



GETTING DRESSED BY MACHINES

You have the right to look fabulous

Four for fashion

The team



**Sinan
Tiryaki**

BACKGROUND

B.Eng. Mechanical Engineering
currently pursuing an
M.Sc. in Practical Informatics

FUTURE POSITION
Data Scientist /
Computer Vision



**Dr. Lennart
Marien**

BACKGROUND

Applied Mathematician
PhD Geosciences
Numerical Climate Modelling

FUTURE POSITION
Data Scientist



**Dr. Martin
Kärgell**

BACKGROUND

Chemist
PhD Materials science
Data Scientist

FUTURE POSITION
Data Scientist
Energy/Sustainability



**Dr. Christian
Messerschmidt**

BACKGROUND

Business Administration
Digital Strategy Consulting
Data/Web Analytics

FUTURE POSITION
Data Scientist
Product Owner for Data Products

TOPIC OF TODAY

How we developed a recommendation machine for fashion online shops



Free standard delivery for Members when spending £20 or more. Click & Collect £3.99 (free for all members) / non-members free over £20. Free and flexible returns

DETAILS DELIVERY AND PAYMENT PRODUCT BACKGROUND

Style with

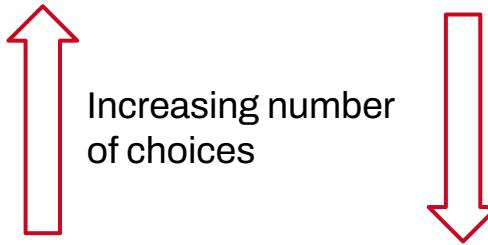
Hollie neck chiffon dress £45.99 New Arrival	Mujae £24.99 New Arrival	Premium Selection Leather waist belt £25.99	Single-breasted jacket £24.99
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OUR STAKEHOLDERS

Fashion retailers with online shops

The paradox of choice

Challenges in the online retail market

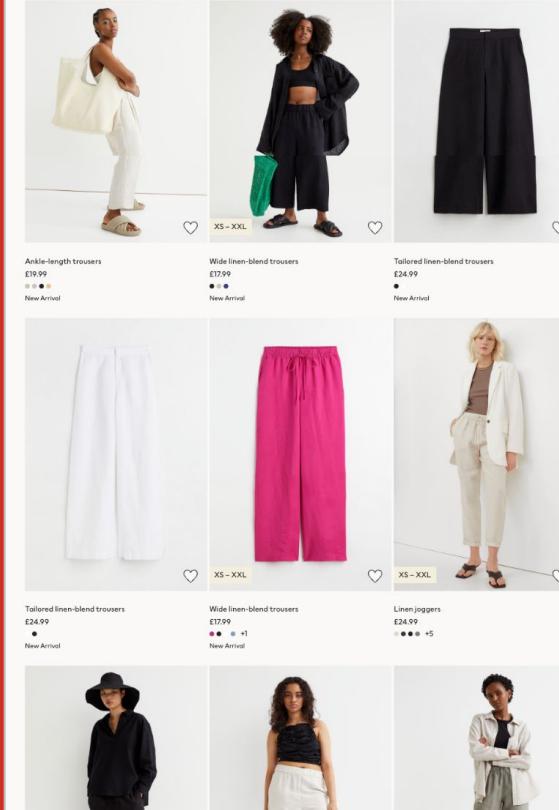


TROUSERS FOR WOMEN

Embrace your own unique style couldn't be easier with our selection of stylish trousers for women. Shop inspiration! Try on our cool cargo trousers paired with a bodysuit and heels or tuck them in an on-trend high-waisted trousers in colourful designs and classic styles. Need something new for work? Look no further and suit trousers to make a lasting impression. Keep it cool and comfy with flared corduroy trousers, leather culottes and patterned leggings. Browse all women's trousers below.

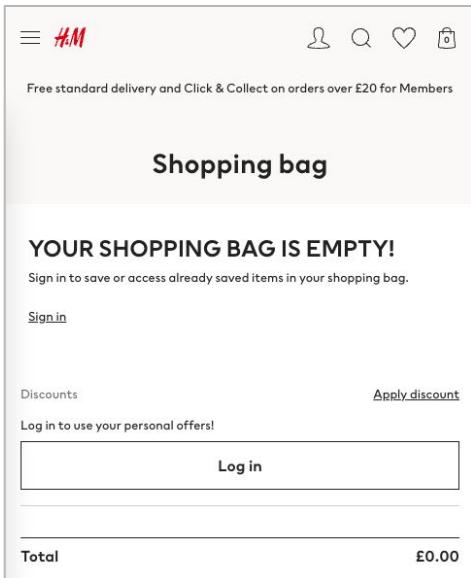
SORT BY ▾ FILTER & SORT

524
Products



Consequences

...for customers



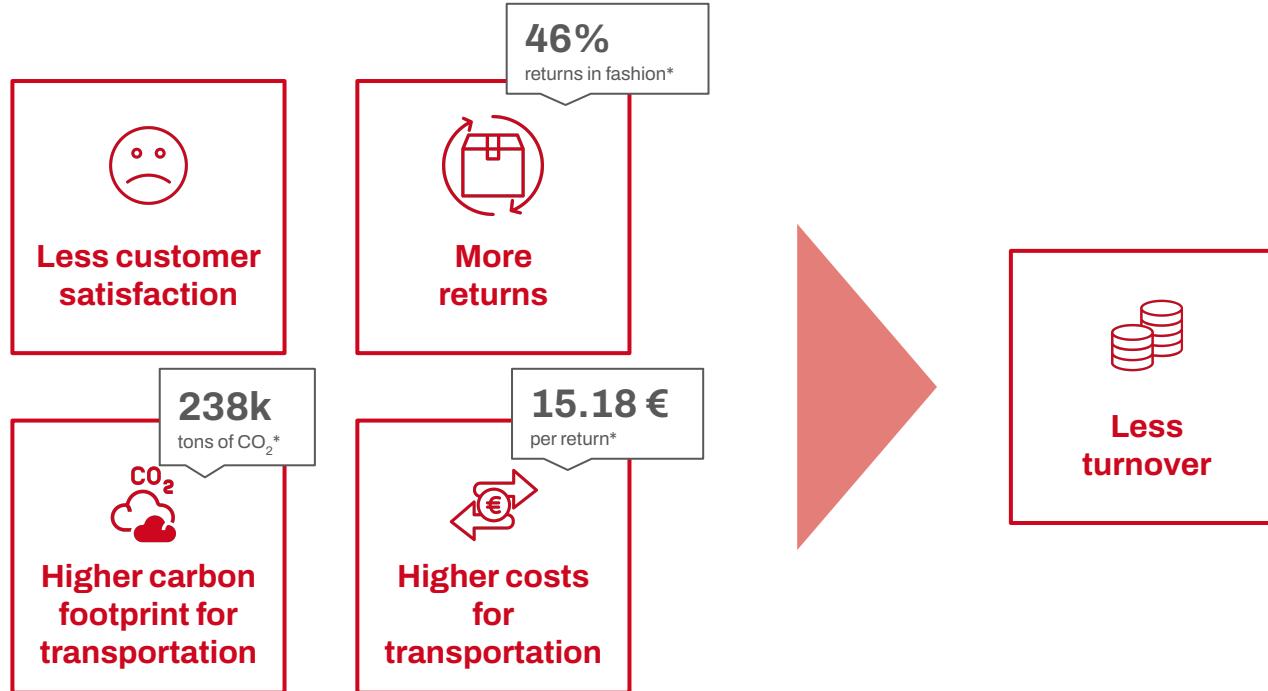
Less or no choices



Wrong choices?

Consequences

...for online retailers



QUESTION

**How can we support
customers to choose the
right products when the
offer is huge?**

SOLUTION

**We develop a recommender
system which suggests
12 best fitting products*
based on previous
customer behavior and
product data.**

Data overview

WERE PROVIDED



Article Metadata

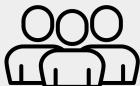
105,542 articles
25 features



Transactions

31,788,324 transactions
5 features
20.09.2018 - 22.09.2020

Session based
positive
customer
interaction



Customer Data

1,371,980 customers
7 features

WEREN'T PROVIDED

Rating



Returned Shipment

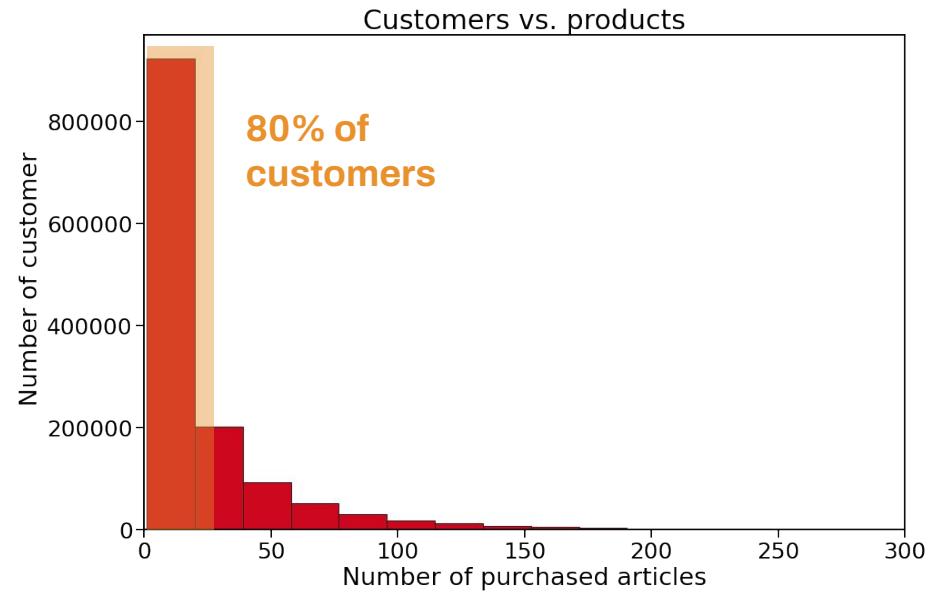


Customer Info

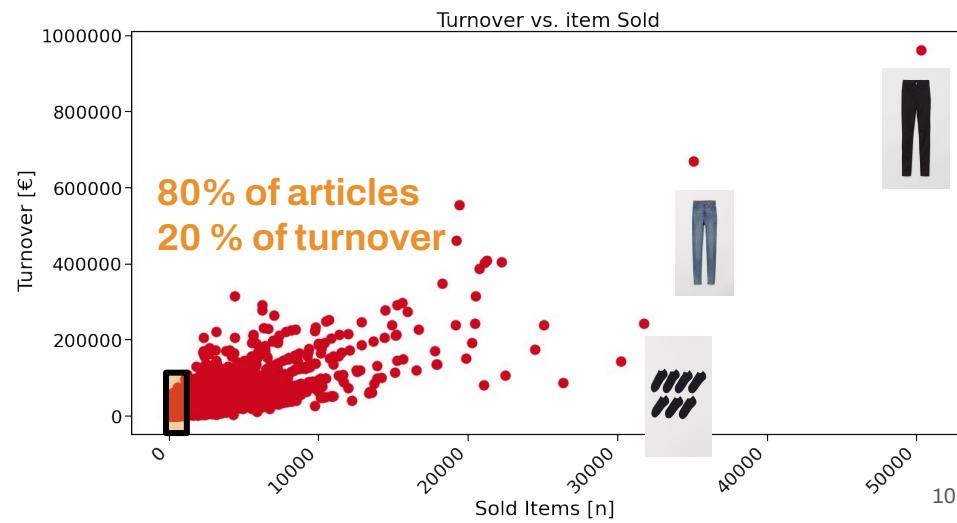


Customer and article data

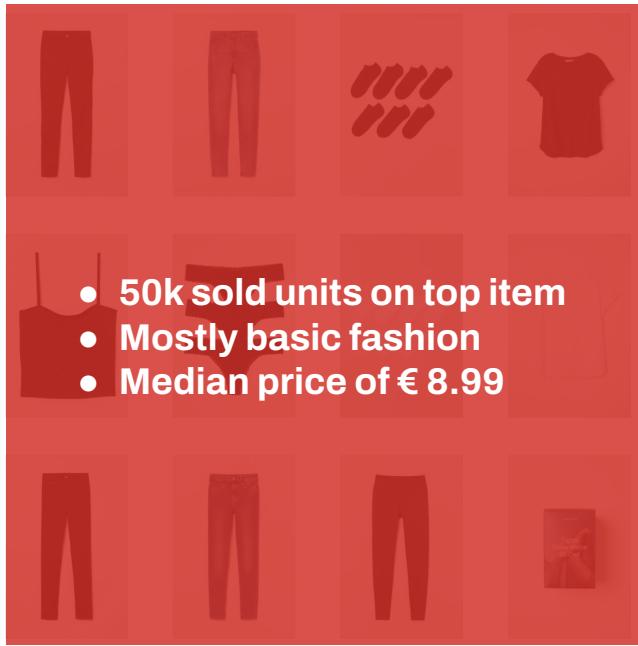
80% of customers purchased less than 35 products



Getting dressed by machines

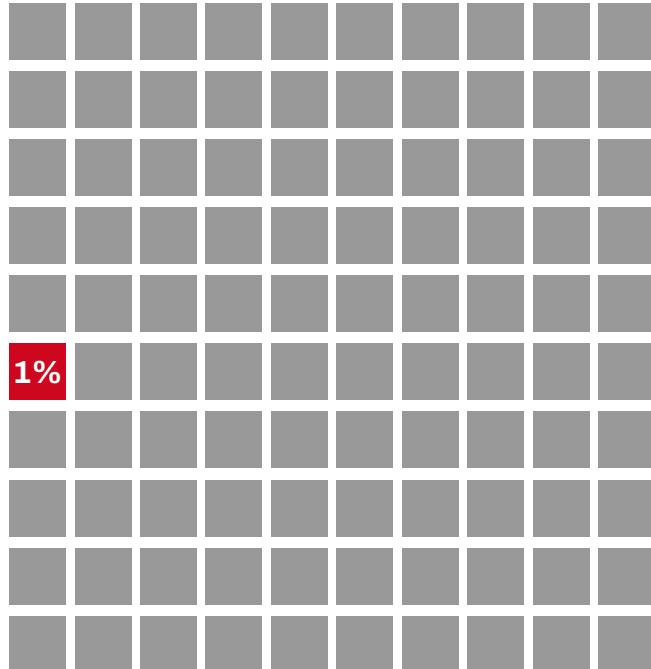


The top 12 products



330 k
units sold
in top 12

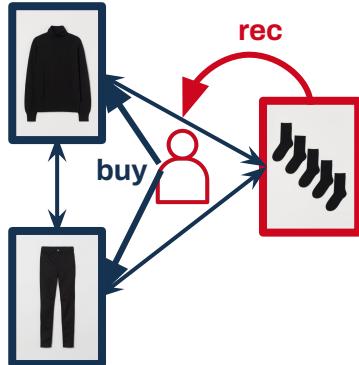
31.8 Mio
units sold over all products



Machines for fashion

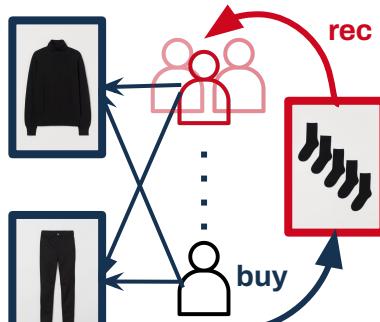
CONTENT-BASED FILTERING

Filter using solely item features



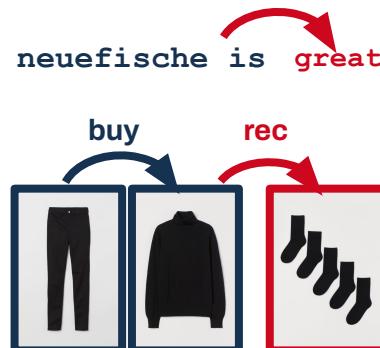
COLLABORATIVE FILTERING

Infer likely buys from behaviour of the user collective



TRANSFORMERS

NLP based auto-complete for your purchase decision



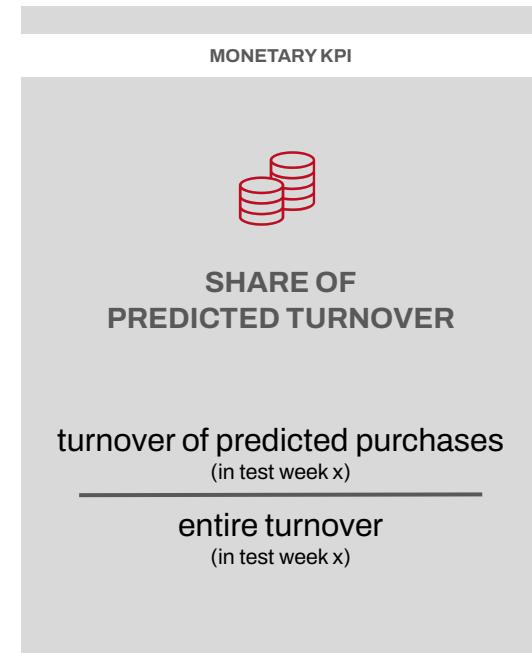
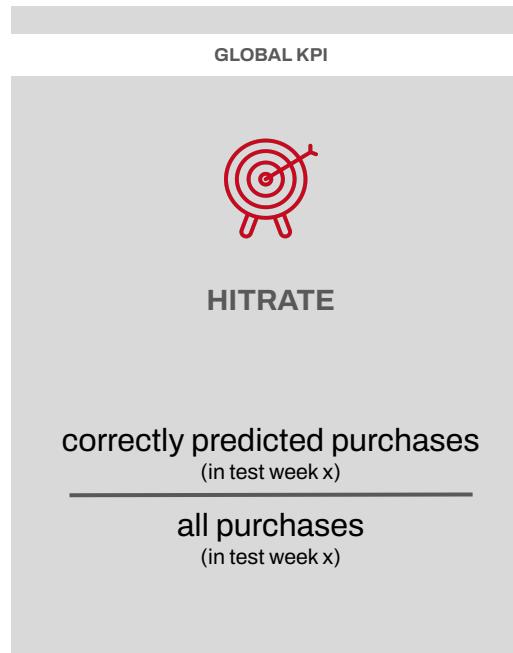
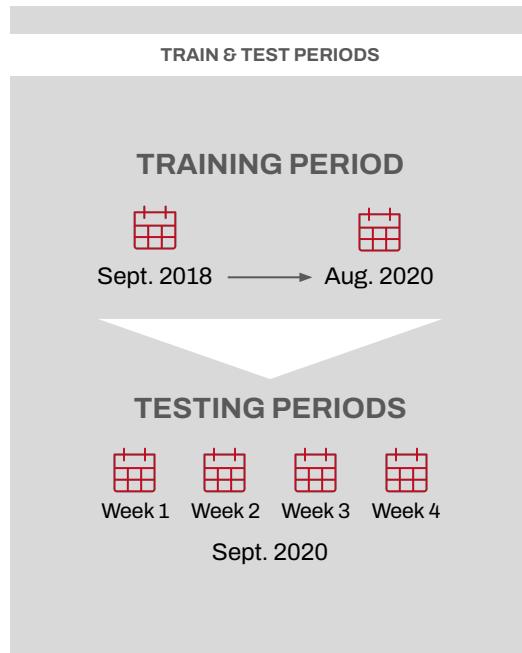
MARKET BASKET APPROACH

Recommend articles based on association rule mining in market baskets

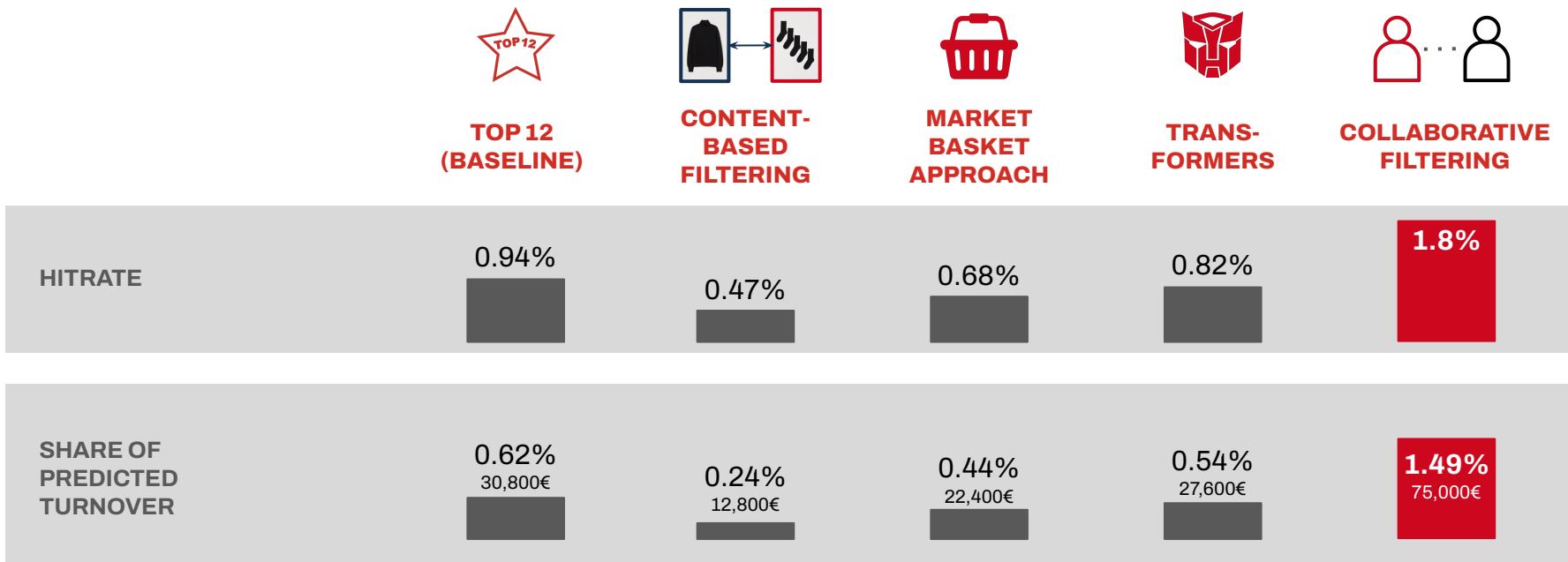


Our KPIs to evaluate our models

Test periods, hitrate & share of predicted turnover



Performance of our models





SEASONALITY?

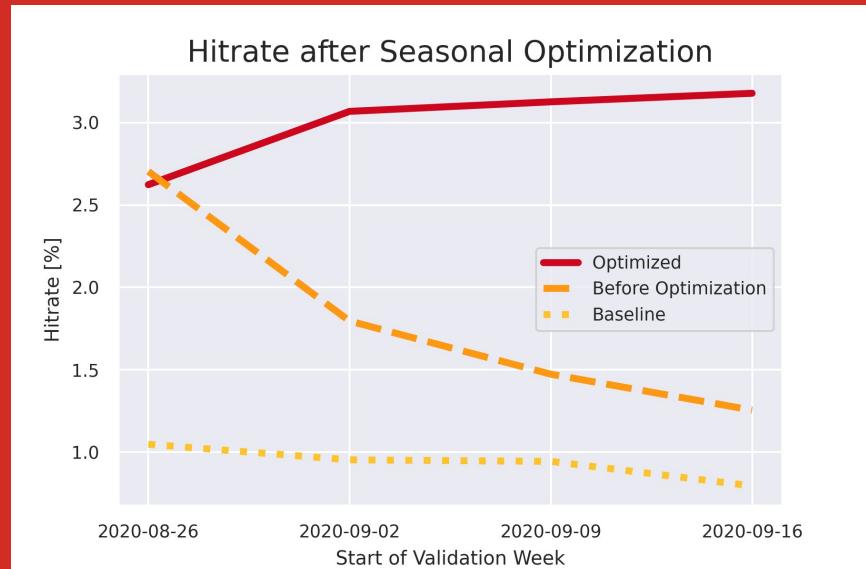


Optimized Model

Collaborative filtering revisited

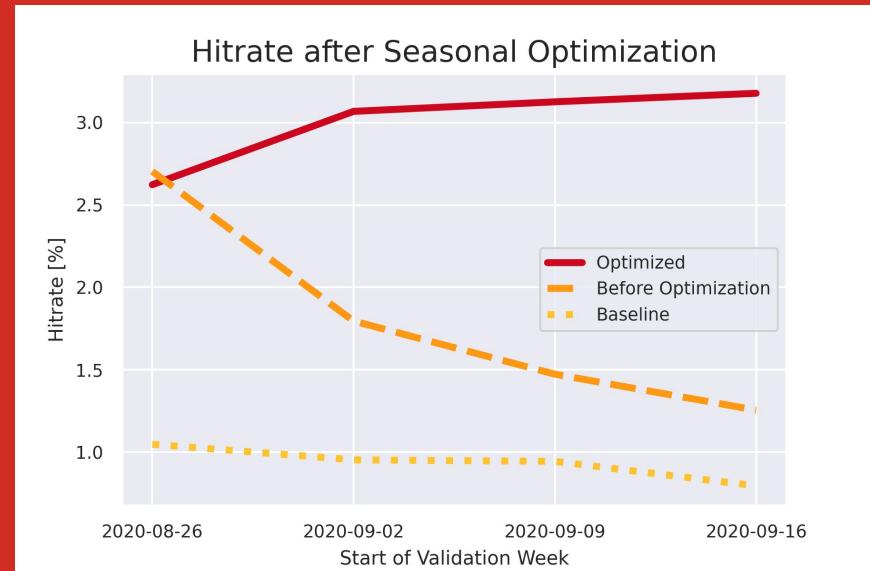
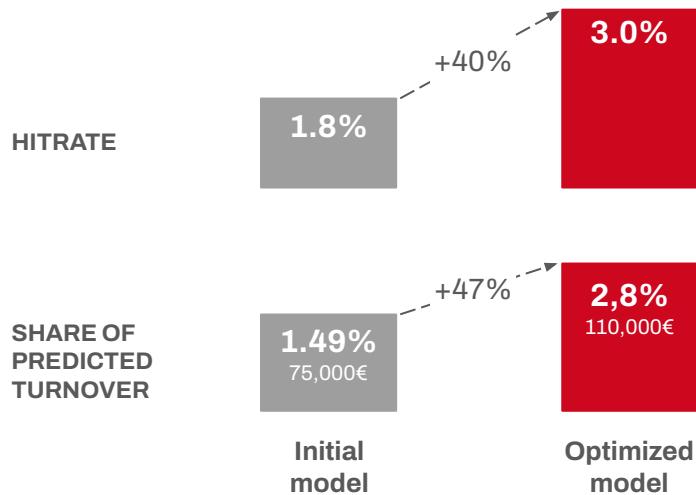
Optimizations:

- Hyperparameters
- Training Period
- Split Model



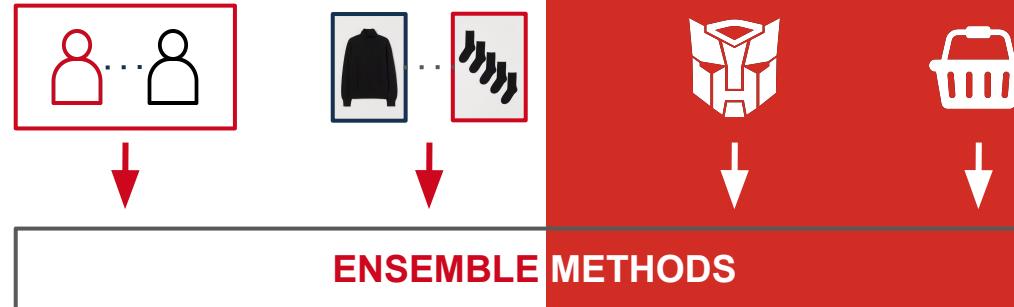
Optimized Model

Collaborative filtering revisited



Conclusion

- Tested **four models** against a TOP12-baseline
- **Collaborative filtering** brought ~300% improvement of baseline-hitraterate
- **Cold start customers** remain an issue
- Customer decisions for fashion products are **hard to predict**



Outlook

- **Optimize recommendations for cold start** customers based on **clusters**
- Optimize **training periods**
- Analyze and potentially skip **outliers**
- Combine our methods with **ensembling and boosting**



Thank you for
your attention

References

- [1] Iyengar, Sheena & Lepper, Mark (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, 79, 995–1006.
- [2] B. Asdecker (2019): "Retourentacho 2018-2019", Online:
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- [3] B. Asdecker (2022): "Statistiken Retouren Deutschland - Definition", Online:
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Accesssed on: 18.05.2022.