Semantic Search in RealFoodTrade

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This is an application paper

No theoretical results

It is about a system

... and its potential socio-economic impact

We kept the paper light-weight...
Content of the paper

- **A(t)**: The amplitude function over time.
- **A**: Amplitude.
- **t**: Time.
- **Known Amplitude**: The amplitude of the waveform is constant.
- **Constant Phase**: The phase of the waveform remains constant.

The diagram illustrates a waveform with a known amplitude and constant phase over time.
Semantic search

- keyword search sometimes is not enough
- need for considering the semantics of terms
Semantic search

- keyword search sometimes is not enough
- need for considering the **semantics** of terms
- **query expansion** according to semantic criteria
  - extension of keyword search
    - [Guha, McCool, Miller WWW 2003]
    - [Rocha, Schwabe, de Aragão, WWW 2004]
Semantic search — techniques

- RDF graph traversal [Catarci et al. ECAI 2004]
- keyword/concept mapping
- RDF graph patterns
- . . .
Motivation

- Farmers excluded from the market by wholesalers
  see [WSJ 26/02/2014]
- Growing food end-prices worldwide
  e.g. in Africa [World Bank, 2013]

Working hypotheses

- inefficiency of food markets
- automated reasoning to help matching demand and supply
Market inefficiency

- Intermediaries to reduce friction in the market [Shi & Siou 2010; Gehrig 1993]
- In the food market intermediaries buy from producers
  - large warehouses, retail stores
  - large distances, long chain, high consumer prices, high waste
Our case study

Which place is this?
Our case study

Talcahuano, the pearl of the Pacific
Our case study

Agreement with fishermen in Talcahuano
RealFoodTrade (RFT)

- marketplace for food
- sellers are the *producers*
- *no middleman* — wholesalers do not take part
The buyer

- geo-located sales
- **flash stand** and **flash market**
- semantic search
  - domain ontology (human-made)
  - Linked Data
Geo-tagged sale/delivery points
Ciao.
Benvenuto su Real Fair Trade.
Flash stand

- Point/time of delivery of fish
- Orders are made/paid in advance
- Time interval intended to be short
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Flash stand

- Point/time of delivery of fish
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Flash stand creation

Crea un Flash Stand

Create flash stand

Starts at
15/mag/2014 12:17

Ends at
15/mag/2014 13:17

Place

Next

I tuoi stand

Stand Attivi

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via della Vasca, Castel d'Azzano, Verona, Italy</td>
<td>24/mar/2014 19:50</td>
<td>24/mar/2014 23:50</td>
</tr>
<tr>
<td>Piazza Sant'Emerenziana, Rome, Italy</td>
<td>05/apr/2014 19:15</td>
<td>08/apr/2014 19:14</td>
</tr>
</tbody>
</table>

Aggiungi
Flash market

- Has location and time interval
- Hosts several flash stands
- Way for the buyer of aggregating purchases
  - “town market” model
Your order has been registered.

Order code: 78200012
To collect your items go to the meeting point in Lambeth North London within Sat Jan 18 19:00:00 UTC 2014

Show this to your seller
Search

Cerca

lub
lubina
lobina
robalo
Ontology integration

- label matching with Linked Data nodes
- navigation of Linked Data sets
- so far, heuristics (they work reasonably well)
Conclusion

- **RFT**: the Web to improve workers’ life
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- Linked Data sets proved useful
  - graph navigation
  - integration of domain ontologies with Linked Data
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- Linked Data sets proved useful
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- Potential for significant *socio-economic impact*
  - lower end prices
  - higher profit for fishermen
Conclusion

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- Linked Data sets proved useful
  - graph navigation
  - integration of domain ontologies with Linked Data
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  - lower end prices
  - higher profit for fishermen
  - [Mandeville, *The fable of bees*, 1714]
Future work

Application

- Tracking of fishing location (provenance)
  - gather geographic data on exploitation
- Entend to other food markets (agriculture etc.)

Recommendation

- Incorporate learning into the system
  - feedback from user behaviour
  - (fuzzy?) ontology, updated continuously
  - personalized recommendations
  - NLP for refined matching
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