Enriching BabelNet verbal entities with videos

A linking experiment with the IMAGACT Ontology of Action

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IMAGACT: the Ontology of Actions

http://www.imagact.it
IMAGACT: the Ontology of Actions

EN: The bus turns into Parliament Square
EN: The bus turns into Parliament Square
The action type discrimination is a way to reach a correct translation.

The bus turns into Parliament Square

EN: turn / round

IT: girare / curvare / svoltare

ES: girar / doblar

ZH: 转 (zhuǎn)
IMAGACT: the Ontology of Actions

- 1,010 scenes
- 9 fully mapped languages, 13 in-progress
- Verbs in different languages are connected to the scenes they can predicate

1 scene is linked to multiple verbs
IMAGACT: the Ontology of Actions

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IMAGACT-BabelNet linking: The Test Set

- 7 English verbs with
  - High frequency of use in spoken language;
  - High degree of referential ambiguity;
  - High level of action referring possibilities.

- 25 IMAGACT scenes and 30 BabelSynsets selected among the ones connected to the verbs

- 750 binary judgments (25 scenes x 30 BS) expressed by human annotators
  - put
  - move
  - take
  - insert
  - press
  - give
  - strike
IMAGACT-BabelNet linking: The algorithms

**IMAGACT Scene"4faba0b4"**

- **pestare, picchiare, menare, battere, colpire**
- **strike, beat, hit, batter, beat up**
- **打, 打架, 捶, 捶打脚跟**
- **niederschlagen, verprügeln, zusammenschlagen**
- **agiedir, golpear, peger**
- **agiedir, аспанчар, паскуар, суттар**
- **издарати, истуки, туки**

**Matching Algorithm**

**BabelNet BabelSynset "bn:00083248"**

- **beat up**: beat + work over
  - Give a beating to; subject to a beating, either as a punishment or as an act of aggression
  - Less definitions
  - To give a beating to; subject to a beating, either as a punishment or an act of aggression, etc.
  - To give a severe beating to, etc.
  - To give a beating to, etc.
  - Thought he beat him up when he walked down the street late at night
  - Less examples
  - For the teacher used to beat the students
  - Beat it: to break up bullying on my way home, etc.

- **picchiare**: bastonare, battere, malmenare, percuotere
- **beat**: work over, beat up
- **打**: DRFT, DRFT
- **apalear, golpear, peger**

IMAGACT-BabelNet linking experiment
IMAGACT-BabelNet linking: The algorithms
IMAGACT-BabelNet linking: The algorithms
**IMAGACT-BabelNet linking: Results**

With both the algorithms the first chosen BS is always good to be linked with the scene.

<table>
<thead>
<tr>
<th>BS x scene</th>
<th>Base Alg.</th>
<th>Improved Alg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>% right (n = 1)</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>% right (n = 2)</td>
<td>84%</td>
<td>88%</td>
</tr>
<tr>
<td>% right (n = 3)</td>
<td>76%</td>
<td>83%</td>
</tr>
</tbody>
</table>

This is a preliminary test, a bigger test set is required to

- Make a fine-tuning of the algorithm parameters;
- Use the annotated dataset to train a machine learning algorithm.
A more informative visual representation of actions inside the BabelSynset by using the IMAGACT scenes in addition to static images.
Linking advantages for IMAGACT

IMAGACT can exploit the BabelNet semantic network to increase the number of mapped languages and lemmas.
**Final considerations**

General action verbs are a lexical class that have a strong impact on the languages, but it's also very difficult to process automatically:

- high level of ambiguity;
- high frequency in the language usage.

It's hard to perform some Natural Language Processing tasks like:

- Word Sense Discrimination;
- Automatic Translation.

IMAGACT provides a **fine-grained categorization of action concepts** in a language-independent environment. A linking between these two resources is desirable to develop complex disambiguation and ontology-based translation tasks.
Thanks for your attention