CrowdQ: Crowdsourced Query Understanding

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Scenario

Find the birthdate of the mayor of the capital city of France
France Cities Map, Major Cities of France
www.mapsofworld.com › France › Facts
Dec 21, 2012 – Paris is the capital of France, as well as the largest city in the country with a population of over 2 million, and a metropolitan area population of ...

Nice - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Nice
Giuseppe Garibaldi, born in Nice, strongly opposed the cession to France (arguing ... Two men dominated this period: Jean-Médécin, mayor for 33 years from 1928 ... However, it is also the largest city in France that is not a regional capital; the ...

Rouen - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Rouen
In the 14th century urban strife threatened the city: in 1291, the mayor was ... Rouen became the capital city of English power in occupied France and when the duke .... Isaac Oliver (c.1560–1917), French-born English portrait miniature painter ...
Bertrand Delanoë
Paris, Mayor

List of mayors of Paris - Wikipedia, the free encyclopedia
Before the French Revolution, the municipality of Paris was headed by the provost of the merchants (prévôt des marchands). On 14 July 1789, at the end of the ...

Bertrand Delanoë - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Bertrand_Delanoë
Delanoë has been mayor of Paris since 18 March 2001, when control of the city council ... Delanoë won the mayorship of Paris, at the head of a coalition of Socialists, ... City Mayors: Bertrand Delanoë – Mayor of Paris, ^"Psychiatric tests for ... Early life - Career - Personal life - Political career

Letter to the mayor of Paris, re: No skyscrapers! | Architecture Here ...
blogs.providencejournal.com/.../letter-to-the-mayor-of-paris-re-no-no-...
Nov 24, 2012 – Anyway, here is my letter. Nov. 24, 2012. Mr. Bertrand Delanoë Mayor of Paris Place de l'Hôtel de Ville Paris, France 75004. Dear Mr. Delanoë: ...
May 30, 1950 (age 62 years)

Bertrand Delanoë, Date of birth

Bertrand Delanoë - Wikipedia, the free encyclopedia
Bertrand Delanoë was born 30 May 1950 in Tunis, to an atheist father (a land ... At the age of 11, Delanoë witnessed the Battle of Bizerte between France and ...

Bertrand Delanoë - Wikipédia
Bertrand Delanoë, né le 30 mai 1950 à Tunis (Tunisie, alors sous protectorat français), est un homme politique français. Membre du Parti socialiste, conseiller ...

Quel âge a Bertrand Delanoë ? - Age des Célébrités
Age de Bertrand Delanoë, Date de naissance de Bertrand Delanoë

Bertrand Delanoë

Looking for a Birthday?
www.peoplefinders.com/Birth-Info
Find Birthday by Name or Phone.
Get Phone, Address, Age Instantly.

Date Of Birth
www.ask.com/Data+Of+Birth
Search for Date Of Birth.
Find Answers on Ask.com.

Free Birth Records
Motivation

• Web Search Engines can answer simple factual queries directly on the result page

• Users with complex information needs are often unsatisfied

• Purely automatic techniques are not enough
• We want to solve it with Crowdsourcing!
Background

• Crowdsourcing so far used for data processing
  – DB/SemWeb: Data integration and cleaning
  – IR: Relevance judgments

We use the crowd to understand the query
CrowdQ

• CrowdQ is the first system that uses crowdsourcing to
  – *Understand* the intended meaning
  – *Build* a structured query template
  – *Answer* the query over Linked Open Data
<table>
<thead>
<tr>
<th>City</th>
<th>Mayor</th>
<th>Birthdate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rome, Italy</td>
<td>Gianni Alemanno</td>
<td>March 3, 1958</td>
</tr>
<tr>
<td>Venice, Italy</td>
<td>Giorgio Orsoni</td>
<td>August 29, 1946</td>
</tr>
<tr>
<td>Milan, Italy</td>
<td>Giuliano Pisapia</td>
<td>May 20, 1949</td>
</tr>
</tbody>
</table>

Cities in Italy | Italy Travel Guide
www.italylogue.com/italian-cities
Learn about the best cities in Italy to visit, and some Italian cities you might never have heard of before. These cities in Italy are all great for visitors.

Top Ten Cities for Visitors to Italy - Top Italian Cities to See
goitaly.about.com/od/planningandinformation/tp/topcities.htm
Italy has many beautiful and historic cities that are well worth a visit. Here are our picks for the ten best cities for visitors to Italy.

Italian Cities and Towns - Italy
en.comuni-italiani.it/
Information and statistics on Italian Regions, Provinces and Municipalities. All Cities, Towns and Villages in Italy. Official site, zip codes, phone prefix, population, ...

WHO/Europe | Italy - Making cities healthy for everyone: European ...
www.euro.who.int/.../italy/.../making-cities-healthy-for-everyo...
Jun 21, 2012 – Over 300 mayors and municipal health leaders met in St Petersburg, Russian Federation on Annual Business and Technical Conference of the WHO European Healthy Cities Network ... “No all solit” (Say no to loneliness) ...
CrowdQ Architecture

**Off-line**: query template generation with the help of the crowd

**On-line**: query template matching using NLP and search over open data
Hybrid Human-Machine Pipeline

Q= \text{birthdate of actors of forrest gump}

Query annotation
- Noun
- Noun
- Named entity

Verification
Is \text{forrest gump} this entity in the query?

Entity Relations
Which is the relation between: \text{actors} and \text{forrest gump} ∨ \text{starring}

Schema element
Starring \rightarrow <\text{dbpedia-owl:starring}>

Verification
Is the relation between:
\text{Indiana Jones – Harrison Ford}
\text{Back to the Future – Michael J. Fox}
of the same type as
\text{Forrest Gump - actors}
Structured query generation

Q= birthdate of actors of Forrest Gump

SELECT ?y ?x
  ?z <rdfs:label> 'Forrest Gump' }
Current Status

• Realize the vision
• Running demo:
  – Daniel Haas, Daniel Bruckner, Jonathan Harper
• Next Steps
  – Evaluation of Crowd effectiveness at each step
  – Comparison hybrid vs machine pipeline
Conclusions

• CrowdQ: an hybrid approach to complex query understanding

• Combines techniques from DB, NLP, IR, Data Mining, and Human Intelligence

• Initial experiments show the potential of CrowdQ