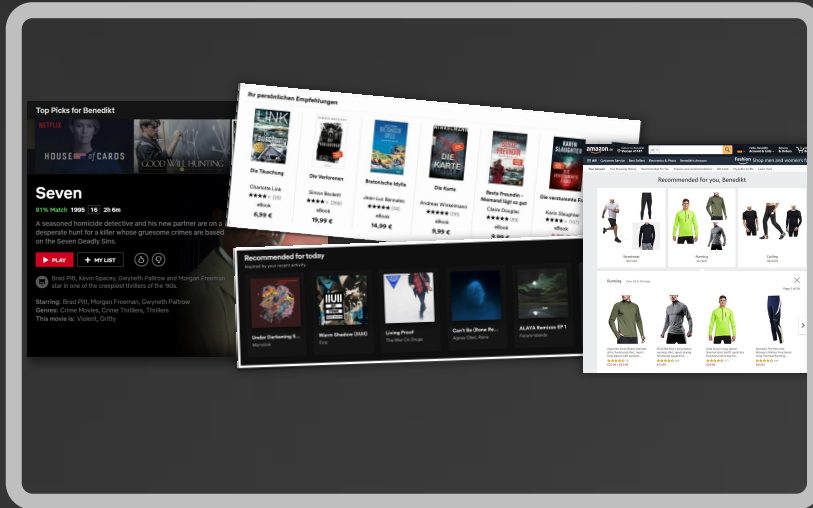


... and other recent developments



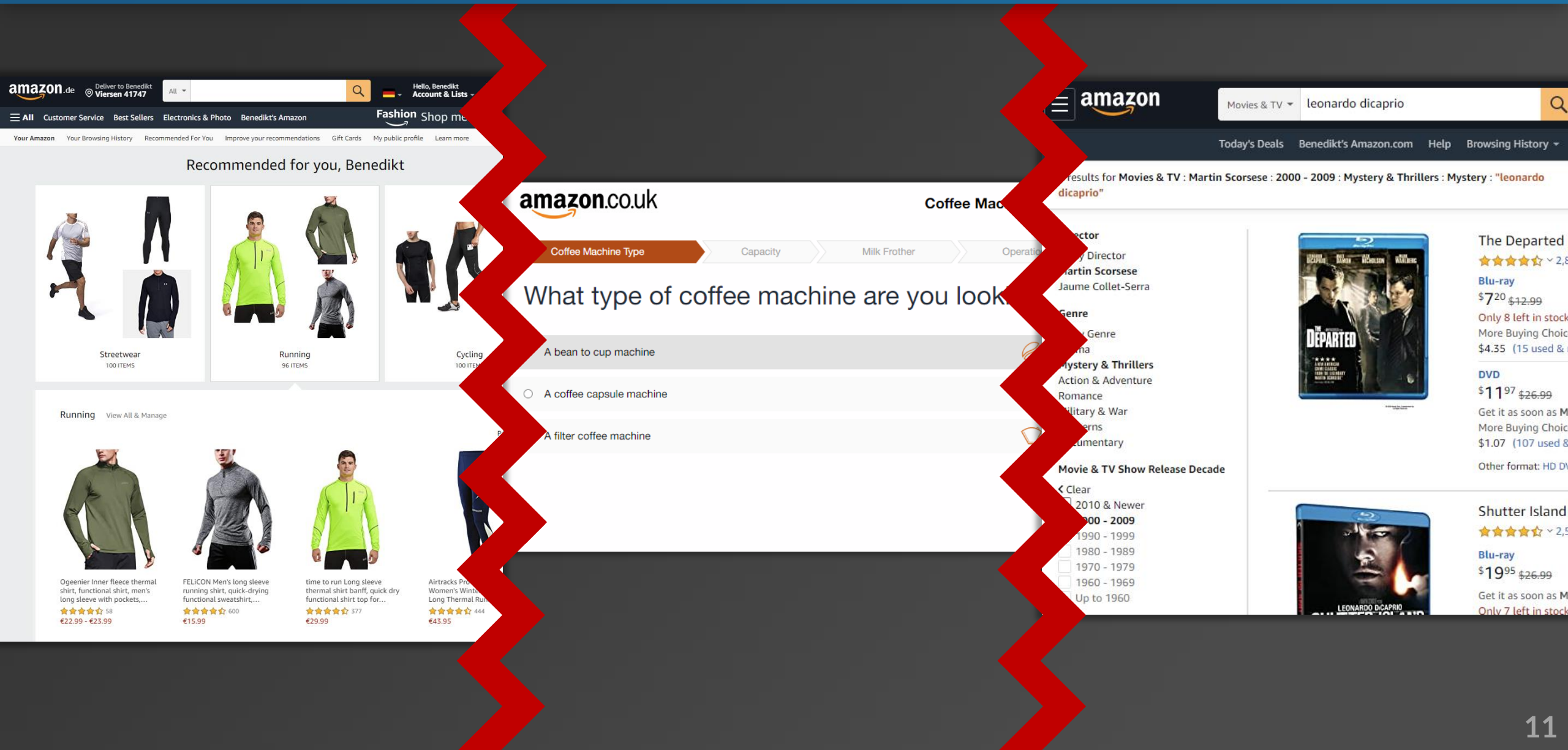
... and other recent developments

Personalization
Interaction effort



Controllability
Transparency

What is the problem?



User perspective?

LAPTOP-SHOP Einkaufswagen (0) Zur Kasse gehen

Empfehlungen:

V142
Hersteller: Vero
Preis (€): 210.80
Zum Warenkorb hinzufügen

V131
Hersteller: Vero
Preis (€): 196.00
Zum Warenkorb hinzufügen

SmartBook 141
Hersteller: Mediacom
Preis (€): 249.00
Zum Warenkorb hinzufügen

SmartBook 140
Hersteller: Mediacom
Preis (€): 239.00
Zum Warenkorb hinzufügen

SmartBook 139
Hersteller: Mediacom
Preis (€): 229.00
Zum Warenkorb hinzufügen

Berater:

Nutzung **Mobilität** Grafikkarte Speicherbedarf Extras Preis Grafikkarte

Mobilität
Wie häufig wirst du deinen Laptop unterwegs nutzen?
Auswahl hier hilft uns die Anforderungen an Displaygröße und Gewicht einzuschätzen.

☐ Ich nutze meinen Laptop viel unterwegs. (0)

☒ Ich nutze meinen Laptop ab und zu unterwegs. (1)

☐ Ich nutze meinen Laptop meistens zu Hause oder am Arbeitsplatz. (16)

☐ Ich bin hier noch unentschieden. (16)

⏪ Vorherige Frage Nächste Frage ⏩

Filter:

Hersteller (1268)

Betriebssystem (1303)

Typ (1303)

Display (1288)

Hersteller (1303)

Prozessor (1262)

Prozessor (876)

GPU Hersteller (1303)

GPU Typ (1298)

GPU (639)

Festplatte Typ (1303)

Zusätzliche Festplatte (GB) (208)

Touchscreen (1303)

Preis (€)

Gewicht (kg)

Zoll (")

Festplatte Kapazität (GB)

Kapazität zusätzliche Festplatte (GB)

Arbeitsspeicher (GB)

CPU GHz

Produkte: 12 von 1303 Ergebnissen mehr anzeigen

Acer 174.00€
C740-C9QX
CPU: Intel Celeron Dual Core 3205U 1.5
GPU: Intel HD Graphics
Zoll ("): 11.6
Festplatte Kapazität (GB): 32
Festplatte Typ: SSD
Zum Warenkorb hinzufügen

Vero 196.00€

Asus 191.90€
Vivobook E200HA
CPU: Intel Atom x5-Z8350 1.44GHz
GPU: Intel HD Graphics 400
Zoll ("): 11.6
Festplatte Kapazität (GB): 32
Festplatte Typ: SSD
Zum Warenkorb hinzufügen

Asus 199.00€

Recommendations

Advisor


Filter

User perspective?

LAPTOP-SHOP Einkaufswagen (0) Zur Kasse gehen

Empfehlungen:


V142



Hersteller: Vero
Preis (€): 210.80

Zum Warenkorb hinzufügen


V131



Hersteller: Vero
Preis (€): 196.00

Zum Warenkorb hinzufügen


SmartBook 141



Hersteller: Mediacom
Preis (€): 249.00

Zum Warenkorb hinzufügen


SmartBook 140



Hersteller: Mediacom
Preis (€): 239.00

Zum Warenkorb hinzufügen

SmartBook



Hersteller: Media
Preis (€): 255.00

Zum Warenkorb hinzufügen

Berater: Nutzung **Mobilität** Grafikkarte Speicherbedarf Extras Preis Grafikkarte

Mobilität
Wie häufig wirst du deinen Laptop unterwegs nutzen?
Deine Auswahl hier hilft uns die Anforderungen an Displaygröße und Gewicht einzuschätzen.

- ☐ Ich nutze meinen Laptop viel unterwegs. 0
- ☒ Ich nutze meinen Laptop ab und zu unterwegs. 1
- ☐ Ich nutze meinen Laptop meistens zu Hause oder am Arbeitsplatz. 10
- ☐ Ich bin hier noch unentschieden. 10

◀ Vorherige Frage ▶ Nächste Frage

Filter:

Hersteller (1268)

Betriebssystem (1303)

Typ (1303)

Auflösung (1288)

CPU Hersteller (1303)

CPU Typ (1262)

CPU (876)

GPU Hersteller (1303)

GPU Typ (1298)

GPU (839)

Festplatte Typ (1303)

Zusätzliche Festplatte (GB) (208)

Touchscreen (1303)

Preis (€)

Gewicht (kg)

Zoll (")

Festplatte Kapazität (GB)

Kapazität zusätzliche Festplatte (GB)

Arbeitsspeicher (GB)

CPU GHz

Produkte: 12 von 1303 Ergebnissen mehr anzeigen

Acer 174.00€
C740-C9QX

CPU: Intel Celeron Dual Core 3205U 1.5
GPU: Intel HD Graphics
Zoll ("): 11.6
Festplatte Kapazität (GB): 32
Festplatte Typ: SSD


Zum Warenkorb hinzufügen

Asus 191.90€
Vivobook E200HA


CPU: Intel Atom x5-Z8350 1.44GHz
GPU: Intel HD Graphics 400
Zoll ("): 11.6
Festplatte Kapazität (GB): 32
Festplatte Typ: SSD

Zum Warenkorb hinzufügen

Vero 196.00€



Asus 199.00€



Personal Characteristics

Personality

Maximization

Rational vs. Intuitive

Situational Factors

Domain Knowledge

Search Goal

Environment

Demography

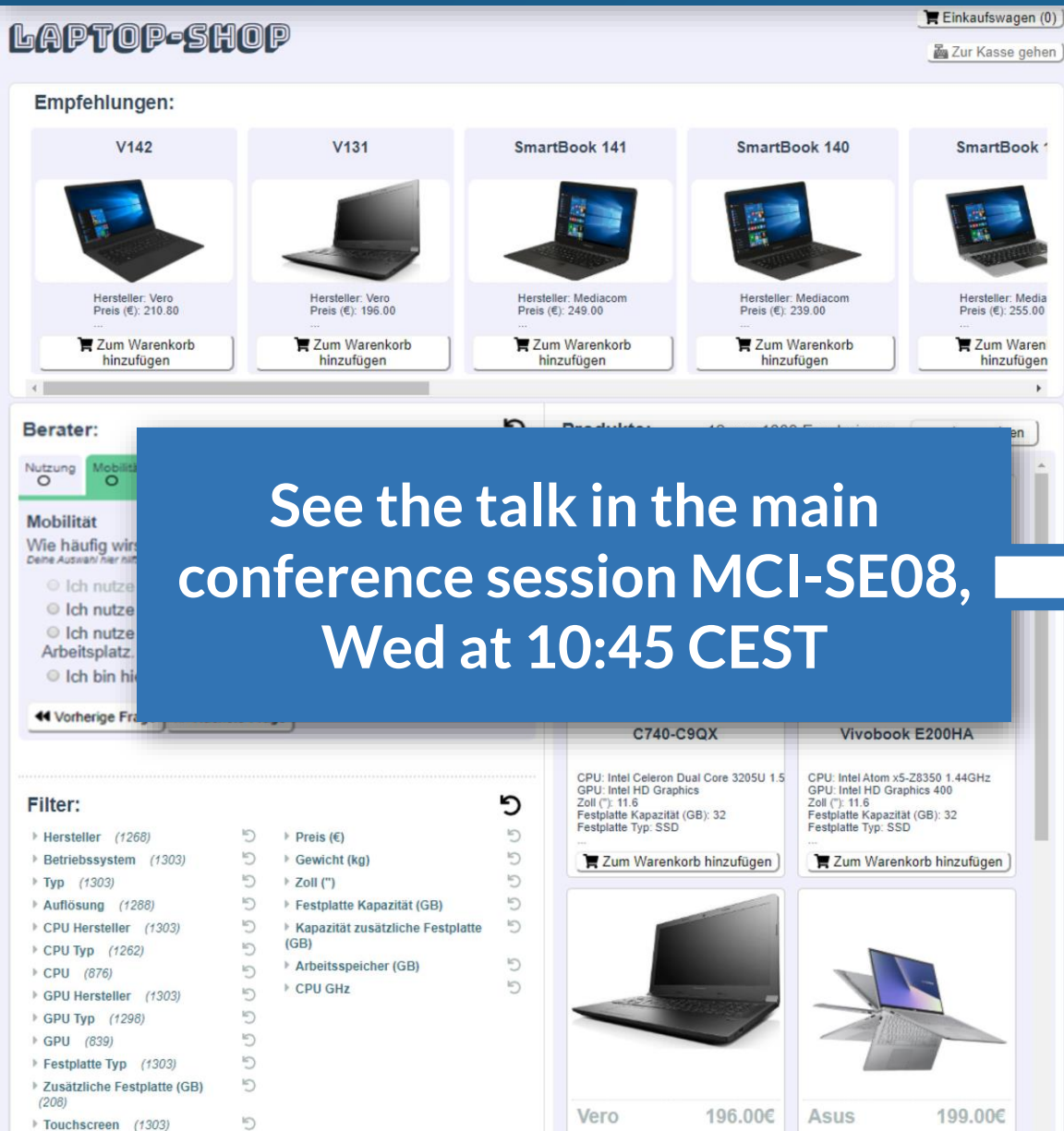
Gender

Age

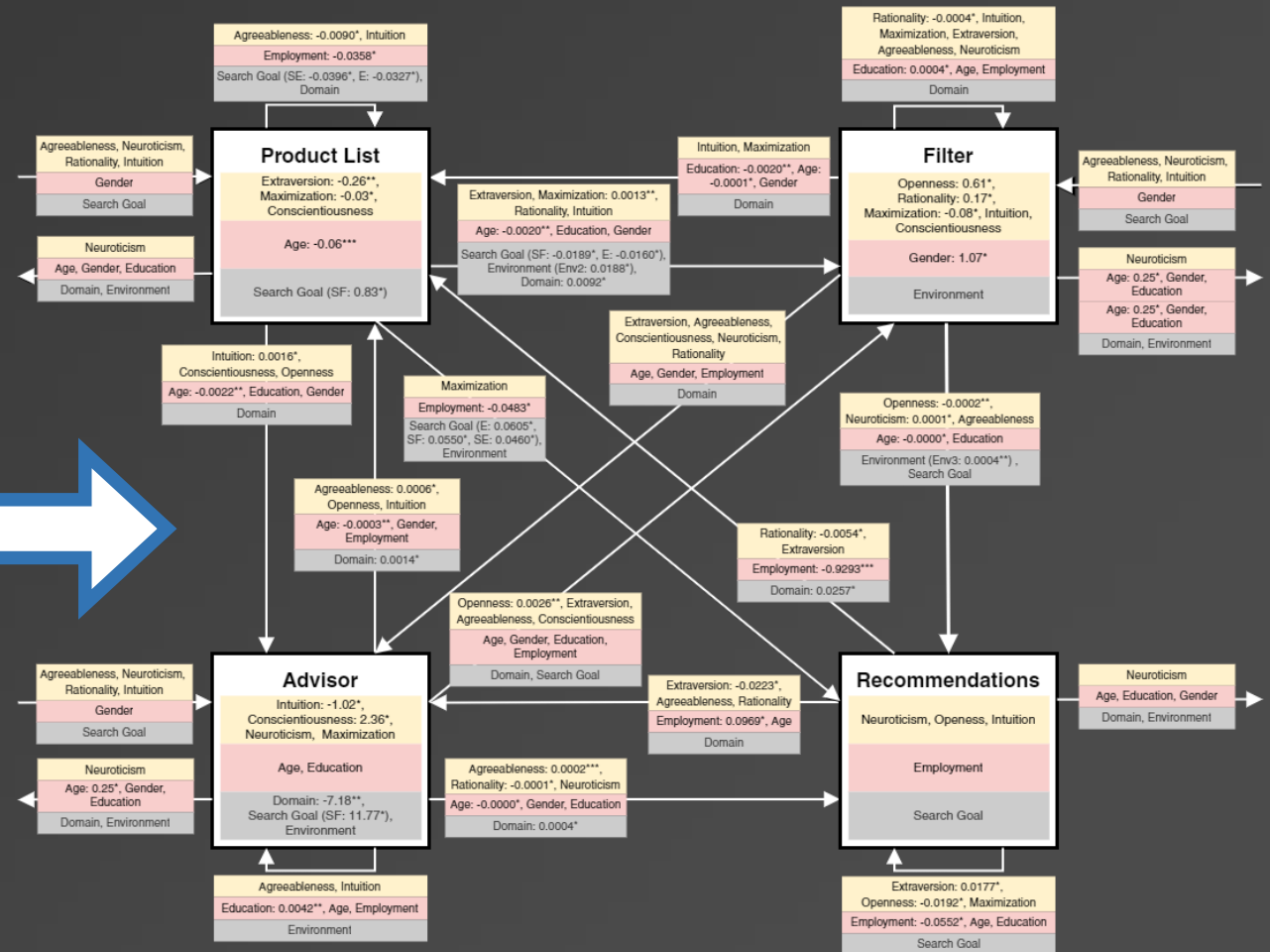
Education

Employment

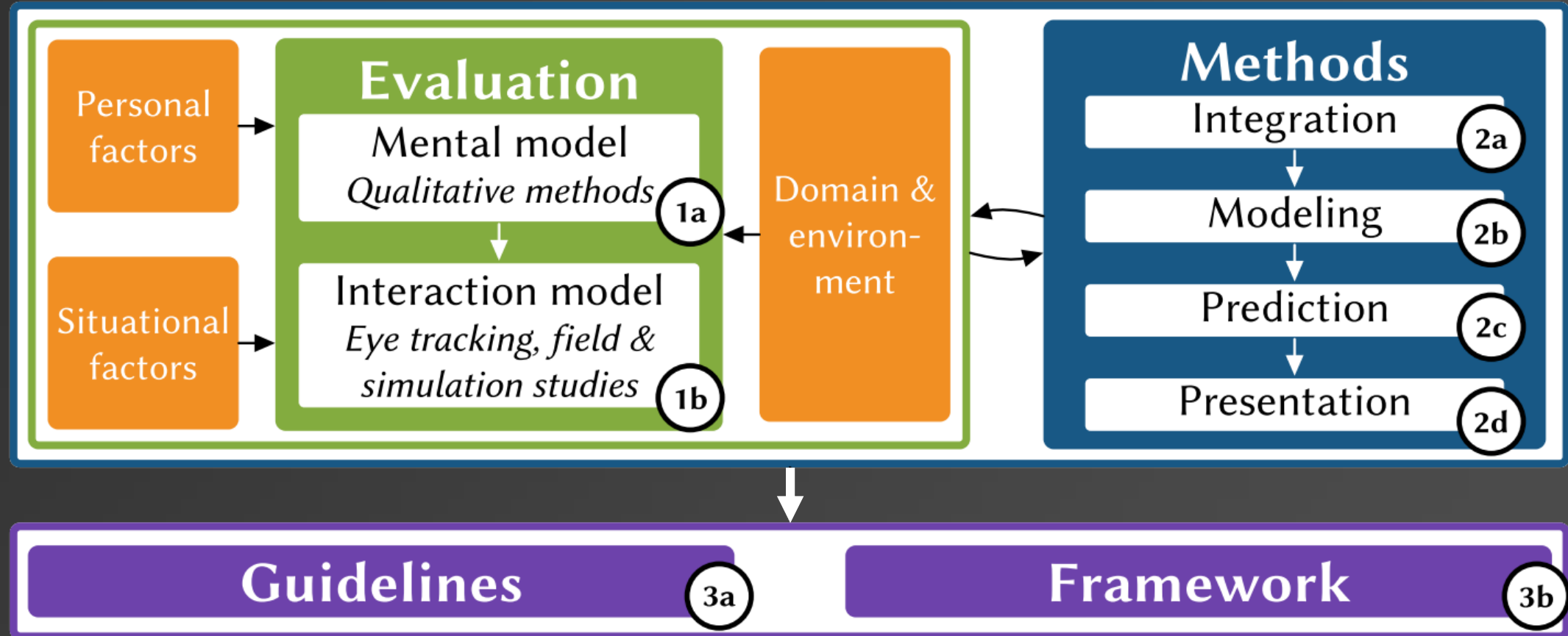
User perspective?



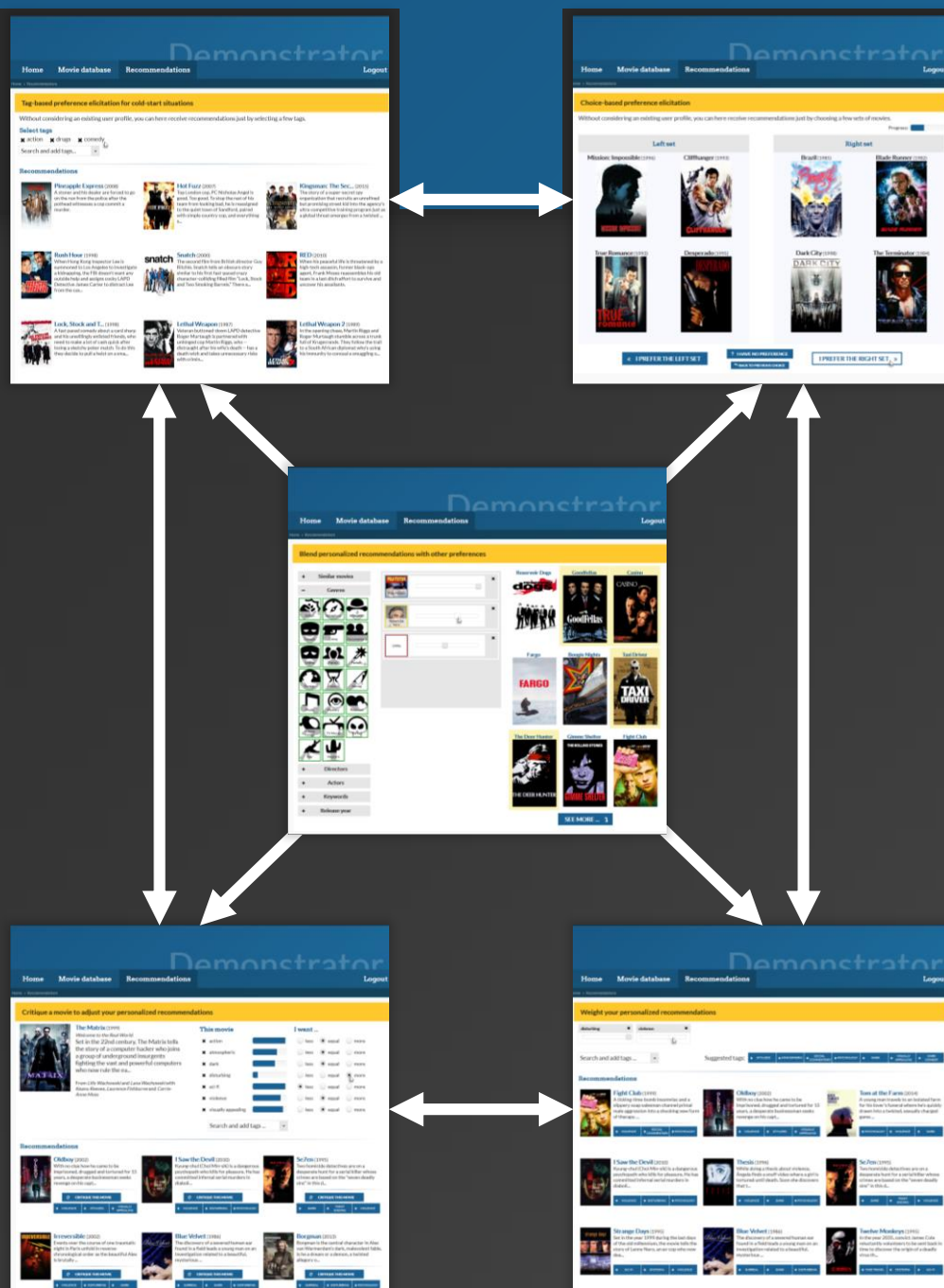
See the talk in the main conference session MCI-SE08, Wed at 10:45 CEST



Research agenda



Combinations?



Loepp & Ziegler (RecSys '19)

LAPTOP-SHOP

Berater (2)

Berater neu starten

Nutzung

Mobilität

Speicherbedarf

Extras

Preis

1) Wofür möchtest du deinen neuen Laptop hauptsächlich verwenden?

Deine Auswahl hier hilft uns die Anforderungen an Arbeitsspeicher und Prozessor abzuschätzen

Surfen und Filme ansehen

Du erwartest eine solide Grundausstattung, um z.B. Texte zu verarbeiten, im Internet zu surfen oder für E-Mails. Du möchtest zudem regelmäßig Filme z.B. über Netflix ansehen.

Für diese Antwort gibt es noch 25 passende Produkte.

Digitale Bild- und Videobearbeitung

Du möchtest Bilder- oder Videos bearbeiten und benötigst dafür eine besonders hohe Rechenleistung.

Für diese Antwort gibt es noch 18 passende Produkte.

Nächste Frage

Anspruchsvolle Officearbeiten

Mit deinem Laptop möchtest du in erster Linie zuverlässig arbeiten und dabei auch auf anspruchsvolle Anwendungen zurückgreifen.

Für diese Antwort gibt es noch 112 passende Produkte.

Gaming

Du spielst regelmäßig (Online-) Spiele mit deinem Laptop und möchtest ein optimales Gaming-Erlebnis.

Für diese Antwort gibt es noch 82 passende Produkte.

Sortierung (3)

Aufsteigend

Absteigend

Preis (€)

Gewicht (kg)

Arbeitsspeicher (GB)

Hersteller

Filter (1)

Noch 110 Produkte in Ihrer Filterung.

Hersteller: 0 / 19

- ☐ Apple
- ☐ HP
- ☐ Acer
- ☐ Asus
- ☐ Dell
- ☐ Lenovo

CPU: 35 / 118

- ☒ Intel Core i7 2.7GHz
- ☒ Intel Core i7 2.2GHz
- ☒ Intel Core i5-1.8GHz
- ☒ Intel Core i5 2.3GHz
- ☒ Intel Core i5 7200U 2.5GHz
- ☒ Intel Core i5 3.1GHz

CPU Hersteller: 0 / 3

- ☐ Intel
- ☐ AMD
- ☐ Samsung

Festplatte Kapazität: 3 / 13

- ☒ 128GB
- ☒ 256GB
- ☒ 512GB
- ☐ 32GB
- ☐ 64GB
- ☐ 1TB

Festplatte Typ: 1 / 3

- ☒ SSD
- ☐ HDD
- ☐ Hybrid

Zusätzliche Festplatte

- ☐ HDD
- ☐ SSD

Preis (€):

174 1775 (5)

Gewicht (kg):

0.69 1.75 (6)

Zoll ("):

12 14

Produkte (4)



Lenovo

IdeaPad 520S-14IKB

Intel Core i3 7130U 2.7GHz; Intel HD Graphics 620; 14; 256GB; SSD;...

599.00€



Acer

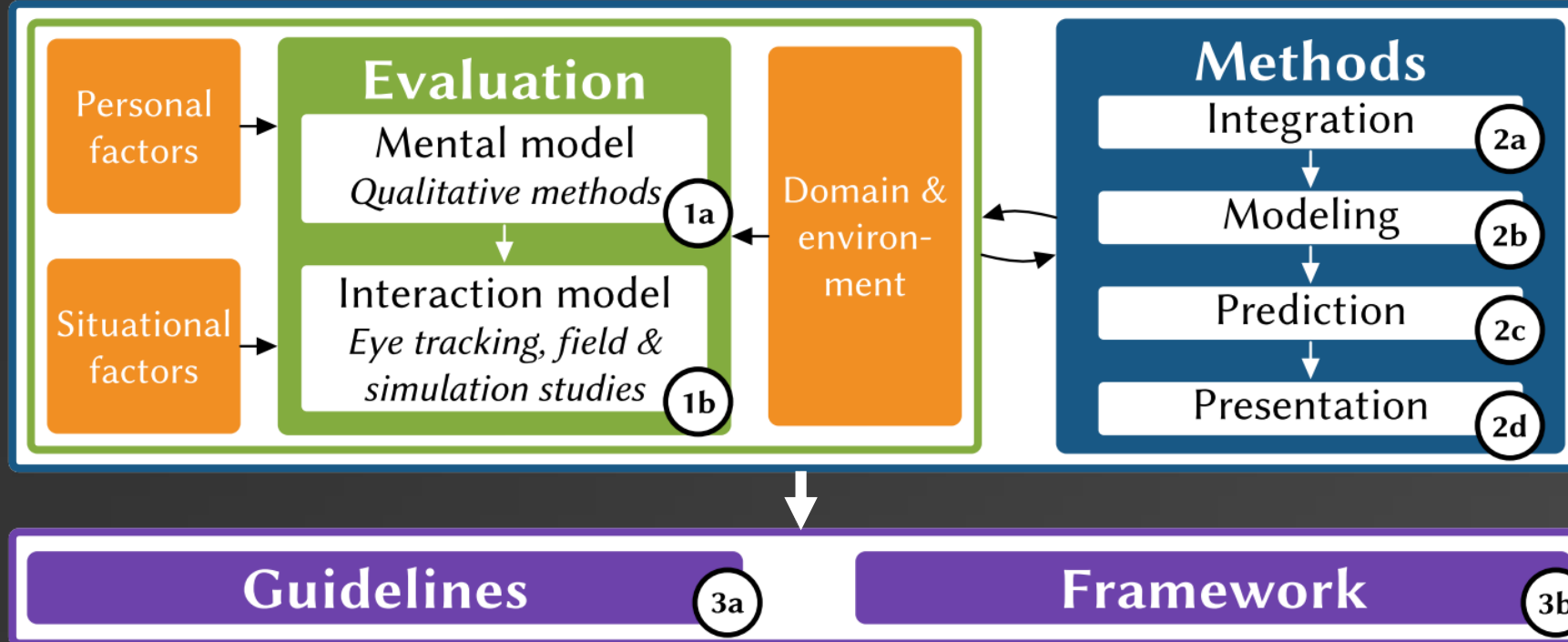
Swift 3

Intel Core i3 7100U 2.4GHz; Intel HD Graphics 620; 14; 128GB; SSD;...

619.00€

Kleemann & Ziegler (MuC '19)

Research agenda



Thank you!



✉ benedikt.loepp@uni-due.de

🐦 [@BenediktLoepp](https://twitter.com/BenediktLoepp)