

Add a personalization touch

Mices 2022
@a2lean

Hallo 🖐️

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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



adelean
EXTRACT TRANSFORM 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.”

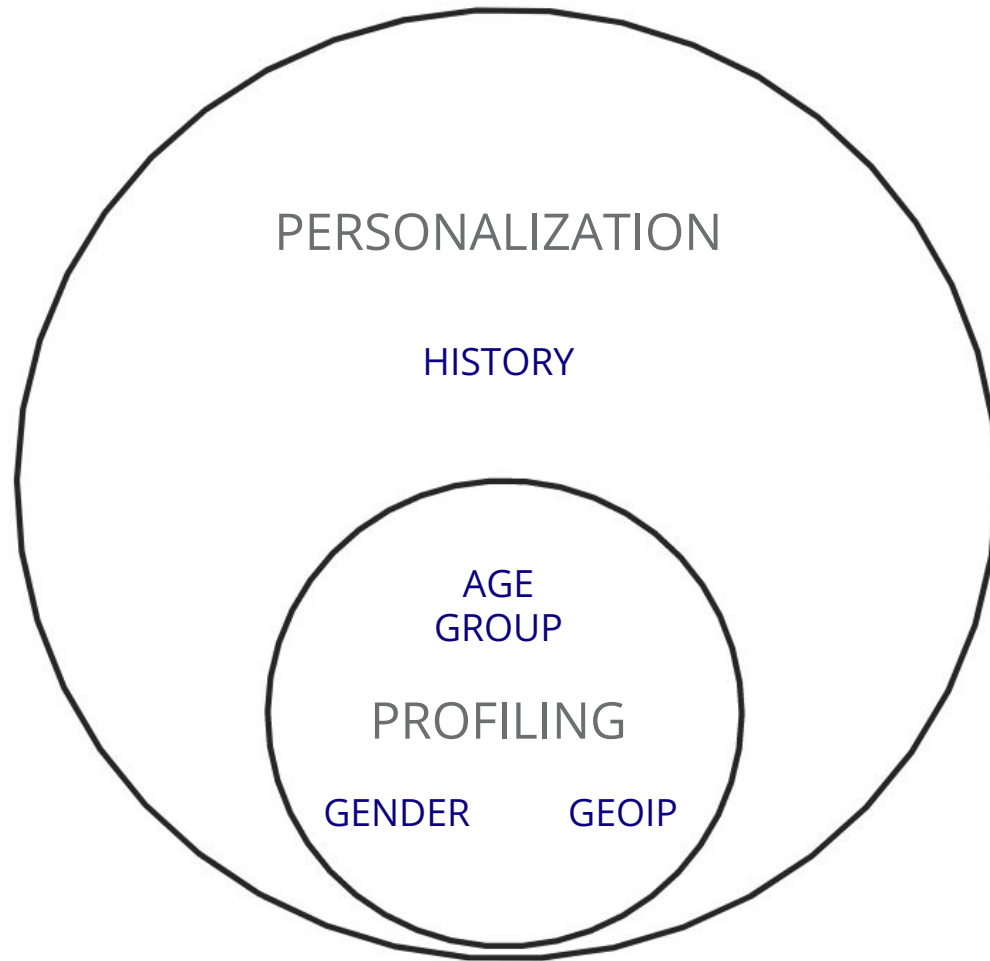
Wikipedia



Customization



Personalization



My Stuffy Friend



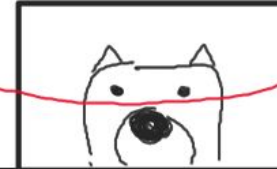
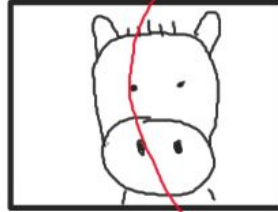
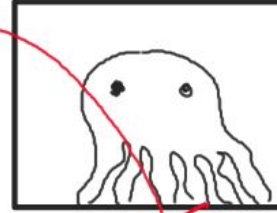
FILTERS

Brand

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

Animal

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



HERE

THERE

HERE



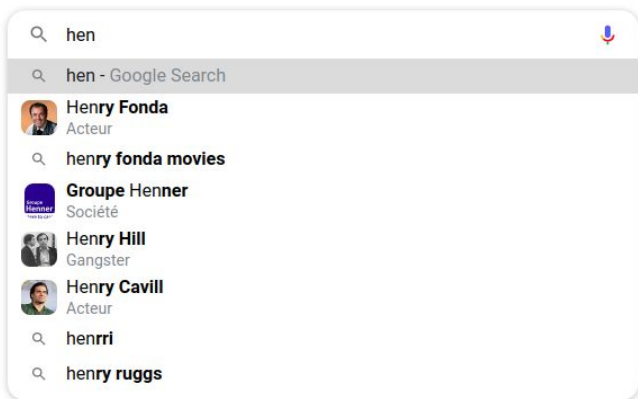
🔍 12 angry men



SAME SESSION



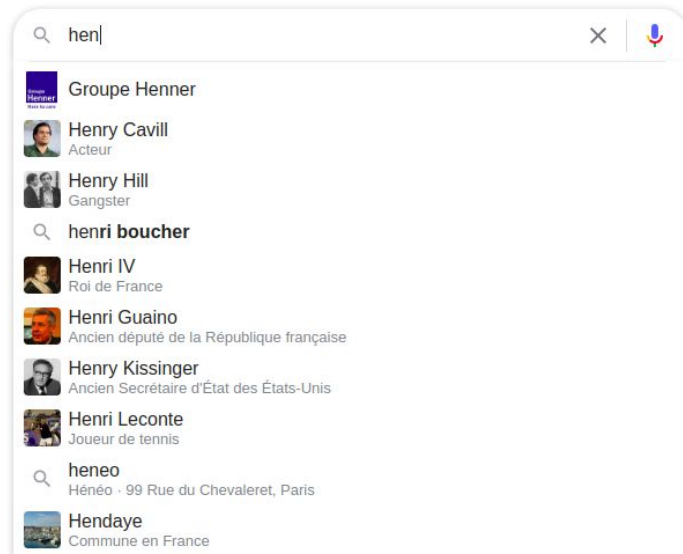
Google



OTHER SESSION



Google



WHY ?

(Well we kind of like it)



Businesses like personalization

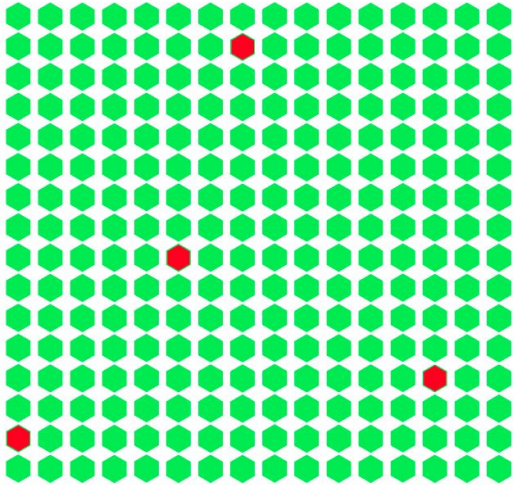
- According to **Adweek**, marketers say personalization can raise revenues by up to **15%**
- One to one **pricing** personalization improves profits by **7.6%** (Scala 1996)
- Content-targeted **emails** can increase the click-throughs up to **62%** (Ansari and Mela 2003)



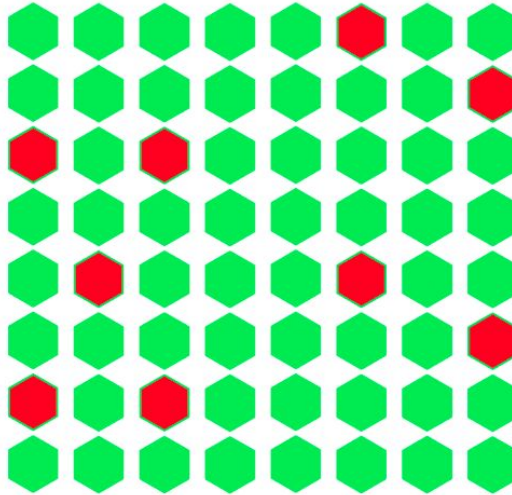
It's great here!
He remembers
what I prefer.

Reduce choice for users

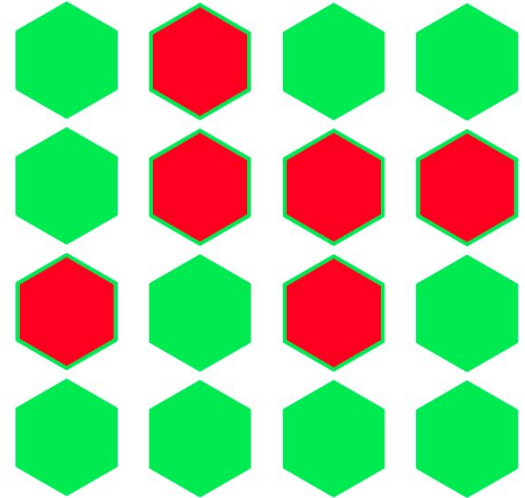
Without Search



With Search



With Personalized Search



Interesting item for client

Disambiguation

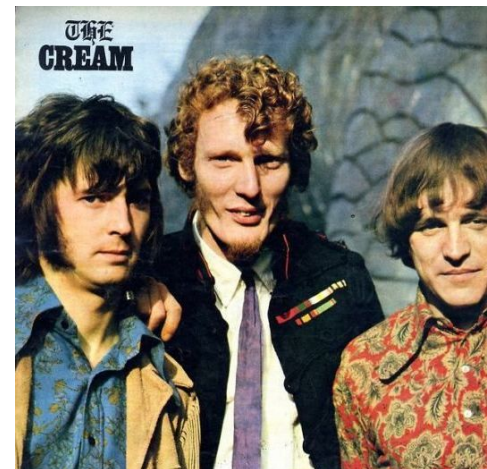
“CREAM”



OR



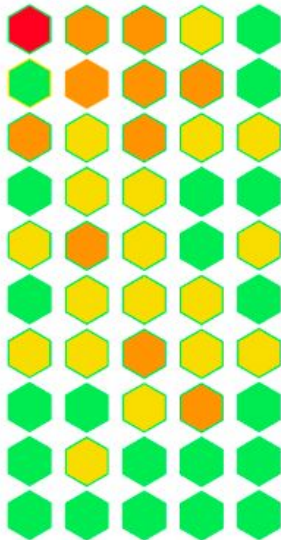
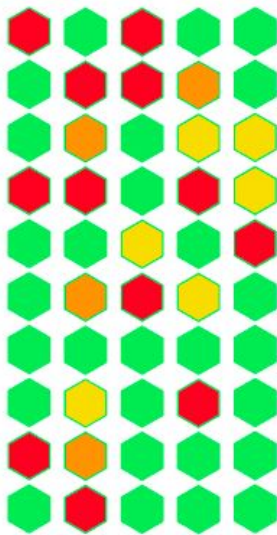
OR



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)

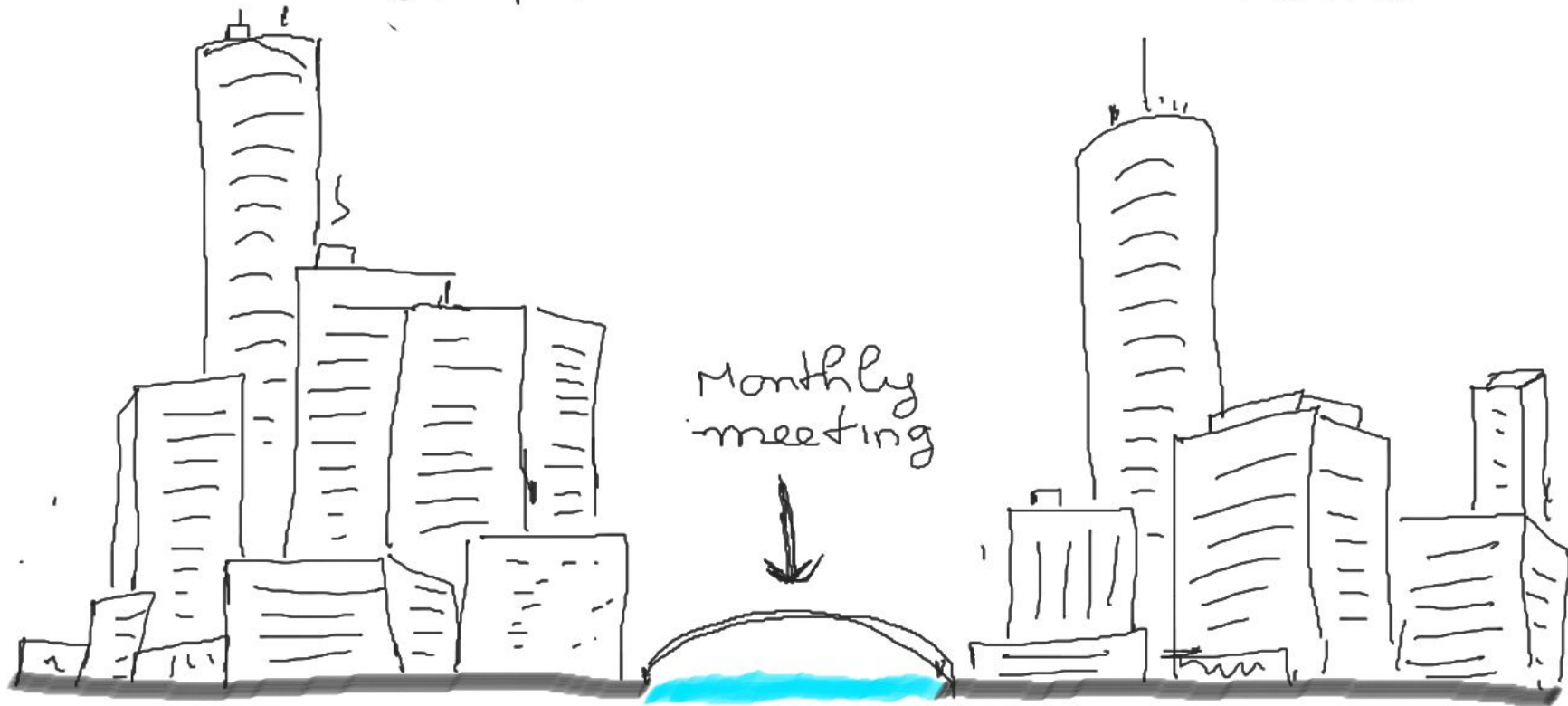


“Any organization that designs a system
(defined broadly) will produce a design
whose structure is a copy of
the organization's communication structure.”

Melvin E. Conway – Conway's law

DATA SCIENTISTS
CITY

SEARCH ENGINEERS
TOWN



Recommender
Systems

Personalized Search

Search
Engines



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"
    }
  ]
}
```

 × Q

| 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



DATA SCIENTIST



SEARCH ENGINEER

Personalized search in Carrefour France

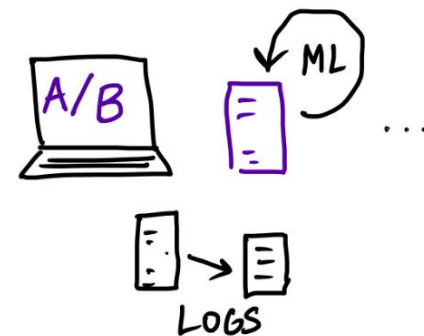


PEOPLE MEET MORE

DATA RETRIEVAL
ALGORITHMS



SUGGESTIONS
BOOSTS, MONITORING
ROADMAPS CONVERGE



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.meetup.com/fr-FR/search-and-data>

