Methods for Minimizing and Understanding e-Commerce Returns

Dr. Alexander K. Seewald

ASPAI 2019 Keynote

alex@seewald.at
http://www.seewald.at

Project Description

The importance of **e-commerce** and the associated freight traffic with all its negative consequences (like congestions, noise, emissions) is constantly increasing. Already in 2015, an European market volume of 444 billion Euros was achieved, representing an annual revenue growth of 13.3%.

Next to single day deliveries, CO_2 intensive delivery methods and underutilized transport systems, **returned goods** are the main problem of online trading. **Up to 50% of textiles** are returned currently.

Our system animates and nudges customers to choose sustainable means of transport when shopping online.
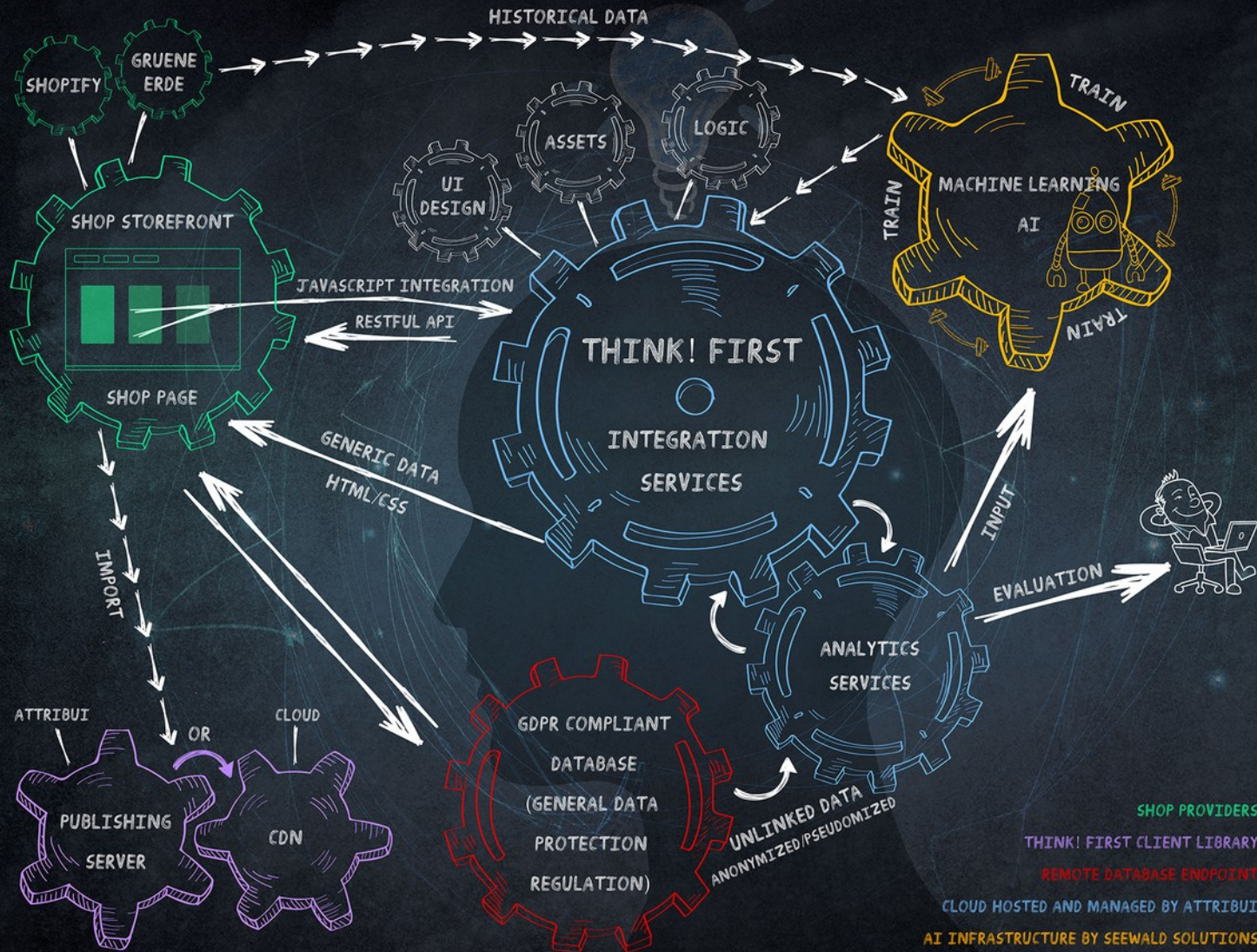
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http://www.seewald.at

Method

We plan to tackle these open problems in freight mobility by using an unique combination of...

1) **gamification elements** (transmedia storytelling, granting of discounts in case of compliance)

2) **persuasive design principles** (highlighting of features such as group orders & environmen-tally friendly transportation)

3) **machine learning** (for the automatic correction of inconsistent or incorrect size information both on customer-level and manufacturer-level, and characterizing returns with understandable learning algorithms)

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http://www.seewald.at

Research Design

Using a **multi-dimensional approach** which includes qualitative and quantitative methods the **impact** on **acceptance, usability and compliance** (reduction of returns, reduction of delivery attempts and shorter transport routes) as well as on the **modal shift** (use of alternative means of transport) will be assessed.

Our project approach will provide valuable insights, whether the planned interventions are appropriate to sensitize online customers for a sustainable transport of goods.
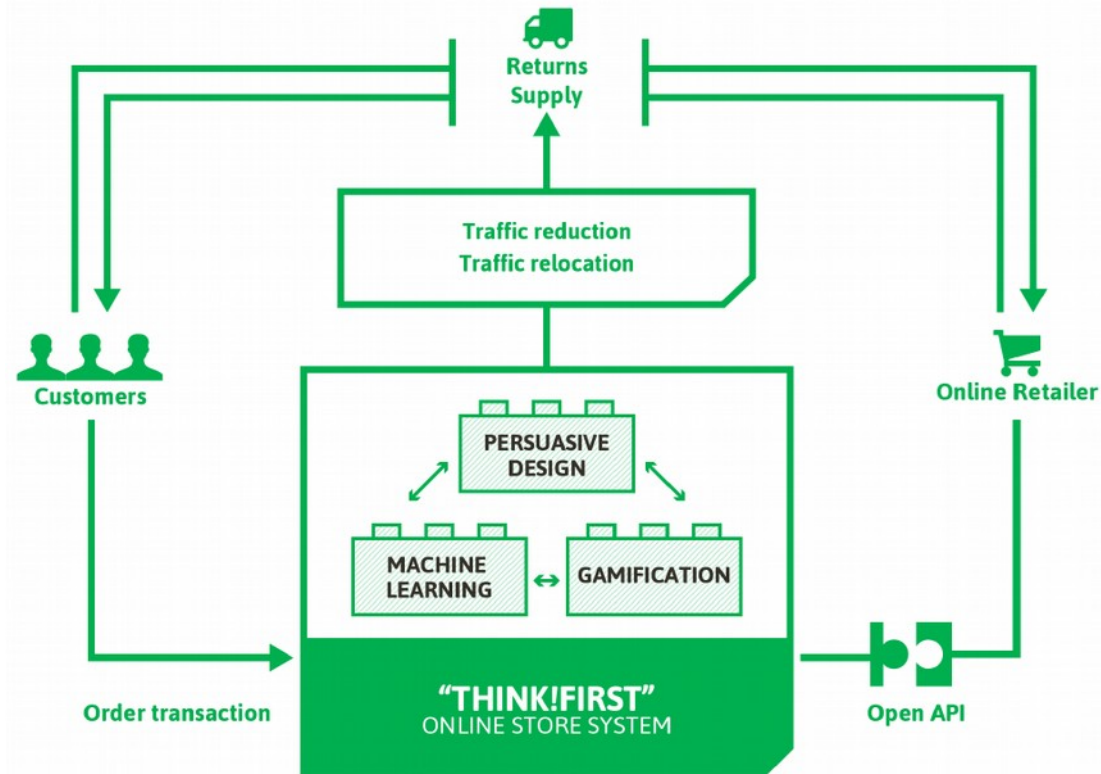
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Project Framework

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Project Goals

PROJECT GOALS

USAGE OF SUSTAINABLE MEANS OF TRANSPORT
- Crowdfunding
- Delivery via cargo bike
- Delivery via train
- Delivery via drones

REDUCTION OF TRANSPORT ROUTES
- Introducing Badge System
- Note on return parcel posting with the postman
- Shopping at local store
- Processing returns in local stores
- Pick-up at local store
- Cancellation of an order

INCREASING THE UTILIZATION OF KEP VEHICLES
- Complete delivery
- Group order
- Extended delivery time
- postal envelopes

AVOIDANCE OF MULTIPLE DELIVERIES
- Delivery at packet station
- Predefined time of delivery
- Announcement of an alternative delivery address
- Package acceptance by a known person
- Messages

REDUCTION OF RETURNS
- Payment before shipping
- Rewards for sustainable choices
- Payment of returns
- Contextual informations
- Introducing a scale for sustainability
- Introducing a progress bar
- Introducing a level system
- Self-visible return protocol
- Persuasive design of the return coupon
- Size finder
- Derive clothing features from size tables
- Comments
- Re-measurement of incoming clothing deliveries and sizes
- Re-use of the delivery box
- Optimal fitting dress size
- Collect points for returns
- Return coupons with collector's value
- Showrooming
- Improved product information
- Comparison with average values
- Avoidance of ordering a product in different sizes

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Project Plan

Time		Autumn 18	Winter 18	X-Mas	Winter II
		August	October	November	December
Strategy	Machine Learning	Optimal fitting size	Optimal fitting size	Optimal fitting size	Optimal fitting size
		Improved product information	Improved product information	Improved product information	Improved product information
		Derive clothing features from size tables	Deriving clothing features from size tables	Deriving clothing features from size tables	Deriving clothing features from size tables
	Persuasive Design		Highlighting of size tables	Highlighting of size tables	Highlighting of size tables
			Improved product information	Improved product information	Improved product information
			Total Delivery	Total Delivery	Total Delivery
	Gamification			Reward for sustainable purchasing behavior	Reward for sustainable purchasing behavior
				Comments	Comments
				Personal Level System	Personal Level System
				Banner for package delivery	Banner for package delivery

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http://www.seewald.at

Persuasive Design

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http://www.seewald.at

Definition

Persuasive design uses conscious design services (Kim & Fesenmaier, 2008) or real goods (Marcuse, 1991) to bring about targeted behavioural changes or influence decisions (Redström, 2006).

„I define persuasive technology as any interactive computing system designed to change people's attitudes or behaviors." (Fogg, 2009)

Based on research done since 1974 by Daniel Kahnemann (Nobel Memorial Prize 2002) & Amon Tversky, and Richard Thaler (Nobel Memorial Prize 2017) on behavioural economics & heuristics and biases in human decision making.

- **Availability:** Overestimating infrequent events that are readily accessible

- **Representativeness:** Categorizing based on similarity to prototype

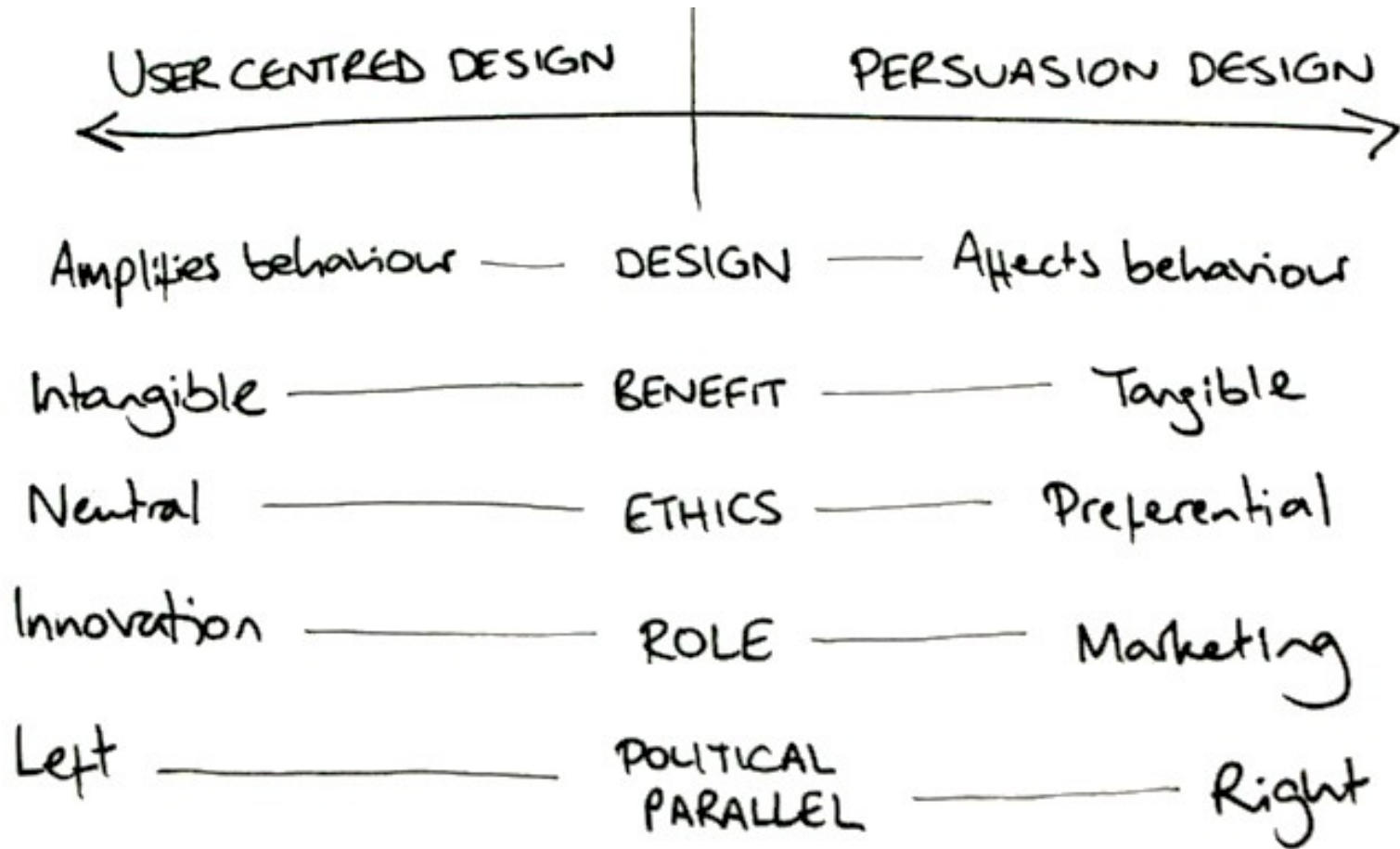- **Anchoring & Adjustment:** When estimating values, start at an easily accessible anchor and adjust from this value

Many other heuristics: e.g. Endowment effect, conjuction fallacy, misperception of randomness, …

In many cases alternative representations of the task can help people make more rational decisions. This is what persuasive design is about.
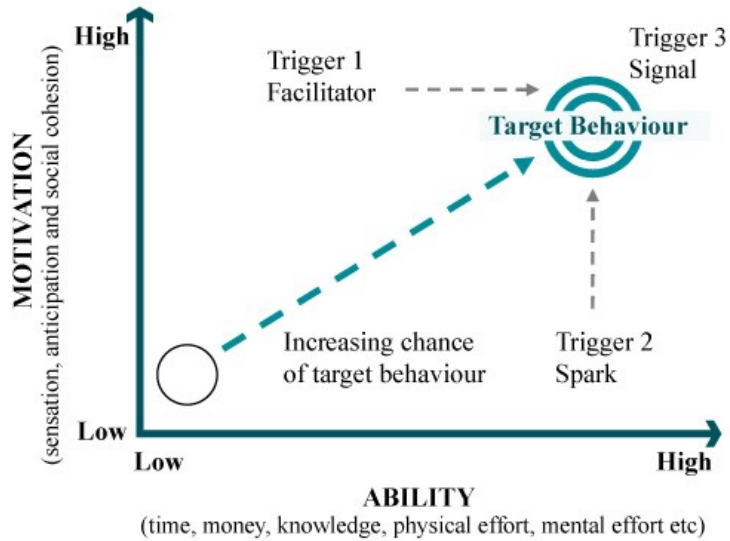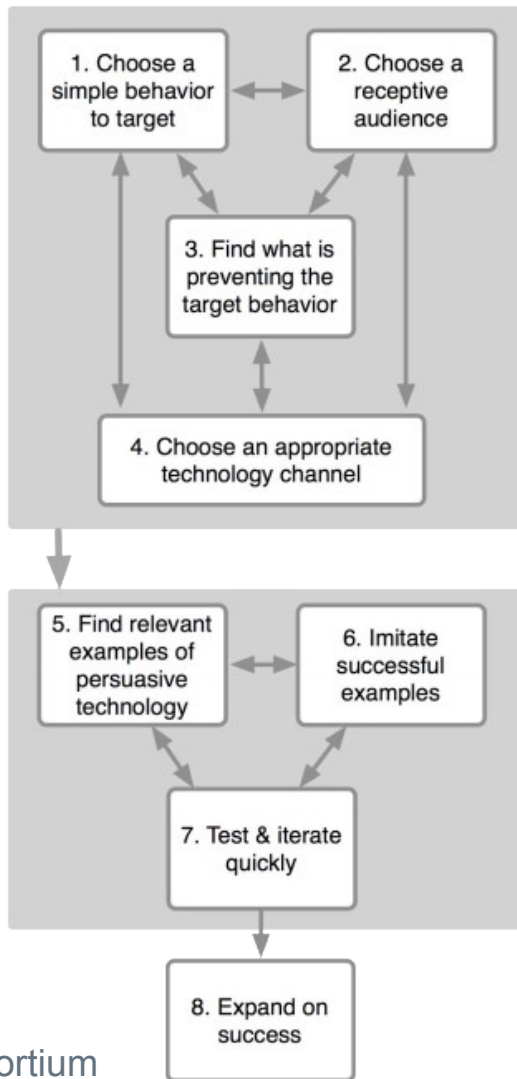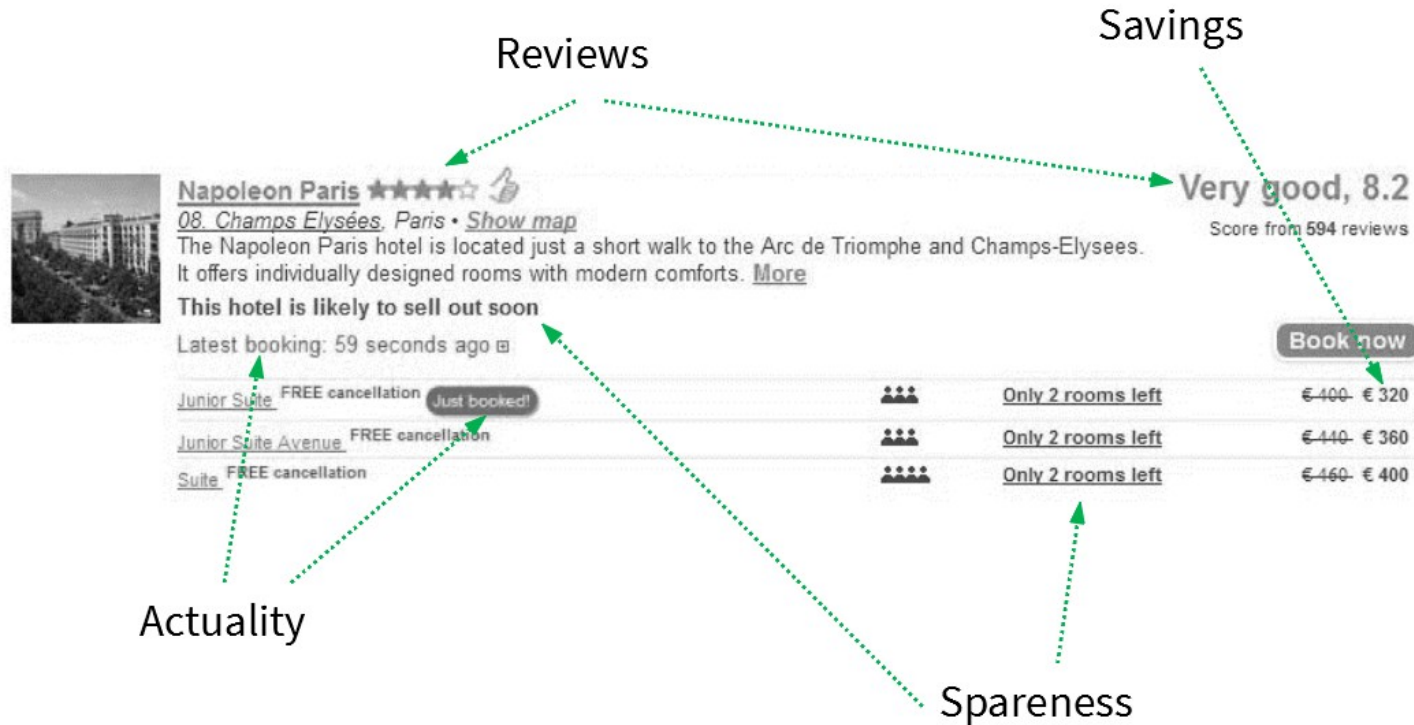
Healey (2011) based on Fogg (2009)

Ø „**Sparks**" are easily accessible and able to achieve positive effects by target need fulfilment (e.g. social acknowledgment, joy, hope)

Ø „**Facilitators**" are intended to facilitate the desired outcome in the case of high motivation but low ability.

Ø „**Signals**" serve as a reminder for users who have the appropriate skills and high motivation, but often forget to act in accordance with their interests.
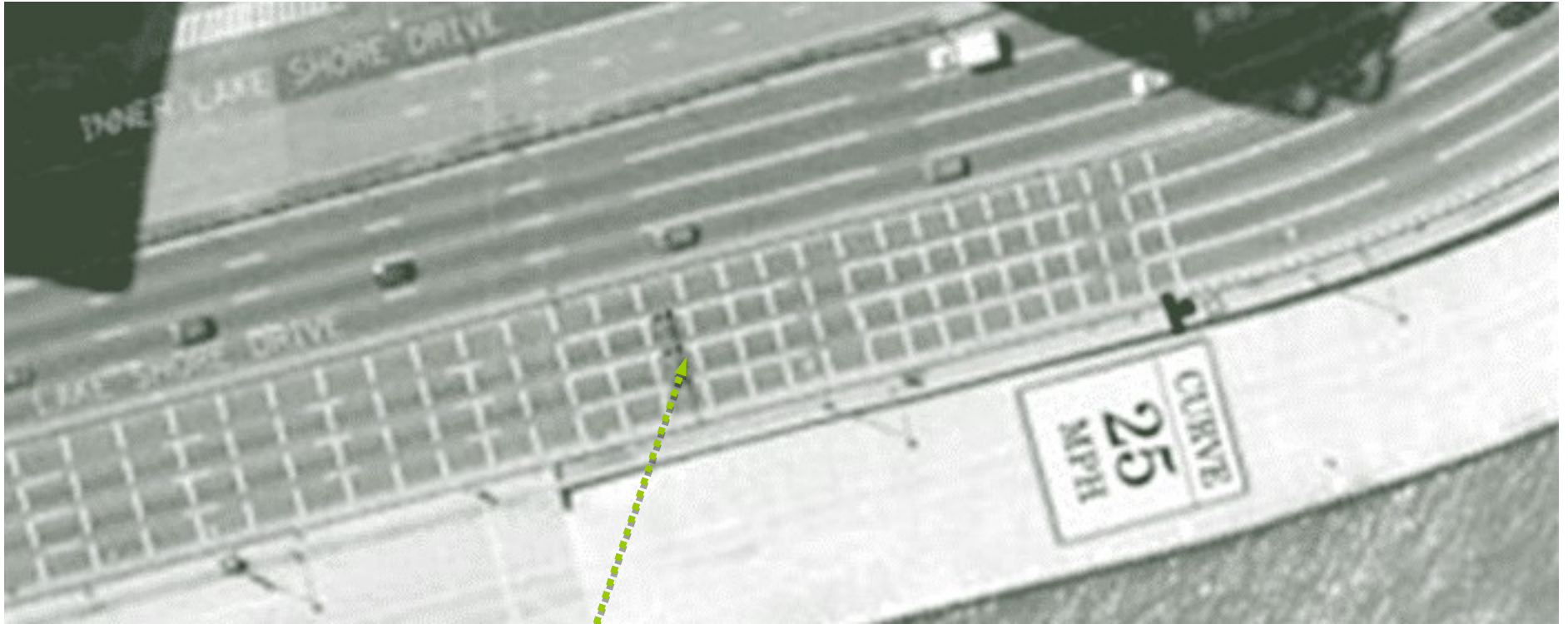
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USER CENTRED DESIGN		PERSUASION DESIGN
Amplifies behaviour —	DESIGN	— Affects behaviour
Intangible ——————	BENEFIT	—————— Tangible
Neutral ——————	ETHICS	—————— Preferential
Innovation ——————	ROLE	—————— Marketing
Left ——————	POLITICAL PARALLEL	—————— Right

Bowles, 2010

1. Choose a simple behavior to target ↔ 2. Choose a receptive audience

3. Find what is preventing the target behavior

4. Choose an appropriate technology channel

5. Find relevant examples of persuasive technology ↔ 6. Imitate successful examples

7. Test & iterate quickly

8. Expand on success

alex@seewald.at
http://www.seewald.at

Example: Hotel Booking

Reviews

Savings

Napoleon Paris ★★★★☆
08. Champs Elysées. Paris • Show map
The Napoleon Paris hotel is located just a short walk to the Arc de Triomphe and Champs-Elysees. It offers individually designed rooms with modern comforts. More
This hotel is likely to sell out soon
Latest booking: 59 seconds ago ⊞

Very good, 8.2
Score from 594 reviews

Book now

Junior Suite	FREE cancellation	Just booked!	▲▲▲	Only 2 rooms left	€400 € 320
Junior Suite Avenue	FREE cancellation		▲▲▲	Only 2 rooms left	€440 € 360
Suite	FREE cancellation		▲▲▲▲	Only 2 rooms left	€460 € 400

Actuality

Spareness

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Example: Sustainability

Direct visualization of progress

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Example: Traffic Safety

Lake Shore Drive Chicago

applied color theory & visual perception

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Bruttopreis inkl. MwSt.   159,80 €
zzgl. Versandkosten   5,95 €

Gesamtsumme   165,75 €
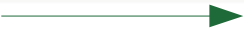
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☐ Newsletter: Ich möchte per E-Mail über Trends und Aktionen informiert werden. Ich bin jederzeit berechtigt, meine Einwilligung gegenüber Grüne Erde GmbH zu widerrufen (datenschutz@grueneerde.at).

☐ Ich habe AGBs , Widerrufsbelehrung und gelesen und Datenschutzerklärung stimme diesen zu.

‹ Zurück

Kostenpflichtig bestellen ›

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Eine Rezension verfassen >

Kundenrezensionen

Die folgende Rezension wurde bisher noch nicht bewertet

★★★★☆ **BH und Unterhosen passend zum Kleid**

von Gisela H. am 24. Oktober 2018 um 10:01 Uhr

Farbe: 19 bordeaux | Größe: 80A

Bequem, guter tragkomfort

> Antwort von Kunzel B. am 25. Oktober um 09:13
>
> Finde ich auch, alles bestens und voll angenehm - ich zieh manchmal gleich zwei übereinander an.

> Antwort von Marion K. am 25. Oktober um 09:15
>
> Ich auch lolz hab immer gedacht ich bin die einzige haha - sau fein!

| Die Rezension war hilfreich für mich | ↰ Antworten |

Die folgende Rezension wurde bisher noch nicht bewertet

★★★★★ **Bequem zu tragen**

von Bettina K. am 24. Oktober 2018 um 04:26 Uhr

Farbe: 01 schwarz | Größe: 80A

Passt gut und ist bequem, drückt, zwickt und verrutscht nicht.

| Die Rezension war hilfreich für mich | ↰ Antworten |

Gamification

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Definition

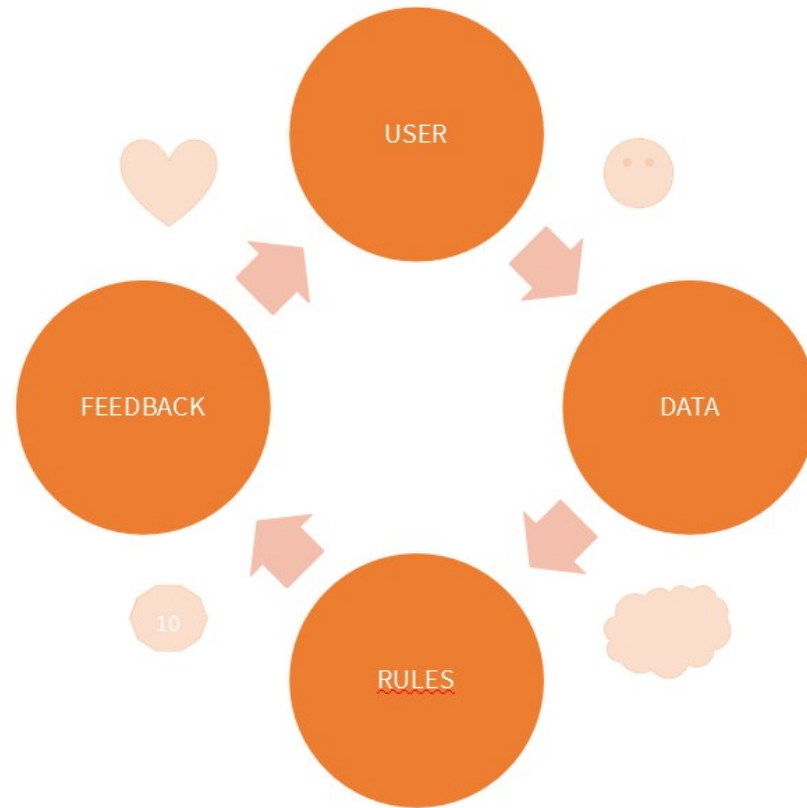„Gamification is the use of elements of game design in non-game contexts" (Deterding, 2011)

Term originally coined by Nick Pelling in 2004, but not widely used until 2010.

Mechanics

Game Mechanics	Human Desires					
	Reward	Status	Achievement	Self Expression	Competition	Altruism
Points	🟢	🔵	🔵		🔵	🔵
Levels		🟢	🔵		🔵	
Challenges	🔵	🔵	🟢	🔵	🔵	🔵
Virtual Goods	🔵	🔵	🔵	🟢	🔵	
Leaderboards		🔵	🔵		🟢	🔵
Gifting & Charity		🔵	🔵		🔵	🟢

Bunchball, (2010)

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Function

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Example: E-Commerce

ebay

Achievements & Avatar

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Example: Mobility

Metro Washington

Visualize as gaming world

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Example: Hotel Booking

Booking.com

& Think!First consortium **Storytelling**

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Philosophie | Über uns | Projekte und Partner | Projekt „Think!First" | **Pflanzen wir gemeinsam einen virtuellen Wald**
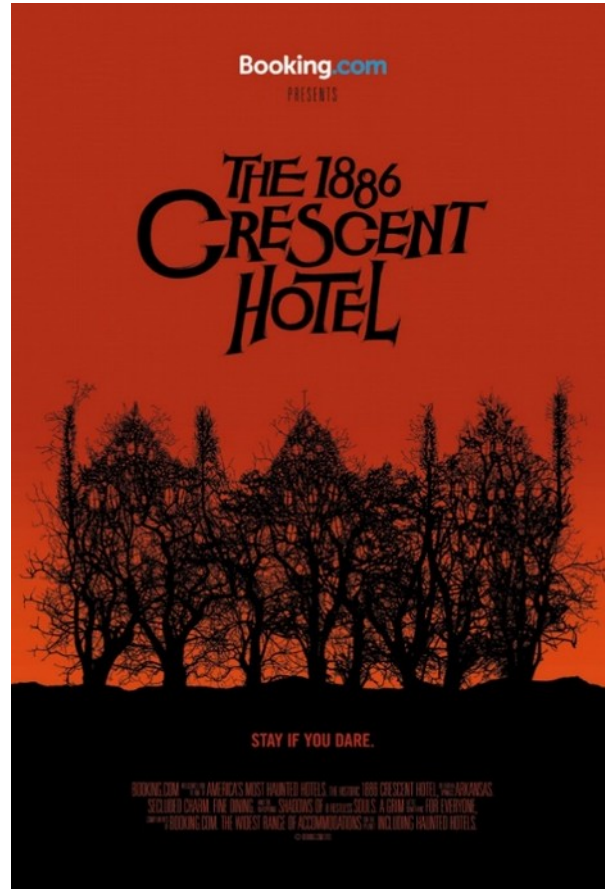
Pflanzen wir gemeinsam einen virtuellen Wald

Durch das ökologische Bestellverhalten von allen Kundinnen und Kunden, entsteht hier ein virtueller Wald – jede ökologisch sinnvolle Handlung lässt einen Baum wachsen.

Aktueller persönlicher Level: Baum So funktioniert's ⌄
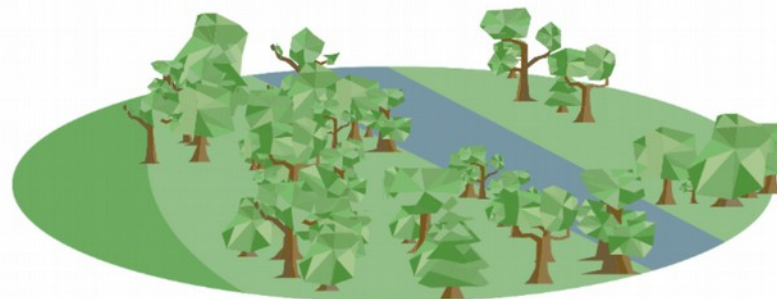
Gutscheine für Grüne Erde-Produkte

Je, nachdem wie groß der Wald schon durch Ihre Zusammenarbeit mit anderen Kundinnen und Kunden gewachsen ist, werden Gutscheine für Gratis-Produkte freigeschalten, welche

Frage?

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73 / 1000 Aktionen	1000 Aktionen	10000 Aktionen
Stufe 1	**Stufe 2**	**Stufe 3**
sanfte Handpflege aus Ziegenmilch	Duftkissen mit Zirbenspäne befüllt	belebendes Duschgel „Spicy Lemon"

Levelsystem

Levels: I: Samenkorn; II: Sämling; III: Jungpflanze; IV: Baum

Sie können noch mehr tun – über Ihren Beitrag zum Wachstum des ganzen virtuellen Waldes hinaus: Begleiten Sie doch Ihr eigenes Samenkorn auf dem Weg bis zu einem ausgewachsenen Baum!

So funktioniert's:

- Bewertungen zu Modeprodukten abgeben, Bewertungen anderer KundInnen bewerten oder auf Bewertungen antworten
- Einen Blick auf die neue Größentabelle werfen und diese für die Einschätzung der eigenen Größe berücksichtigen
- Den Banner, der zur Post-App führt, anklicken und die App ausprobieren, um eigene Sendungen zu verwalten und Pakete umzuleiten

Unsere Partner für den Versand Ihrer Pakete (für Österreich und Schweiz: Post, für Deutschland: DHL) bieten die Möglichkeit zur Sendungsverfolgung und Paketumleitung. Probieren Sie diese Services und sparen Sie durch die Vermeidung von unnötigen Fahrten aktiv CO_2.

Danke für den Hinweis

Machine Learning

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Definition
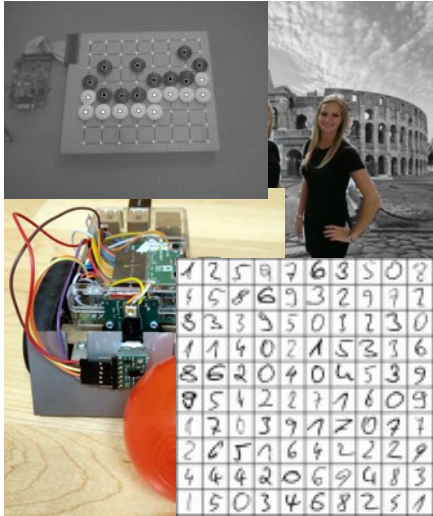
„The field of machine learning is concerned with the questions of how to construct computer programs that automatically improve with experience." (Tom M. Mitchell, 1997)

Major part of Artificial Intelligence since 1959.

Recent successes: Google DeepMind AlphaGo, Tesla self-driving cars, Speech recognition, OCR, DeepL text translation, ...

Two known problems causing returns*

- Inconsistent size data within and between manufacturers
- Incorrect estimates of fitting sizes by buyers

We created suitable learning systems to correct both errors from historical buying behaviour and other data sources. This correction is transparent to the user.

* K. Kristensen, N. Borum, L.G. Christensen, et al. Towards a next generation universally accessible online shopping-for-apparel system. In Human-Computer Interaction, Volume 8006, Lecture Notes in Computer Science, pp.418-427. Springer, 2013.

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Can returns be reduced (e.g. by 10%) via trivial means?
(based on project partner's dataset with several million samples over several years)

Ban 0.17% of customers and sell 4.31%* less

Delist 1.13% of products and sell 13.46%* less
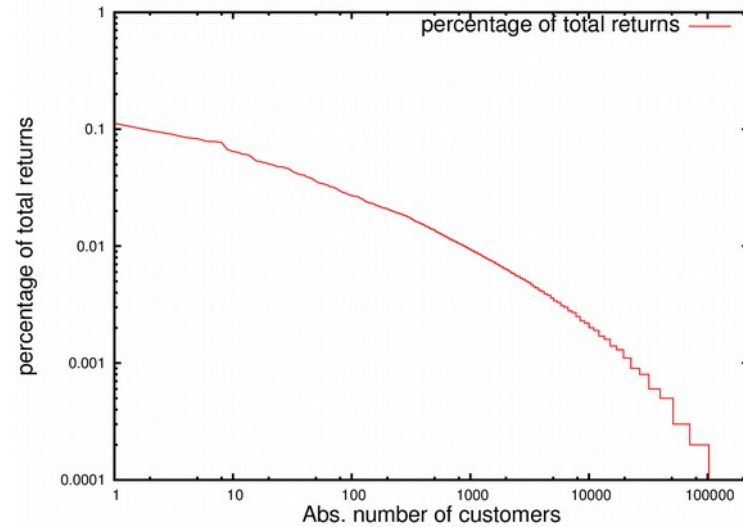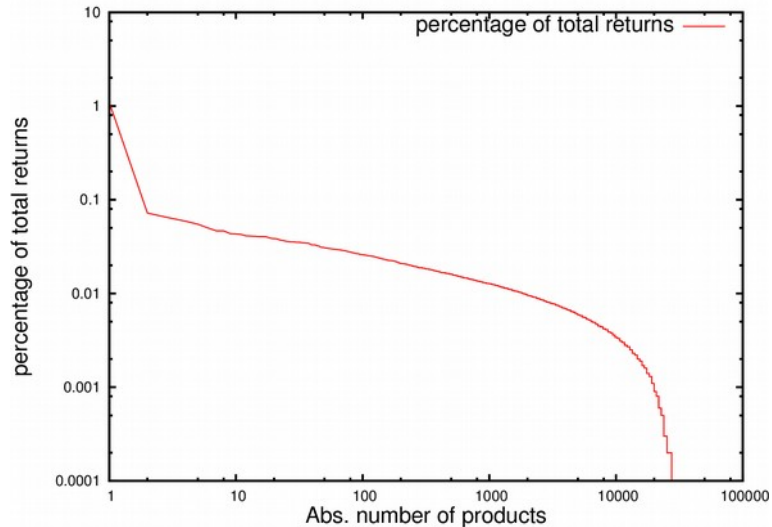
Assuming perfect oracle to predict beforehand which products/ customers to ban/delist (est. from historical data)

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Product sales, returns, return rate (grouped by customers)
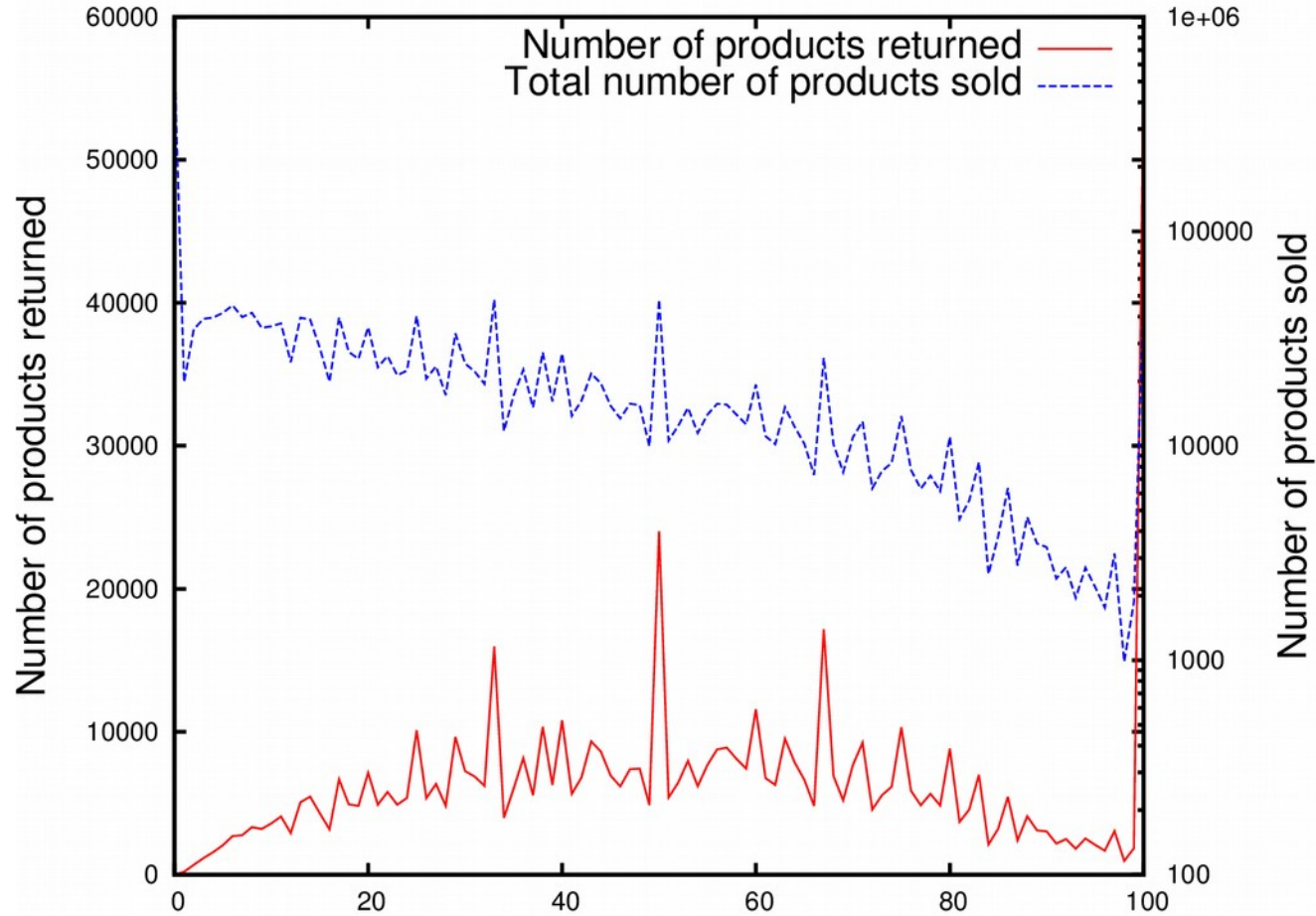
Product sales, returns, return rate (grouped by products)

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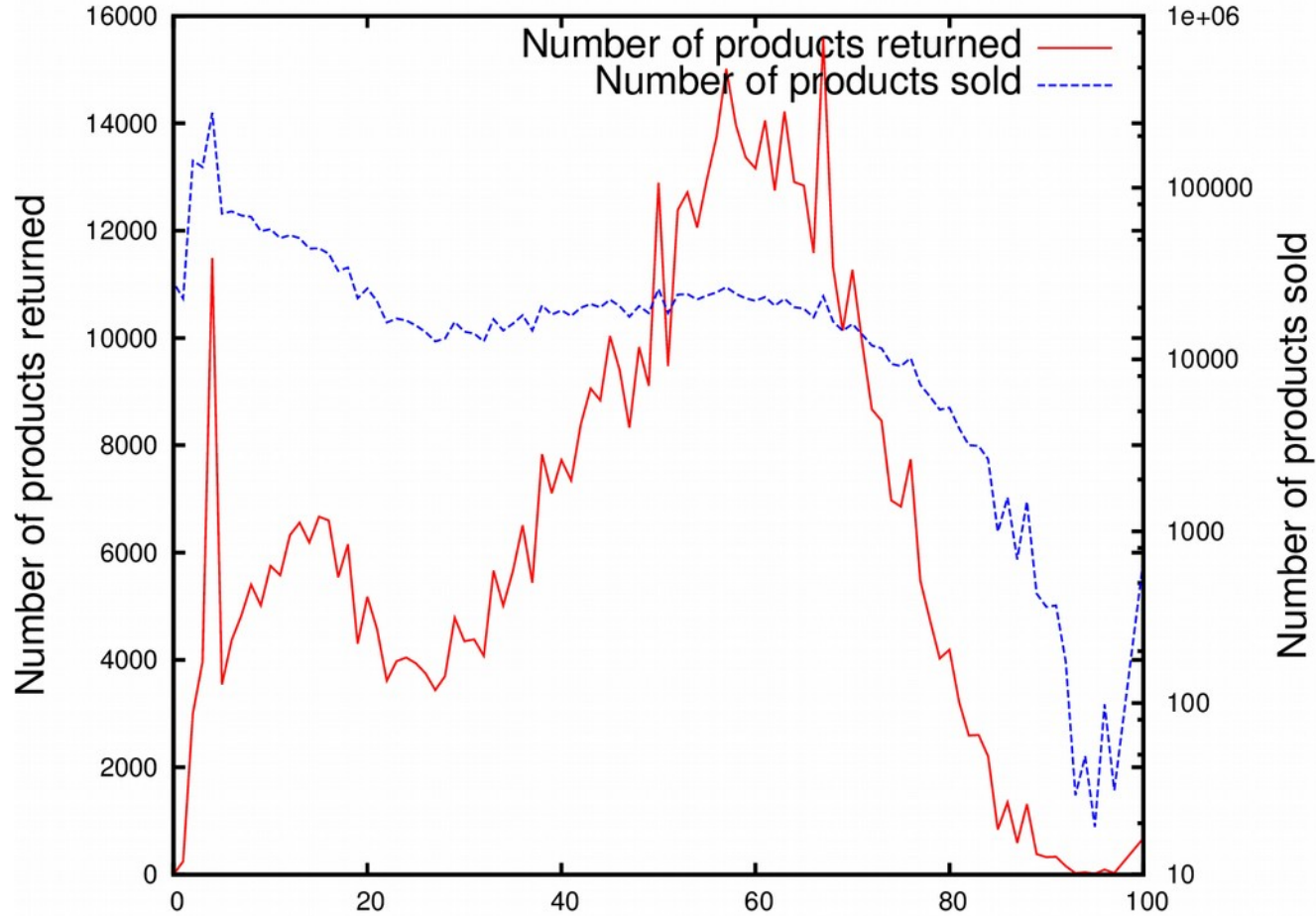
Size Information

- Just providing better size information to customers can lower returns significantly (up to 46%)*

- Qualitative size information such as figurative, figure-accentuating, casual and straight *may* be more useful to communicate size categories than the more commonly used quantitative size information.

We are evaluating both approaches. Note that manufacturers' size bias could be completely removed by producing garments without size information and remeasuring each piece.

* Singh, K. (2015). Reducing Customer Returns in an Online Marketplace. Dept. of Fashion Technology. National Institute of Fashion Technology, Mumbai, India.

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Removing too good to be true features

- Incomplete and outdated data dictionary!

- How to exclude features that are changed due to returns?

```
(Warenausgang.rueckgeliefert_day >= 1) => class=1 (632724.0/0.0)
=> class=0 (1823351.0/6186.0)
```

99.97%(!) accuracy, prec. = rec. = F0 = AUC = 1.0

Successively removing possibly spurious highly predictive attributes (tr3-tr11) as estimated by RIPPER & logistic regression

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Dataset	#F.	Prec.	Rec.	F_0	AUC
tr3	154	0.813	0.821	0.817	0.840
tr4	150	0.866	0.590	0.706	0.790
tr5	149	0.798	0.772	0.785	0.820
tr6	145	0.822	0.862	0.842	0.857
tr7	303	0.865	0.898	0.881	0.917
tr8	290	0.784	0.827	0.805	0.830
tr9	283	0.765	0.793	0.779	0.792
tr10	282	0.765	0.794	0.779	0.794
tr11	237	0.768	0.789	0.778	0.789
tr11_17	237	0.767	0.775	0.771	0.769

Selected Rules

```
(VKA.ARSeit_month >= 4) and (VKA.VK_PreisA >= 49.9) and (VKA.WarennummerCode <=
62069090) => class=1 (7573.0/1469.0)
```
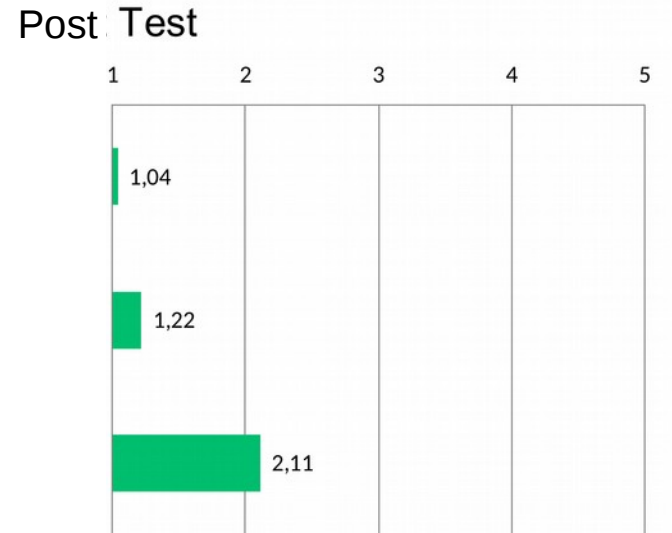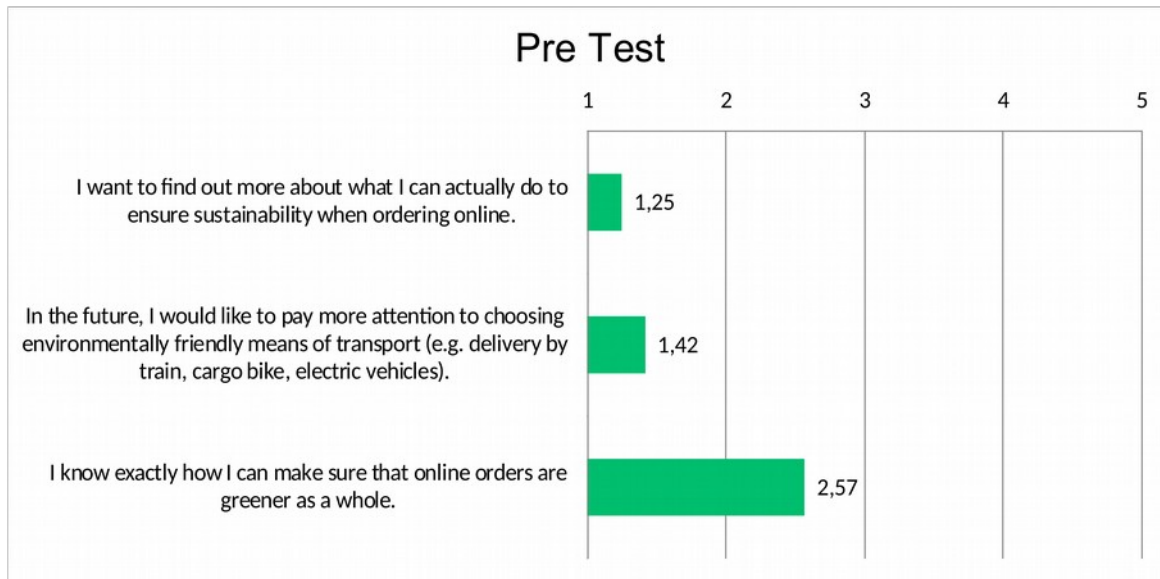
- Available in online shop since April
- Sales price at least 49.9 EUR
- Product group code less than 62069090
- 80.61% returns in this subgroup

```
(VKA.WarennummerCode >= 40169997) and (Auftrag.ErsterVersPlan_weekday = Do) and
(Auftrag.LieferAdresseFl = 1) => class=1 (107.0/13.0)
```

- Product group code at least 40169997 (exludes free product giveaways)
- Planned to be sent out on a Thursday
- Sent via express delivery
- 87.86% returns in this subgroup

alex@seewald.at
http://www.seewald.at

Conclusion

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Test users self-report that they are now better informed

Pre Test

| | 1 | 2 | 3 | 4 | 5 |

- I want to find out more about what I can actually do to ensure sustainability when ordering online. — 1,25
- In the future, I would like to pay more attention to choosing environmentally friendly means of transport (e.g. delivery by train, cargo bike, electric vehicles). — 1,42
- I know exactly how I can make sure that online orders are greener as a whole. — 2,57

Post Test

| | 1 | 2 | 3 | 4 | 5 |

- 1,04
- 1,22
- 2,11

N=70, 1=high approval

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Discussion

- Preliminary results indicate that users who chose to test the modified webshop have roughly twice(!) the average returns rate outside the test period. This makes analysis of the results much more complex. Double-blind random trials would have prevented this, however according to EU GDPR storage and processing of personal data must be confirmed by the user.*

- It is somewhat surprising that products base data features appear so prominently in the ruleset. This may indicate that products-specific features rather than customer/article relations drive returns.

- Final results will be posted on our blog by end of April
  https://www.thinkfirst.blog/en/

* We still could have sent half of the test users to the original website, but this would have reduced the sample size significantly.

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alex@seewald.at
http://www.seewald.at

Thank you!

Questions?

alex@seewald.at
http://www.seewald.at