

Building a thesaurus for product search in ecommerce



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From Magento Elastic Suite to PCU

04/07/2017, RISE CAEN



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Overview

- **Why product search ?**
- **Now - Magento Elastic Suite primer**
- **How MES Thesaurus answers ecommerce-specific needs**
- **Tomorrow - PCU : Machine Learning for ecommerce**
- **Questions**

The speaker

- **Marc Dutoo, R&D projects lead at Smile, the leading EU Open Source service provider**
- **PCU project coordinator, Data / API / Cloud expert**



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Why product search ?



Why product search ?

- In ecommerce, search is very important



- Typically **60%** of product buys come from it, and only 40% from category / shelves browsing...
- but their management cost doesn't reflect that !
- A specific, very concrete criteria of search results being right or wrong : whether the customer **buys** its products.
- This financialy incentive curbs everything:
 - Autocompletion is paramount
 - Boosting search fields
 - Scoring searched products
 - Rescoring results
 - Enriching results
 - ...thesaurus building





Never empty results

- Never empty results



- In other search domains, for instance knowledge management or entreprise search, an empty result is a good answer, meaning that the knowledge or document is not yet there and adding it would be an improvement
- But in ecommerce, there should never be 0 result, because the customer must **never be in a dead end**

- => “push” generic, “hot” products to the customer : most viewed, most bought, discounted, newest, available, hot brands...

- branches out to recommendation algorithms (the other axis of ecommerce)

- But also curb search algorithms to have as wide returns as possible

- correction, query expansion i.e. **thesaurus**





Products differ widely across domains

- A lot of **different features** across categories
 - Books : only author, editor
 - Smartphone : size, camera resolution, memory, network, color...
 - Overall, 80 distinct filters are used in 800 mo page view logs
 - Product categories also can be searched
 - And always : price, discount, but also brand, availability, store, description...
- Whose contribution to search varies. Ex. description is often **too wide** :
 - Book description : can cover as many topics as book do
 - T-shirt description : “this blue t-shirt goes very well with yellow trousers”
- The solution
 - Search in all fields, but allow filtering those specific fields => combined search + filters functionality
 - And allow to configure **separately** how each field / feature contributes to search results : boost title, don't look in book description...



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Now – Magento Elastic Suite primer



Now – Magento Elastic Suite primer

- **Magento** : leading Open Source ecommerce platform
- **ElasticSearch** : Open Source distributed search platform and ecosystem, easy to set up and integrate in business applications, built on Apache Lucene
- **Magento Elastic Suite** (MES) : Open Source “searchandising” solution by Smile, the leading Open Source solution provider in Europe

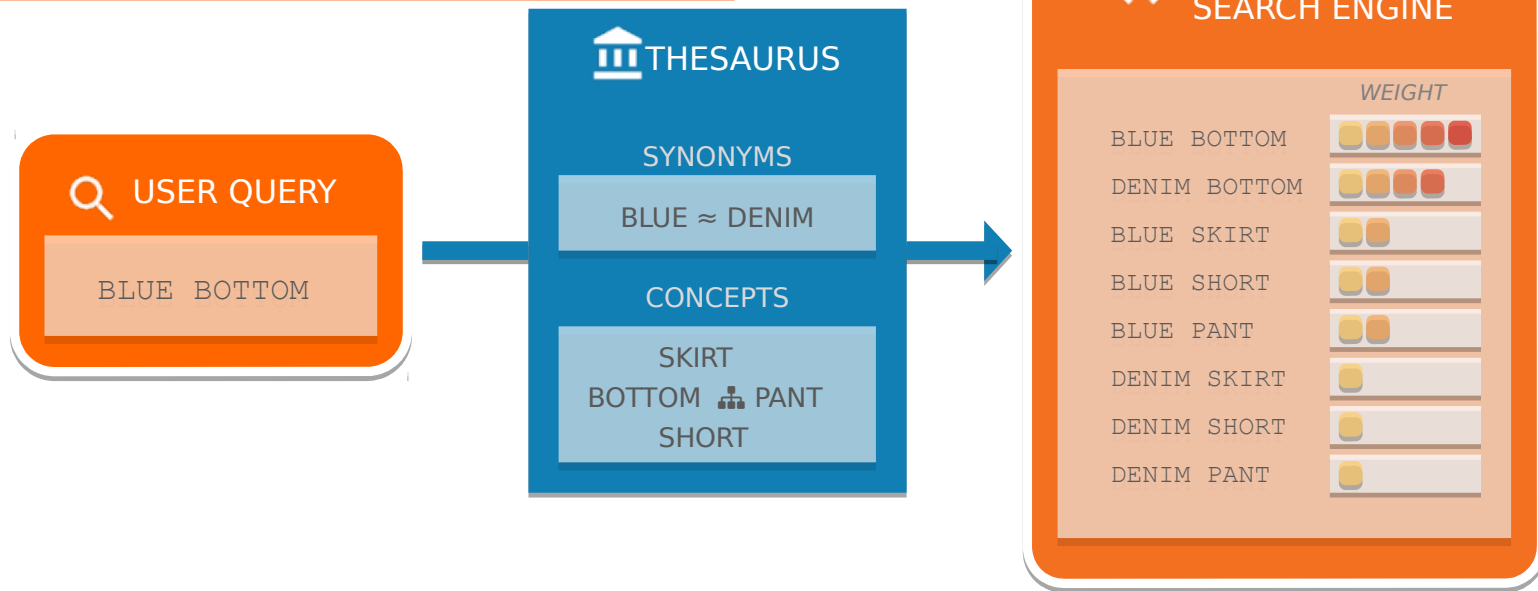
- Searchandising : mixes search and product selling optimisation techniques and marketing

- **Features :**

- Search (field boost, thesaurus...)
- Facettes (i.e. filters)
- Merchandising (product placement...)



MES THÉSAURUS



Des règles sémantiques pour optimiser le moteur de recherche

- Définissez des synonymes et des concepts adaptés à votre catalogue produit
- Le moteur de recherche utilise ce thésaurus pour créer des requêtes voisines de la requête de l'utilisateur

Tous les résultats sont consolidés en utilisant un poids adapté

General Information

Thesaurus Name *

Colors

Store *

All Store Views
Main Website
Main Website Store
Default Store View



Thesaurus configuration

Column	Synonym terms	Action
	<input type="text" value="blue,denim"/>	
	<input type="text" value="rose,fuchsia"/>	

MES Thesaurus, for ecommerce specific needs



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MES Thesaurus – practical examples

- **color** : denim, sky blue, cyan... : thesaurus of blue
- **clothes** : jeans <= trousers
- **DIY** / bricolage : grass => seeds
- HOWEVER iphone - galaxy : incorrect example
 - of a “high end smartphone” thesaurus rule, because iphone is a different world than Android and Apple fans are very loyal to the brand !
 - => rather a “high end smartphone” category
- ... i.e. very **specific** to each kind of product, catalog, vendor



MES Thesaurus – building process

- When the ecommerce website is being built, MES experts talk with the vendor to help him configure it
 - Products, categories, thesaurus...
- 3 weeks after it has gone “live”, MES experts study how it is used and patch configuration
 - By looking in search analytics (Magento backoffice or Google Analytics) :
 - In **searches with empty or few results**, find most entered terms : do they need synonyms to be added to the thesaurus ?
 - Also seldom clicked categories...



Ecommerce search beyond thesaurus

- Search of a **lot of words** : several searches are done and combined
 - Of all words together first – but higher risk of returning no result (also because higher risk of spelling mistake)
 - Then of each single word, then of all pairs of 2 words, then 3
 - Combined by giving less weight to those last ones

Tomorrow : Machine Learning for ecommerce with PCU



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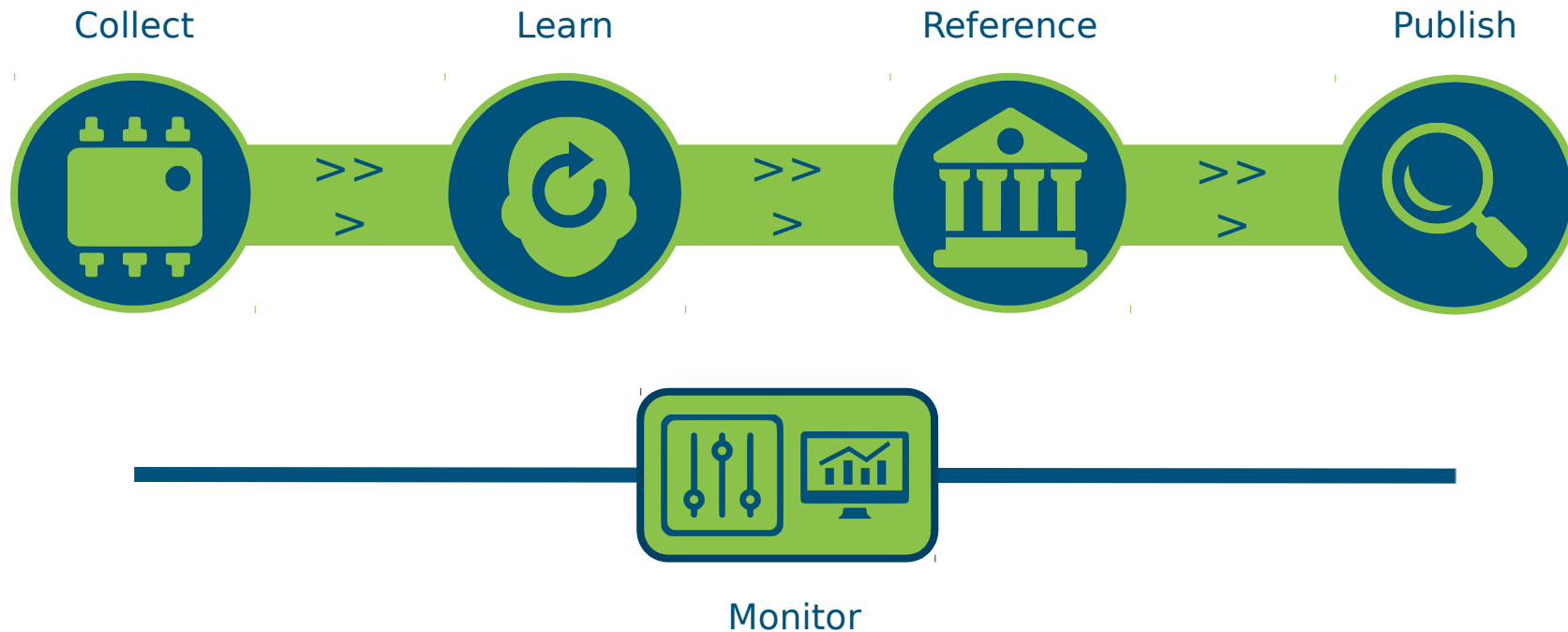
Factsheet - Unified Knowledge Platform

- 6 partners over 2017-2019, sponsored by the French ministry of Industry
- In order to democratize Big Data, so that every company will be able to add value to its own core business thanks to its existing data :
 - a Big Data / Machine Learning / semantic module to enrich any business application
- As showcased in 2 use cases :
 - E-commerce (up to digital in store) & B2B
 - Enterprise search
- Thanks to:
 - A factory of Machine Learning and Semantics-enriched search engines
 - state-of-the-art and new algorithms analyzing user behaviour
 - end-to-end event-driven data processing workflow
 - an open source, best-of-breed, unified, flexible and extensible approach



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Overall architecture





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Partners and stakeholders



Smile : coordinator, architecture, ecommerce



Paris 13 : Machine Learning, semantics



ESiLV : pipeline, semantics



Proxem : text & opinion mining, B2B



Wallix : enterprise search experience



Armadillo : integration & mgmt API & UI

Financial sponsors : BPI, IDF

Cluster : System@tic





Key Machine Learning outputs - ecommerce

- Ecommerce : **recommendation** algorithms that learn from user behaviour, for advertising but also search autocomplete
 - Most searched product filters / features
 - Most searched query terms, predict their evolution (for autocomplete)
 - Collaborative filtering on product views
 - More widely, most viewed or sold products or features and their evolution...
- Ecommerce & B2B : also
 - Detect buy intent
 - predict sales
 - predict churn
 - Suggest or train customer segments, using classification



Key Machine Learning outputs - search

- **Named Entity Recognition** (topics & aspects)
 - For supervised enrichment of ontology
 - up to opinion mining, for polarity of opinion about aspect (good or bad)
- Allowing to transform fulltext search into **structured** search :
 - “samsung tv” => type:tv and brand:samsung
- Thesaurus that **learns** from user behaviour :
 - if a lot of people search “jeans”, but don't click on any result and rather search “trousers”, and only then click on a product => “jeans to trousers” query expansion should be added to thesaurus
 - Using search query co-occurrence
- **Enterprise search**, beyond files & classification :
 - Search competences and experiences...



Outputs

- **Generic platform**

- Unified, flexible, extensible, best-of-breed-based, API-managed
- Along with a set of standard connectors, data pipeline elements and Machine Learning (ML) and text mining algorithms

- **Use cases and products**

- E-commerce (product, deployed at Smile early adopter customers), B2B (deployed at Smile & Proxem)
- Enterprise search (product, deployed at each partner's)

- **Open Source Ecosystem**

- Ties with integrated technical components' communities as well as derived business-specific products
- Home of platform examples, tryout and adoption

<https://pcu-consortium.github.io/>
<http://magento-elastic-suite.io> - <http://www.smile.fr>
Contact : marc.dutoo@smile.fr



Questions ?

Thank you
for your
attention !



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