Desperately searching for travel offers? Formulate better queries with some help from Linked Data.

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Outline

- Background
- Motivation
- Re-one system
- Evaluation
- Conclusion

Background

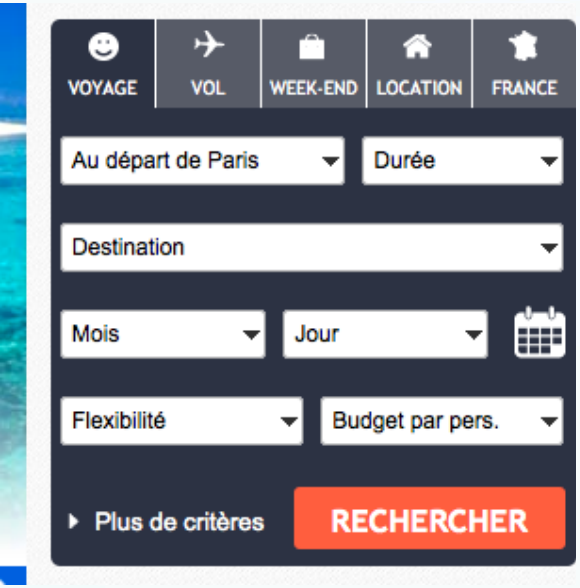
E-tourism

80 % of people do travel planning online.

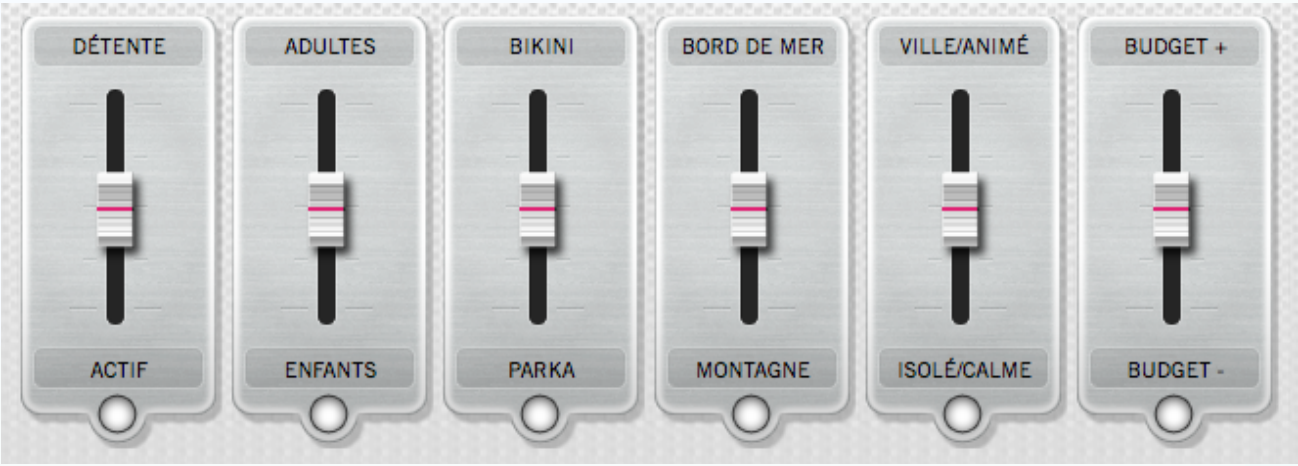
Background

About 60 % of travelers always start their travel booking and planning process with search.

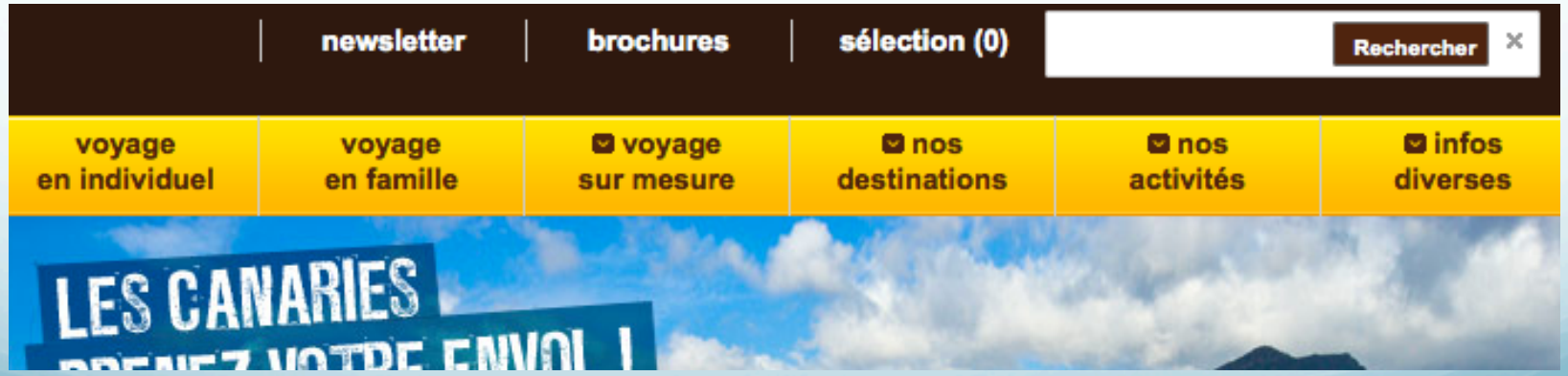
Search form



Search slider



Search bar




Google
YAHOO!
bing

facebook

Expedia

make my trip

CHOICE HOTELS INTERNATIONAL

Frommer's

BRITISH AIRWAYS

YouTube™

Google™

YAHOO!

bing™

Disney

Hotels.com™ Le choix évident™

NIAGARA FALLS TOURISM

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KAYAK

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MarineLand NIAGARA FALLS CANADA

viator A TripAdvisor® Company

ONTARIO Yours to discover

mapquest

Background

- **Undecided**: 68% start searching without a clear travel destination

Background

- Inspirational search

Background

- Too much time spent
- Too many browsing and searching
- Gather information and manual verification on multiple websites
- No efficient facility on travel websites in supporting users in expressing their needs and finding what they want

Motivation

- To develop an efficient search system to facilitate the travel offer finding task on travel websites
- By helping users formulate rich and explicit search queries
- E.g. in France at the seaside

  where there is art museum

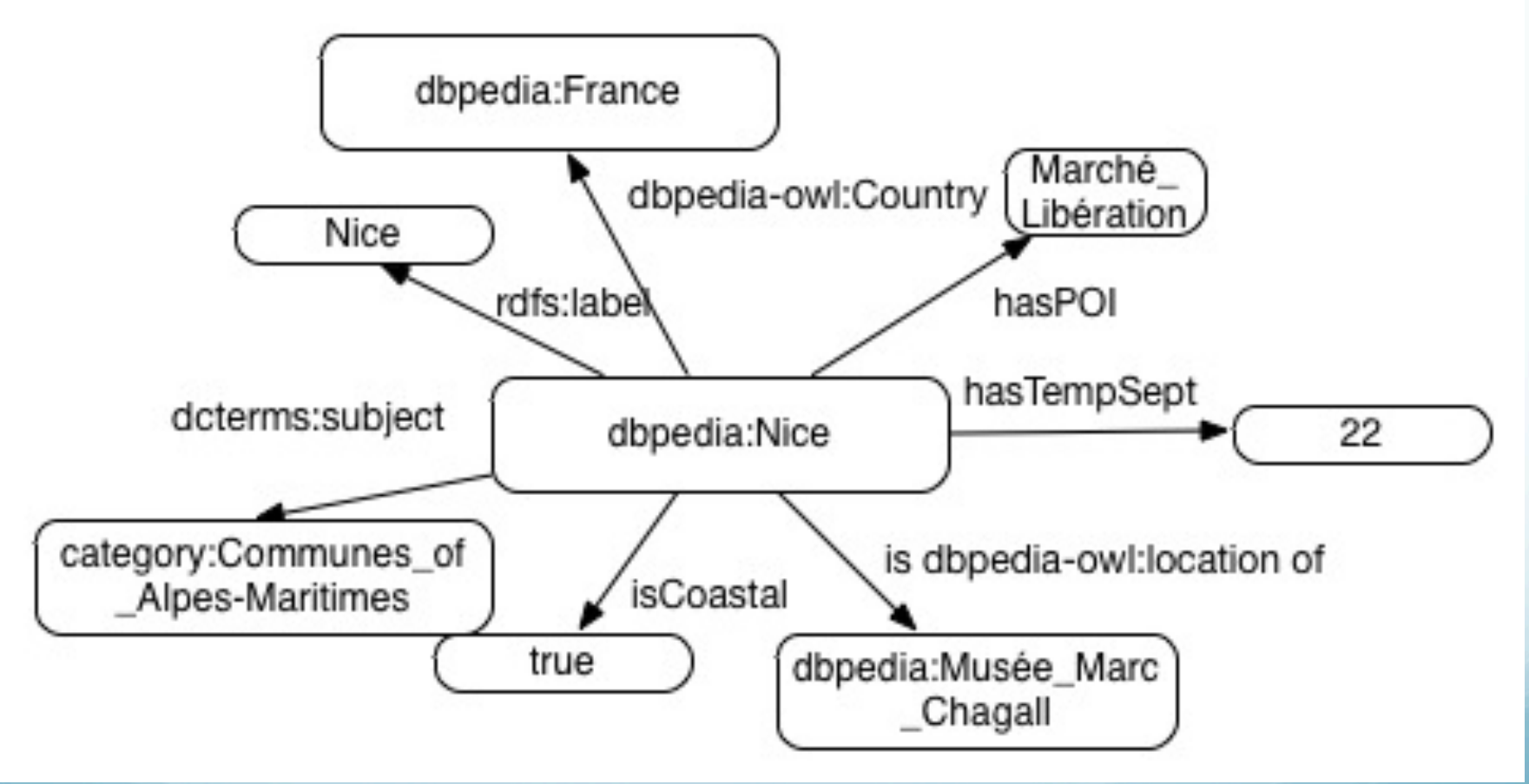
Re-one system

- Travel destination-centered semantic data graph
- Data graph verbalization
- Travel offer catalogue annotation
- Query Auto-completion
- Search results ranking

Travel destination-centered semantic data graph

- Travel destinations: very important but not always well described in travel offers' presentations
- Linked Data can help!
- Construction of a travel destination-centered semantic data graph gathering sources from DBpedia, Foursquare, Bing Maps and World Weather Online

Travel destination-centered semantic data graph

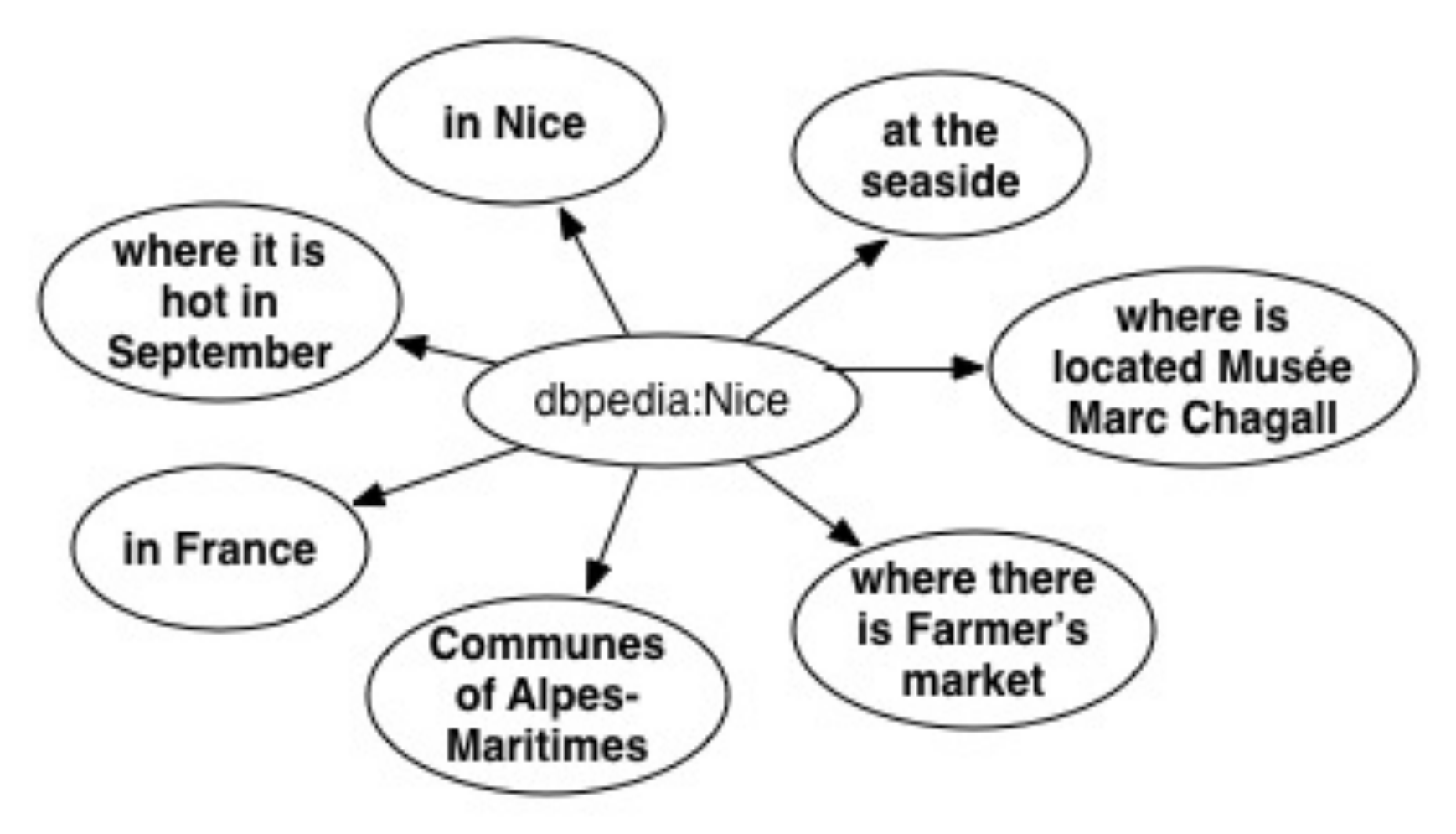


Data graph verbalization

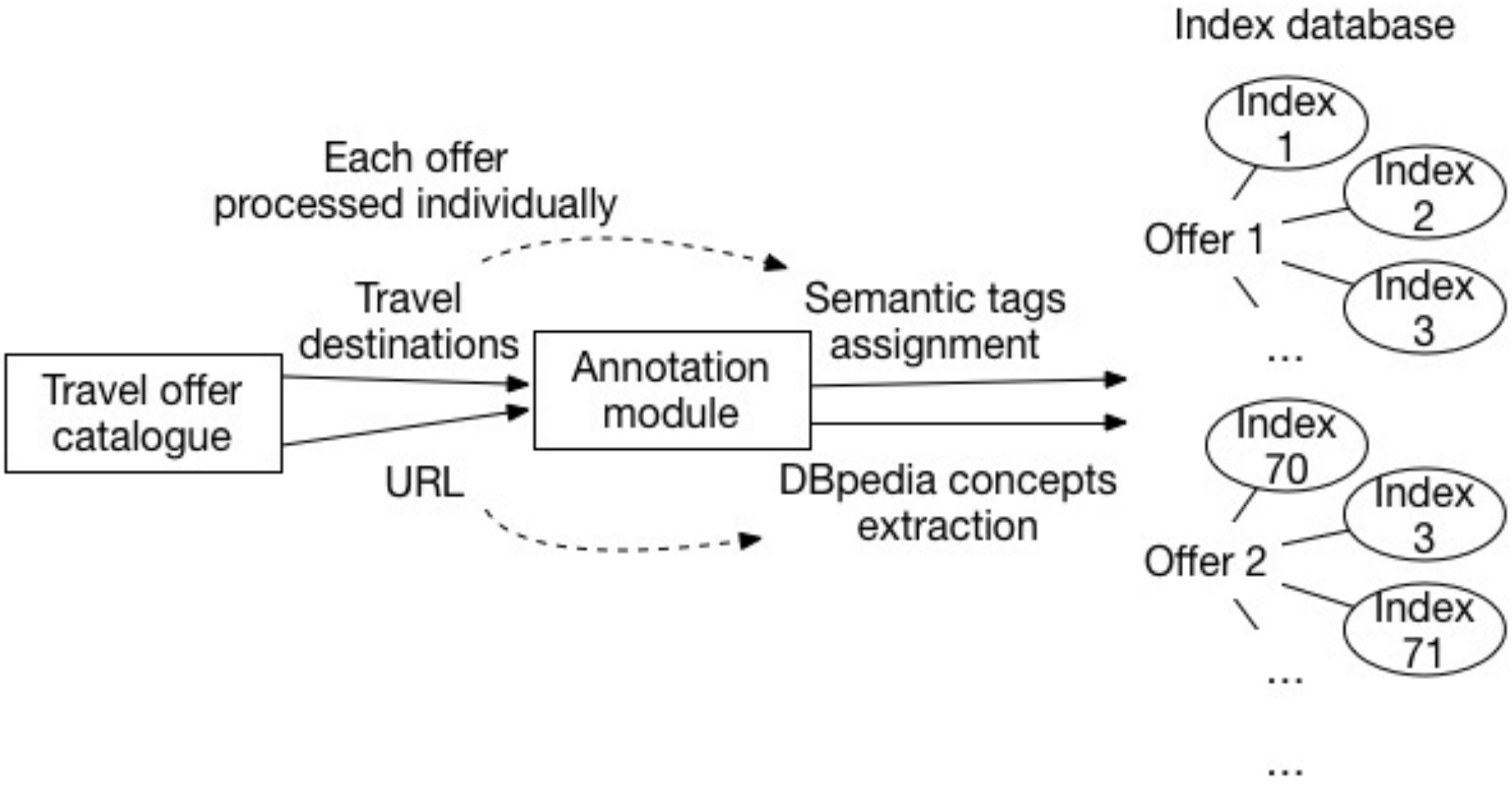
Pattern-based method to verbalize the (property, object) couples of the triples in the data graph.

(property, object) couples	Verbalization pattern
dbpedia-owl:country, dbpedia-owl:Country	in + country's label
is dbpedia-owl:location of, dbpedia-owl:Place	where is located + place's label
rdfs:label, datatype value	in + value
dcterms:subject, skos:Concept	Concept's label
hasTempSept, datatype value	where it is hot/moderate/cold in September
hasPOI, POI	where there is + POI's category
isCoastal, datatype value	at the seaside

Each travel destination is associated with a certain number of semantic tags written in a controlled language.



Travel offer catalogue annotation



Query Auto-completion

VS

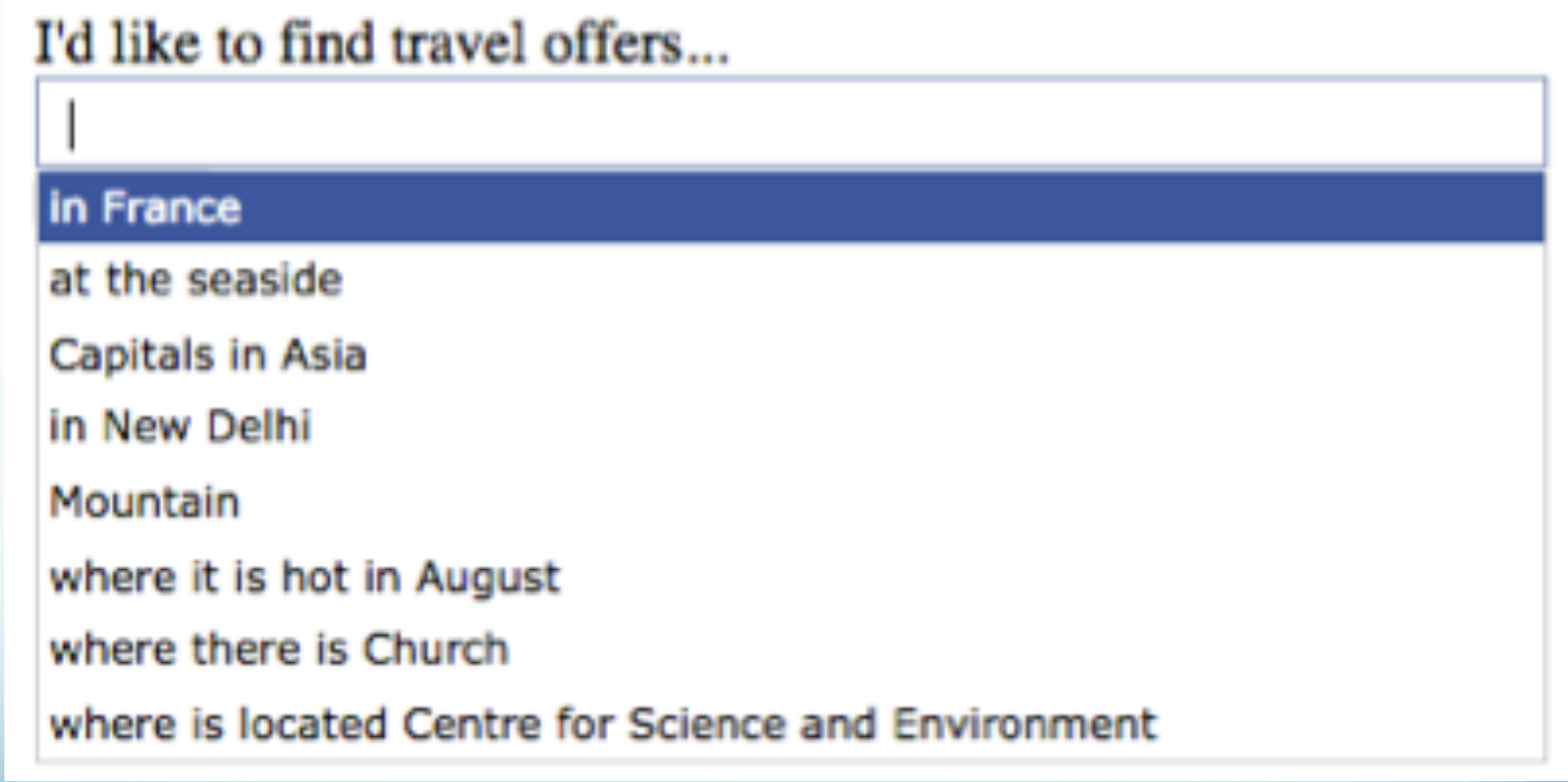
Based on how often past users have searched for a term

Based on how a criterion is relevant to find offers corresponding to it

Query Auto-completion

- Criterion: an attribute of an offer allowing direct verification whether the offer has it or not
- Indexes can be considered as criteria.
- Criteria are ranked by the probability of finding an offer with them.
- 8 criteria which are best ranked of each type are suggested at the beginning of the session

Query Auto-completion



Query Auto-completion

- Implementation using jQuery Tokeninput
- Controlled interaction: only known criteria & validate a criterion before another one
- Two different modes
  - When the user is typing
  - When one or several criteria are validated and the user is idle
- Ranking: maximizing the probability of performing a successful query and favoring the diversity of the proposed criteria types

Search results ranking

- Not the focus of this work
- All retrieved results are of the same importance.
- E.g. in Slovenia at the seaside

Evaluation

- Experiment data: travel catalogue of a French tour operator containing 956 offers and covering more than 150 countries
- Baseline: Google Custom Search already installed on this French tour operator's website
- French version of Re-one
- User study with 34 participants aged 23-35 who are used to do travel search on the Web

Evaluation

- Focus on Query Auto-completion
- Metrics:
  - *average number of words per query*
  - *average number of criteria per query*
  - *provenance of criteria*

    (user thought-of → system intelligence)

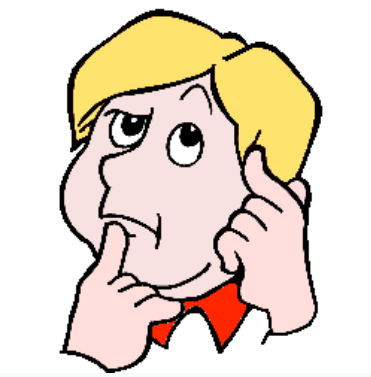
    1. It is a criterion that I already had in mind and it was not in the suggestions.

    5. It is a criterion that I did not have in mind. Some suggestions inspired me and helped me find this criterion.

Evaluation

- Duration of the offers: from 1 to 71 days
- Two experiments:
  - search for a short trip (1 to 4 days)
  - search for a long trip (5 days and more)

Evaluation



Put themselves in the scenario of searching for the next travel

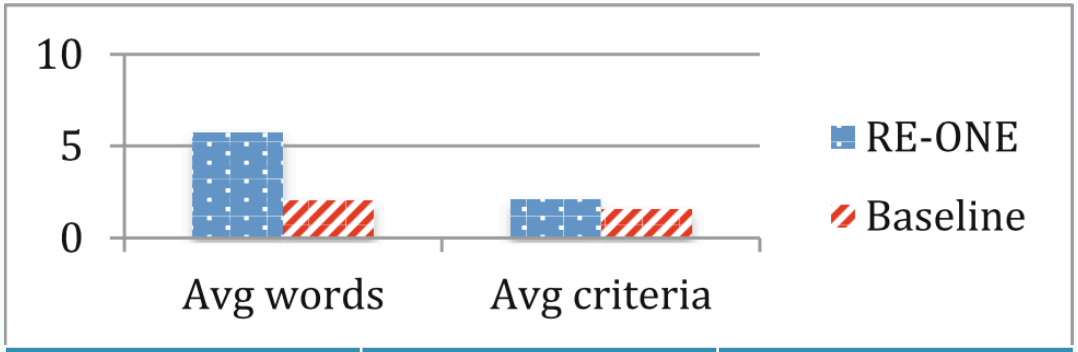
Half of the users search first in Re-one, the other half search first in baseline

3 independent reviewers verify each query-to-criteria split

Split queries into criteria

Evaluate each criterion according to the 5-level provenance scale

Results of the 1st experiment



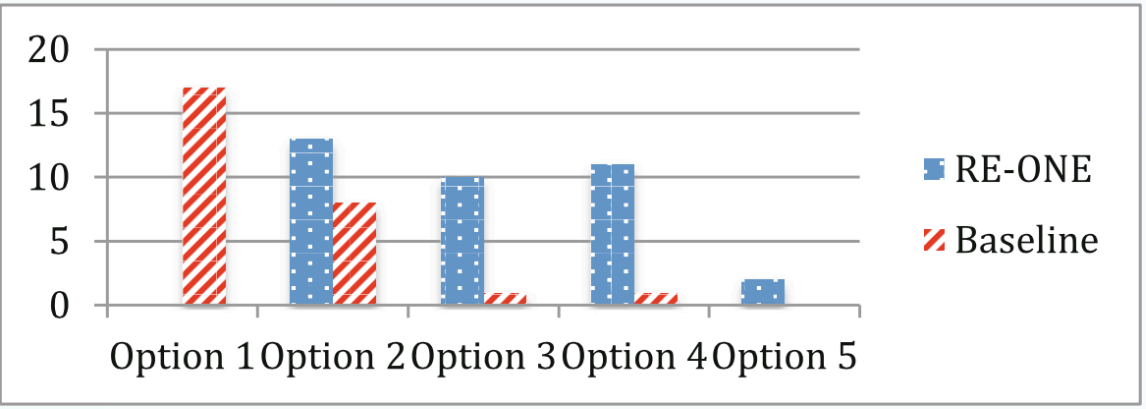
	Avg words	Avg criteria
Re-one	5.76± 3.46	2.12 ± 0.8
Baseline	2.06 ± 1.14	1.59 ± 0.78

P-value < 0.001 P-value < 0.05

64.2% longer

25% richer

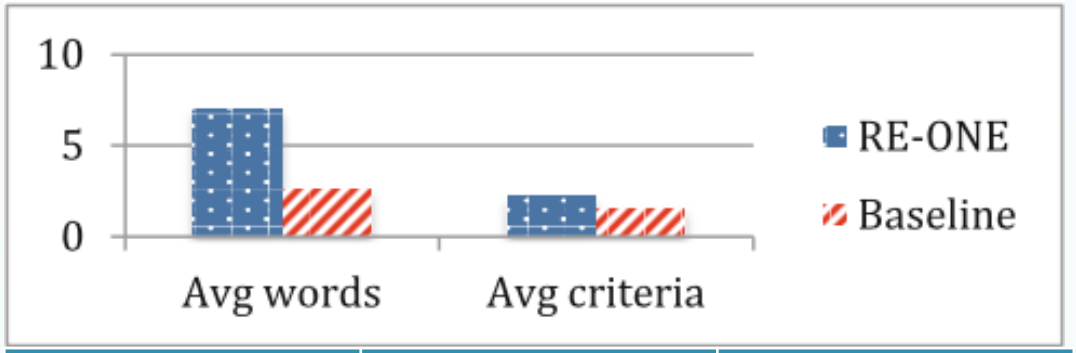
Results of the 1st experiment



Provenance

RE-ONE	The baseline system
Church New art	Church
Northern Europe North Cape	Europe
Cross-country skiing in Coroico	Cross-country skiing France
Volcanic island Porto-Novo Ribera Grande	Island of Malta

Results of the 2nd experiment



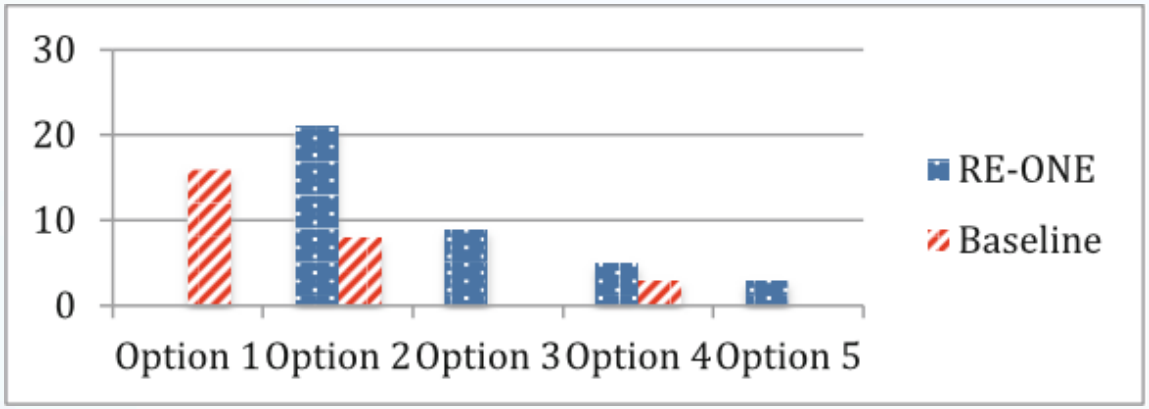
	Avg words	Avg criteria
Re-one	5.76± 3.46	2.12 ± 0.8
Baseline	2.06 ± 1.14	1.59 ± 0.78

P-value < 0.05 P-value < 0.05

62.5% longer

29% richer

Results of the 2nd experiment



Provenance

RE-ONE	The baseline system
Seafood Culture Salvador Dali	Seafood
Summer where there is a historical site	Summer historical
South-East Asia Hô-Chi-Minh City	South-East Asia travel
Trek in New Zealand	Linguistic stay

General discussion

- Re-one outperforms the baseline in both experiments
- 63.4% longer and 27% richer
- T-test proves the consistency of positive impact
- Stronger to suggest criteria of added value with regards to users own ideas, which end up being accepted and constituting the final queries

Conclusion

- Takeaway:

  Linked Data can help end users formulate better queries in the context of inspirational search like travel search.

- Sépage is optimizing Re-one. (http://sepage.com/)
- Come out soon!