

Add a personalization touch

Mices 2022
@a2lean

Hallo 🙌

Vincent Bosc and **Aline Paponaud**

Adelean:

- Experts in **Search** Technologies
- **Integrators** of **Elasticsearch** and **Solr**
- **Consulting, Services** and **Training** providers
- **Developers** of **a2** – your Search Engine Technology for E-Commerce and Enterprise Search





WHAT?

WHY?

BUT!

HOW?

...And an example 



WHAT ?

(What is search personalization)

“Personalized search refers to web search experiences that are tailored specifically to an individual's interests by incorporating information about the individual beyond the specific query provided.”

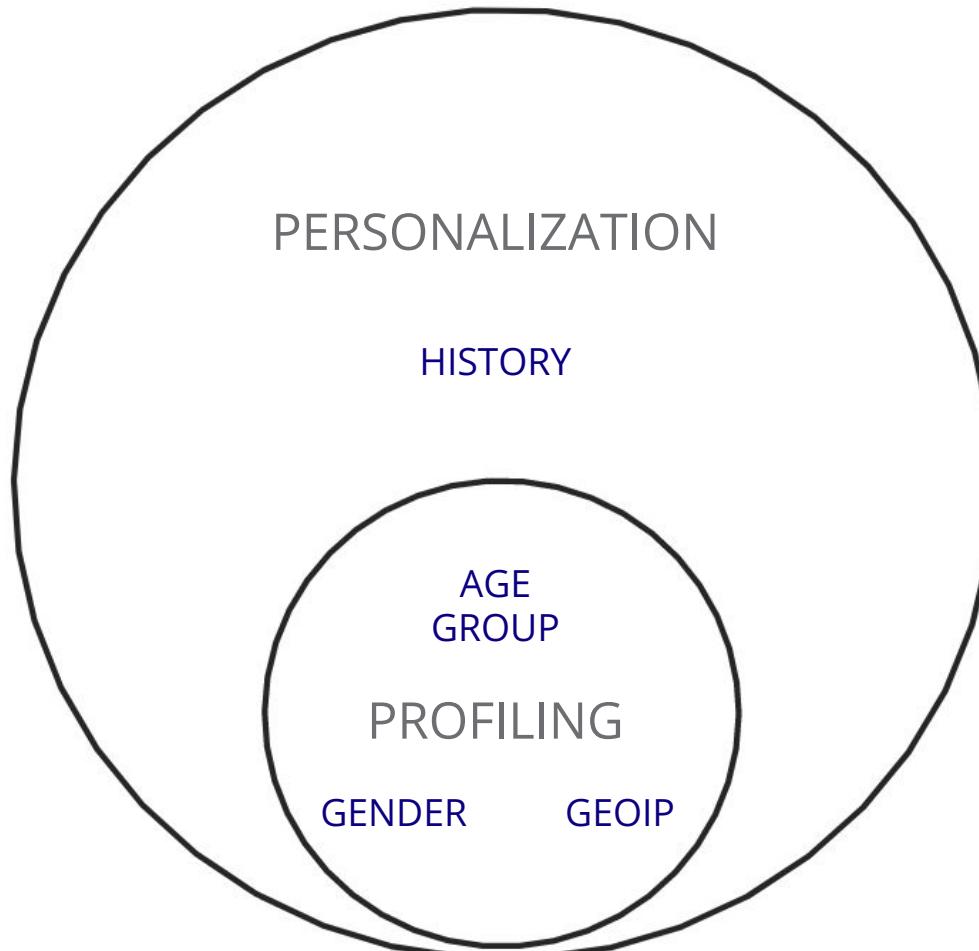
Wikipedia



Customization



Personalization



My Stuffy Friend



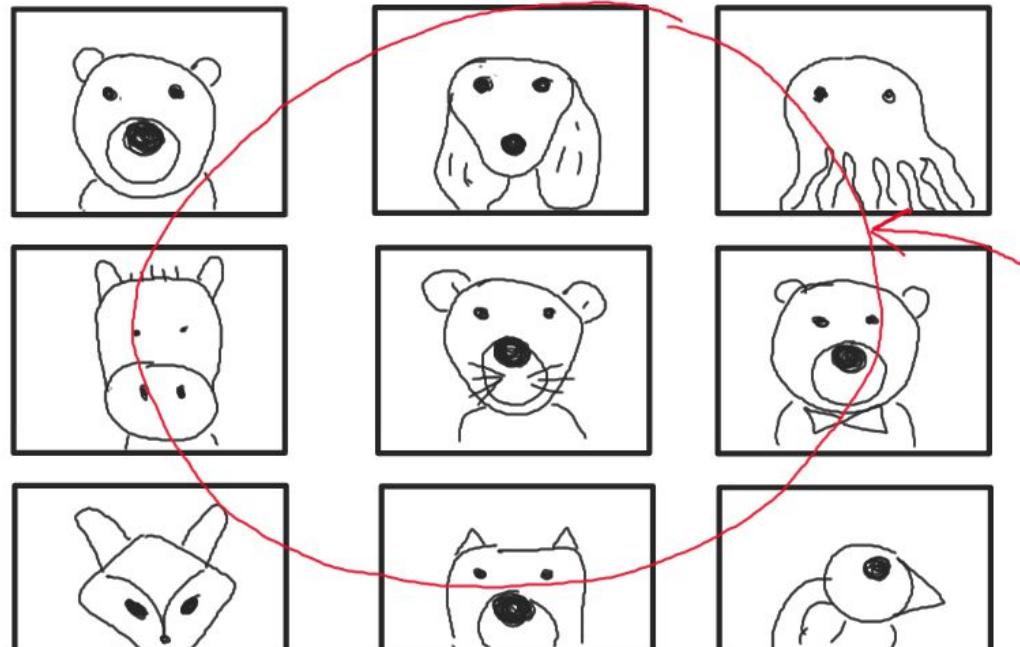
FILTERS

Brand

- Jelly Dog
- Plush One
- Teddy Teddy
- Soft Bear

Animal

- Bear
- Cat
- Dog
- Elephant
- Rabbit
- Squirrel



HERE

HERE

THERE



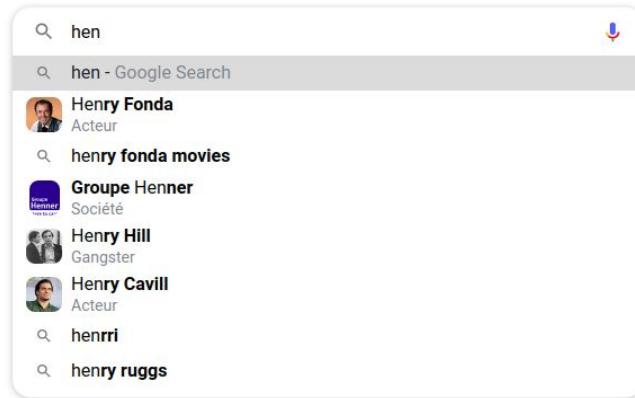
12 angry men



SAME SESSION



Google



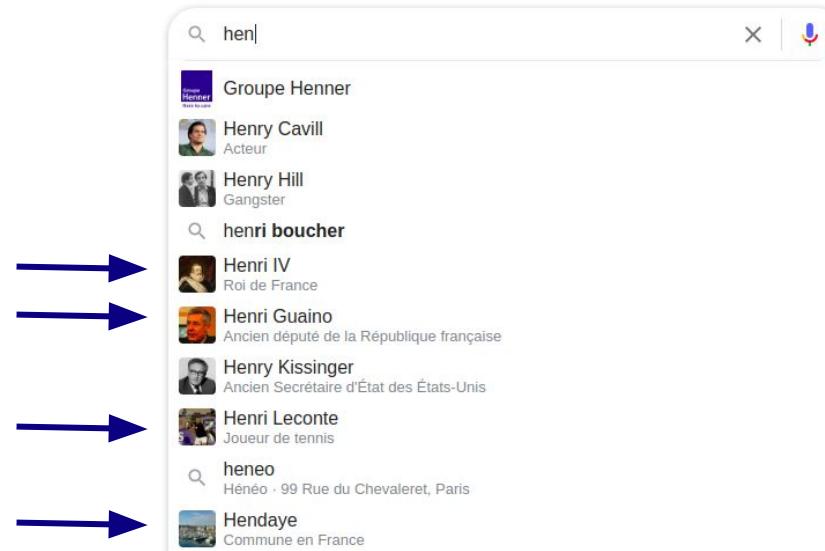
hen

- hen - Google Search
- Henry Fonda
Acteur
- henry fonda movies
- Groupe Henner
Société
- Henry Hill
Gangster
- Henry Cavill
Acteur
- henri
- henry ruggs

OTHER SESSION



Google



hen

- Groupe Henner
- Henry Cavill
Acteur
- Henry Hill
Gangster
- henri boucher
- Henri IV
Roi de France
- Henri Guaino
Ancien député de la République française
- Henry Kissinger
Ancien Secrétaire d'État des États-Unis
- Henri Leconte
Joueur de tennis
- heneo
Hénéo - 99 Rue du Chevaleret, Paris
- Hendaye
Commune en France



WHY ?

(Well we kind of like it)

Businesses like personalization

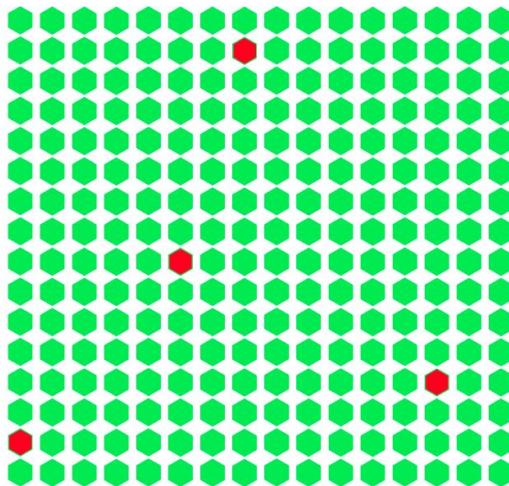
- According to **Adweek**, marketers say personalization can raise revenues by up to **15%**
- One to one **pricing** personalization improves profits by **7.6%** (Scala 1996)
- Content-targeted **emails** can increase the click-throughs up to **62%** (Ansari and Mela 2003)



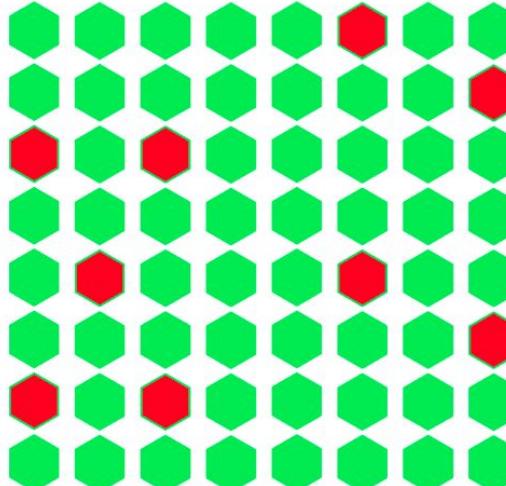
It's great here!
He remembers
what I prefer.

Reduce choice for users

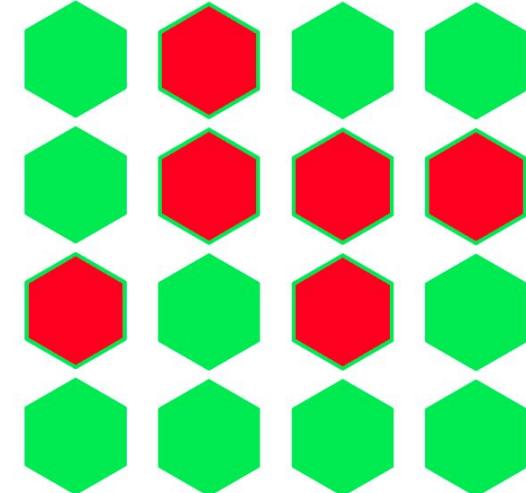
Without Search



With Search



With Personalized Search



 Interesting item for client

Disambiguation

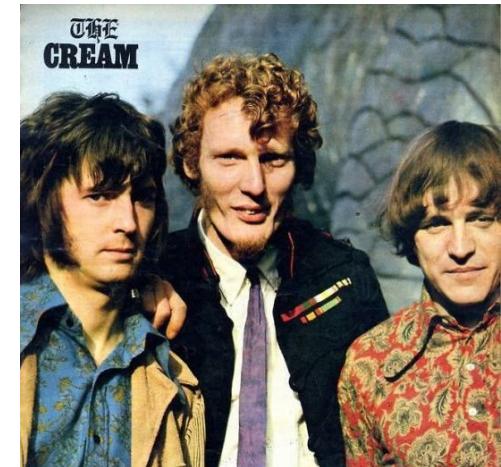
“CREAM”



OR



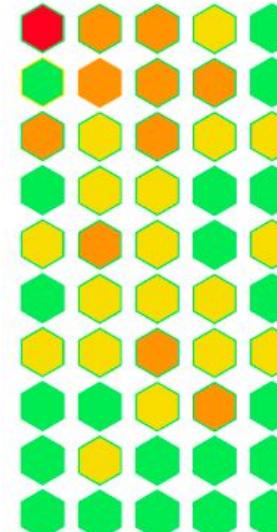
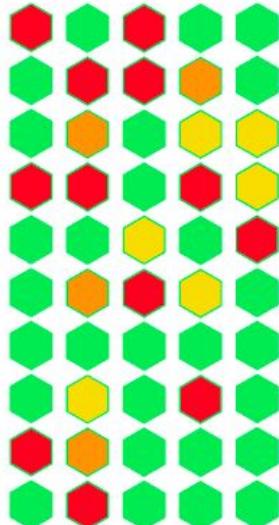
OR



Spread results

Queries that receive clicks on many items across all users benefit more from personalization

Will personalization improve these queries ?





BUT

(There are many challenges)

“A query a user comes with usually has so much context that the opportunity for personalization is just very limited.”

Pandu Nayak (Google)

Complexity

- **Quality data** is needed
- How much personalization do you incorporate in your formula ?
- **Testing** is very difficult
- Same problems than **recommender systems**:
 - Cold start
 - Remove popular products from formula
 - Echo chamber, Filter bubble
 - Users sharing account in home

Privacy

27% of people find search personalization too invasive



64% reported that they felt uncomfortable because they didn't knowingly provide the data the brand used



How can he
know all that
about me? is
he stalking me?



Storing personal data

Personalization based on **short-term history** or **within-session** behavior is shown to be **less valuable** than long-term or across-session personalization

- Privacy implications of storing long user histories
- Massive personal data sets can be quite **costly**

Solutions

- Transparency
- Honesty
- Use only **your own data**
- Give the possibility of privacy to users



HOW

(at an organization level and technically)

“Any organization that designs a system
(defined broadly) will produce a design
whose structure is a copy of
the organization's communication structure.”

Melvin E. Conway – Conway's law

DATA SCIENTISTS

SEARCH ENGINEERS

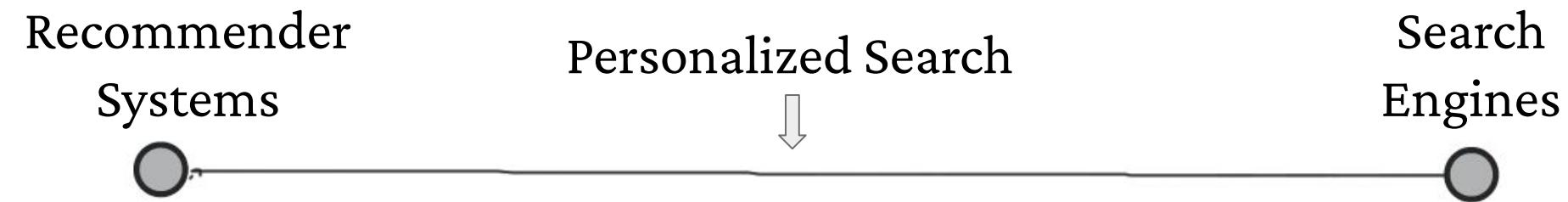
CITY

TOWN



Monthly
meeting





SEARCH ENGINEER

DATA SCIENTIST

PERSONALIZED SEARCH

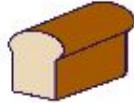
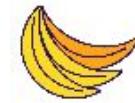
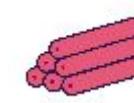
Two main techniques

- Additional **boost** in your query (or filter)
- **Reranking** top N results

Collecting the data

- **Straight questions** to customer
- **Demographic information** (age, gender, geoip)
- Track **customer behavior**:
 - Search terms
 - Add to cart
 - Clicks on results
 - Clicks on facets

Collaborative Filtering

						
			✓			✓
			✓	✓		
		✓				✓
	✓					✓

Additional boost

```
{  
  "id_item": "14322312"  
  ....  
  "liked_by_persona": ["hardrock_fan"]  
}
```

```
{  
  "query": {  
    "function_score": {  
      "query": { -- INITIAL QUERY -- },  
      "functions": [  
        {  
          "filter": {  
            "terms": {  
              "liked_by_persona": [  
                "hardrock_fan",  
                "vegan"  
              ]  
            }  
          },  
          "boost_factor": 1.2  
        }  
      ],  
      "boost_mode": "multiply"  
    }  
  }  
}
```

ML reranking

- Create your model with user features
- Personalized **Learning to Rank**
 - Ranknet → LambdaRank → LambdaMART (Ranklib implementation)
 - LTR with user features
- Rerank **top n** results
- Trade Off **Efficiency vs Relevancy**
 - Size of n
 - Lower the number of features

How to test

- AB tests
- Replay sessions
- Check that users are not leaving your site

Personalized search in Carrefour France



 A2
ADELEAN
SEARCH
PLATFORM

1M
USERS

70
BOOSTS
OVER
FREQUENT BUYS

30K
PRODUCTS

Frequently bought items

```
{  
  "id_user" : "4158415",  
  "frequently_bought_items" : [  
    {  
      "ean" : "3257971309114",  
      "quantity" : "24.0"  
    },  
    {  
      "ean" : "3533630098293",  
      "quantity" : "18.0"  
    },  
    {  
      "ean" : "3245413442338",  
      "quantity" : "18.0"  
    },  
    {  
      "ean" : "3270190025337",  
      "quantity" : "18.0"  
    },  
  ]  
}
```



milk



PRODUCT	Initial score	Modified score
	45,5	45,5
	43,1	43,1
	44,2	44,2
	42,2	47,2



Personalized search in Carrefour France



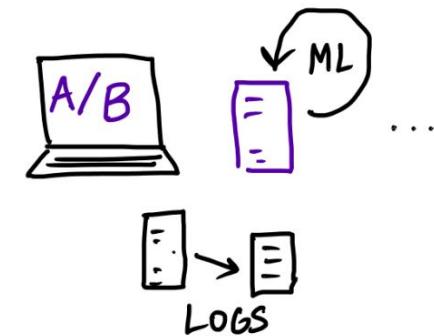
Personalized search in Carrefour France



PEOPLE MEET MORE

DATA RETRIEVAL
ALGORITHMS

ROADMAPS CONVERGE
SUGGESTIONS
BOOSTS, MONITORING



NEW TOOLS AND SOLUTIONS

Takeaways

What: adding **individual data** in a search request to make it more relevant

Why: we find what we want, **faster** and without effort

But: it's a complex **challenge** and respect of **privacy** can't be ignored

How: **mix** data scientists and search engineers, **add** data at indexing or search steps, and **test**

Add a personalization touch

Thank you

Questions / Feedback / More ...

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<http://www.linkedin.com/company/adelean>

<http://www.meetup.com/fr-FR/search-and-data>

