NewsReader
Building structured event indexes of large volumes of financial and economic data for making decisions
FP7-2012-ICT-315404

Event Detection

Itziar Aldabe / German Rigau / Aitor Soroa
IXA group, UPV/EHU
http://ixa.si.ehu.es
Project Objectives

- Event Detection in English, Dutch, Spanish and Italian
  - events in terms of *who* did *what* *when* and *where*
  - relations between events
  - factual / non-factual or speculative
  - provenance: who tells what and when
- Narrative schemas and storylines over longer periods of time
- Event reasoning: richness, coherence, relevance
- Large-scale processing, storage and retrieval of events (integrate new with old)
Project Objectives

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- Large-scale processing, storage and retrieval of events (integrate new with old)
Event Detection: Main goals

- **Events, participants**, their **roles** in text
- **Time** and **place** expressions
- **Attribution** of the events (aka **Authority** and **Factuality**)
- Standard **output** and **scaling**

- English (UPV/EHU, VUA, FBK)
- Spanish (UPV/EHU)
- Dutch (VUA)
- Italian (FBK)
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
  who: Mariano Rajoy
  what: that the budget cuts will continue next year
  when: yesterday
  where: in Madrid
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will **continue** next year.

event1: announced
  who: Mariano Rajoy
  what: that the budget cuts will continue next year
  when: yesterday
  where: in Madrid

event3: continue
  what: the budget cuts
  when: next year
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
  who: Mariano Rajoy
  what: that the budget cuts will continue next year
  when: yesterday
  where: in Madrid

event2: cuts
  what: budget

event3: continue
  what: the budget cuts
  when: next year
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
  who: Mariano Rajoy
  what: that the budget cuts will continue next year
  when: yesterday
  where: in Madrid
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
  who: Mariano Rajoy NERC (PER)
  what: that the budget cuts will continue next year
  when: yesterday
  where: in Madrid NERC (LOC)
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
  who: Mariano Rajoy
    ▪ http://dbpedia.org/resource/Mariano_Rajoy
  what: that the budget cuts will continue next year
  when: yesterday
  where: in Madrid
    ▪ http://dbpedia.org/resource/Madrid
Event Detection: Example

**Bush** announced yesterday in Madrid that the budget cuts will continue next year.

- [http://dbpedia.org/page/George_W._Bush](http://dbpedia.org/page/George_W._Bush)
- [http://dbpedia.org/page/Jeb_Bush](http://dbpedia.org/page/Jeb_Bush)
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced
  who: Mariano Rajoy
  what: that the budget cuts will continue next year
  when: yesterday
  - 2015-03-04 TIMEX3
  where: in Madrid
Event Detection: Example

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.

event1: announced => announce.01
  who: Mariano Rajoy
    ▪ Arg0-PAG: announcer (vnrole: 37.7-1-Agent, 48.1.2-Agent)
  what: that the budget cuts will continue next year
    ▪ Arg1-PPT: utterance (vnrole: 37.7-1-Topic, 48.1.2-Theme)
  when: yesterday
    ▪ AM-TMP
  where: in Madrid
    ▪ AM-LOC

SRL + Predicate Matrix
Event Detection: NLP tools

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.
Outline

- System architecture & NAF
- EN, SP, IT and NL pipelines
- Evaluation of EN pipeline
- Cross-lingual interoperability
Architecture

- A system composed of many virtual machines (VMs) distributed across one or more physical machines.
- Two types of VMs:
  - **boss VM**: The main/manager node.
  - **worker VM**: The VMs that perform the processing. They contain all the NLP modules.
Standards for inter-operability

- NAF
  - Basic format for inter-document NLP analysis
  - Stand-off XML, multi-layered annotation format
  - Allows parallel processing
  - Covers many linguistic levels
  - All NLP modules read and write NAF
English generic pipeline v2.1

1) NAF libraries (EHU, VUA)
2, 3, 4) Ixa-pipes (EHU): tok, pos, nerc
5, 6) ukb (EHU), vua-svm-wsd (VUA)
7) ixa-pipe-srl (mate tools + predicate-matrix):
   - dependency parsing + SRL (N+V) + event-classification
8) ixa-pipe-parse (EHU): constituent parsing
9) corefgraph (EHU): nominal coreference
10) ixa-pipe-ned (DBpedia spotlight): Entity Linking
11) fbk-timepro (FBK): timex3
12) vua-factuality (VUA)
13) vua-opinion-miner (VUA)
14) vua-event-coref (VUA): intra-document event coreference
15) fbk-temprel (FBK)
16) fbk-causalrel (FBK)
English generic pipeline v2.1
Spanish generic pipeline v2.0

1) NAF libraries (EHU, VUA)
2, 3, 4) ixa-pipes (EHU): tok, pos, nerc
5) ixa-pipe-wsd (ukb)
6) ixa-pipe-srl (mate tools + multilingual predicate matrix): dependency parsing + SRL (N+V) + event-classification
7) ixa-pipe-parse (EHU): constituent parsing
8) corefgraph (EHU): nominal coreference
9) ixa-pipe-ned (DBpedia spotlight): cross-lingual Entity Linking
10) vua-event-coref (VUA): intra-document event coreference
11) ixa-heidel-time (EHU): timex3
Spanish generic pipeline v2.0

1. Document
2. Ixa-pipe tokenizer
3. Ixa-pipe POS tagger
4. Mate-tools based Dependency Parser
5. Mate-tools based SRL
6. Event Coreference
7. Ixa-pipe Constituent Parser
8. Graph-based Coreference
9. Ixa-pipe NERC
10. Spotlight-based NED
11. UKB-based WSD
12. Time Expressions
Dutch generic pipeline v2.0

1) NAF libraries (EHU, VUA)
2,3) ixa-pipes (EHU): tok, nerc
4) vua-alpino (VUA): pos, parsing
5) vua-svm-wsd (VUA)
6) vua-srl (VUA)
7) vua-ontotagging (VUA) : cross-lingual Predicate-matrix tagging
8) vua-framenet-classifier (VUA)
9) corefgraph (EHU): nominal coreference
10) ixa-pipe-ned (DBpedia spotlight) : cross-lingual Entity Linking
12) vua-opinion-miner (VUA)
13) vua-event-coref (VUA) : intra-document event coreference
14) vua-heidel-time (VUA)
Italian generic pipeline v2.0

1) fbk-tokenpro (FBK)
2) fbk-morphopro (FBK)
3) fbk-tagpro (FBK)
4) fbk-lemapro (FBK)
5) fbk-entitypro (FBK)
6) fbk-chunkpro (FBK)
7) fbk-timepro (FBK)
8) fbk-syntaxpro (FBK)
9) fbk-eventpro (FBK)
10) fbk-temprel (FBK)
11) fbk-factpro (FBK)
Large-scale processing

- LN car company news (EN) : ~ 6M
  - 1st year: 63K
  - 2nd year: 1.3M articles
- TechCrunch (EN) : 43K articles
- Kiem (EN) : 212K documents
- Dutch House of Representatives (NL) : 1M documents
- Europarl (EN, ES) : ~19K EN, ~19K ES
- WikiNews (EN, ES, IT, NL) :
  - 19K EN, 8K IT, 7K ES and 1K NL
- ECB+ (EN) : 984 articles
Evaluation of pipelines

- Intra-document Benchmarking
  - On standard datasets (EN)
  - WikiNews (EN, ES, IT, NL) :
    - 19K English, 8K Italian, 7K Spanish and 1K Dutch
    - 120 documents (EN => ES, IT, NL)
    - Timelines (SemEval-2015)
  - NERC, NED, Nominal Coref (EN)
  - SRL, Event Detection, Event Coref (EN)
  - Temporal Processing (EN, IT)
- Cross-document Benchmarking (EN, ES, IT, NL)
  - ...

NewsReader Donostia 5 March 2015
Evaluation of pipelines

- NERC evaluation (ixa-pipes-nerc)

### Table 6: NERC CoNLL 2003 testb results.

<table>
<thead>
<tr>
<th>System</th>
<th>Precision</th>
<th>Recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newsreader (ixa-pipe-nerc)</td>
<td>91.64</td>
<td>90.21</td>
<td>90.92</td>
</tr>
<tr>
<td>Stanford NER</td>
<td>-</td>
<td>-</td>
<td>88.08</td>
</tr>
<tr>
<td>Ratinov et al. (2009)</td>
<td>-</td>
<td>-</td>
<td>90.57</td>
</tr>
<tr>
<td>Passos et al. (2014)</td>
<td>-</td>
<td>-</td>
<td>90.90</td>
</tr>
</tbody>
</table>

### Table 7: NERC Intra-document Benchmarking with Wikinews.

<table>
<thead>
<tr>
<th>System</th>
<th>mention extent</th>
<th>Precision</th>
<th>Recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newsreader (ixa-pipe-nerc combined)</td>
<td>Inner phrase-based</td>
<td>62.46</td>
<td>76.26</td>
<td>68.67</td>
</tr>
<tr>
<td>Stanford NER (all english distsim)</td>
<td>Inner phrase-based</td>
<td>63.53</td>
<td>68.21</td>
<td>65.79</td>
</tr>
<tr>
<td>Illinois NER (CoNLL 2003)</td>
<td>Inner phrase-based</td>
<td>57.19</td>
<td>69.44</td>
<td>62.72</td>
</tr>
<tr>
<td>Newsreader (ixa-pipe-nerc combined)</td>
<td>Inner token-based</td>
<td>72.37</td>
<td>79.43</td>
<td>75.74</td>
</tr>
<tr>
<td>Stanford NER (all english distsim)</td>
<td>Inner token-based</td>
<td>77.14</td>
<td>71.77</td>
<td>74.36</td>
</tr>
<tr>
<td>Illinois NER (CoNLL 2003)</td>
<td>Inner token-based</td>
<td>69.24</td>
<td>72.93</td>
<td>71.04</td>
</tr>
<tr>
<td>Newsreader (ixa-pipe-nerc combined)</td>
<td>Outer phrase-based</td>
<td>53.30</td>
<td>68.24</td>
<td>59.85</td>
</tr>
<tr>
<td>Stanford NER (all english distsim)</td>
<td>Outer phrase-based</td>
<td>52.86</td>
<td>59.51</td>
<td>55.99</td>
</tr>
<tr>
<td>Illinois NER (CoNLL 2003)</td>
<td>Outer phrase-based</td>
<td>47.53</td>
<td>60.52</td>
<td>53.24</td>
</tr>
<tr>
<td>Newsreader (ixa-pipe-nerc combined)</td>
<td>Outer token-based</td>
<td>73.50</td>
<td>67.20</td>
<td>70.21</td>
</tr>
<tr>
<td>Stanford NER (all english distsim)</td>
<td>Outer token-based</td>
<td>78.22</td>
<td>60.63</td>
<td>68.31</td>
</tr>
<tr>
<td>Illinois NER (CoNLL 2003)</td>
<td>Outer token-based</td>
<td>70.26</td>
<td>61.66</td>
<td>65.68</td>
</tr>
</tbody>
</table>
Evaluation of pipelines

- NED evaluation (DBpedia-spotlight)
  - Standard datasets
    - AIDA 79.67 precision 75.94 recall
    - TAC KBP 79.77 precision 60.68 recall
  - Wikinews

<table>
<thead>
<tr>
<th>Corpus</th>
<th>Precision</th>
<th>Recall</th>
<th>Gold</th>
<th>System-NERCI</th>
<th>System-NED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airbus</td>
<td>54.79%</td>
<td>53.87%</td>
<td>292</td>
<td>316</td>
<td>292</td>
</tr>
<tr>
<td>GM</td>
<td>60.98%</td>
<td>36.83%</td>
<td>505</td>
<td>321</td>
<td>305</td>
</tr>
<tr>
<td>Stock</td>
<td>55.20%</td>
<td>30.51%</td>
<td>331</td>
<td>194</td>
<td>183</td>
</tr>
<tr>
<td>Total</td>
<td>57.31%</td>
<td>39.45%</td>
<td>1133</td>
<td>968</td>
<td>780</td>
</tr>
</tbody>
</table>

Table 8: Performance of the NED module on the WikiNews dataset
Evaluation of pipelines

- Nominal Coreference (Corefgraph)

<table>
<thead>
<tr>
<th>System</th>
<th>MUC</th>
<th>B³</th>
<th>CEAF</th>
<th>BLANC</th>
<th>CoNLL 2011 F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanford</td>
<td>59.6</td>
<td>68.3</td>
<td>45.5</td>
<td>73.0</td>
<td>59.3</td>
</tr>
<tr>
<td>Newsreader (Corefgraph)</td>
<td>51.0</td>
<td>67.2</td>
<td>43.4</td>
<td>69.7</td>
<td>54.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System</th>
<th>MUC</th>
<th>B³</th>
<th>CEAF</th>
<th>CoNLL 2011 F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newsreader (Corefgraph)</td>
<td>19.70</td>
<td>18.34</td>
<td>18.96</td>
<td>19.00</td>
</tr>
</tbody>
</table>
Evaluation of pipelines

- Semantic Role Labelling (mate)

<table>
<thead>
<tr>
<th></th>
<th>Precision</th>
<th>Recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labeled</td>
<td>(19137 + 10036) / (22467 + 10818)</td>
<td>87.65%</td>
<td></td>
</tr>
<tr>
<td>Labeled recall</td>
<td>(19137 + 10036) / (24748 + 10818)</td>
<td>82.02%</td>
<td></td>
</tr>
<tr>
<td>Labeled F1</td>
<td></td>
<td></td>
<td>84.74%</td>
</tr>
<tr>
<td>Unlabeled</td>
<td>(20697 + 10818) / (22467 + 10818)</td>
<td>94.68%</td>
<td></td>
</tr>
<tr>
<td>Unlabeled recall</td>
<td>(20697 + 10818) / (24748 + 10818)</td>
<td>88.61%</td>
<td></td>
</tr>
<tr>
<td>Unlabeled F1</td>
<td></td>
<td></td>
<td>91.55%</td>
</tr>
</tbody>
</table>

Table 23: Performance of MATE on the English dataset of CoNLL-2009

<table>
<thead>
<tr>
<th></th>
<th>Precision</th>
<th>Recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labeled</td>
<td>(3288 + 1186) / (4154 + 1186)</td>
<td>83.78%</td>
<td></td>
</tr>
<tr>
<td>Labeled recall</td>
<td>(3288 + 1186) / (5314 + 1338)</td>
<td>67.26%</td>
<td></td>
</tr>
<tr>
<td>Labeled F1</td>
<td></td>
<td></td>
<td>74.62%</td>
</tr>
<tr>
<td>Unlabeled</td>
<td>(4154 + 1186) / (4154 + 1186)</td>
<td>100.00%</td>
<td></td>
</tr>
<tr>
<td>Unlabeled recall</td>
<td>(4154 + 1186) / (5314 + 1338)</td>
<td>80.28%</td>
<td></td>
</tr>
<tr>
<td>Unlabeled F1</td>
<td></td>
<td></td>
<td>89.06%</td>
</tr>
</tbody>
</table>

Table 26: Performance of MATE over the GS annotations of WikiNews with the full span from NAF.
Evaluation of pipelines

- Event Coreference
### Evaluation of pipelines

- **Time detection (TimePro)**

<table>
<thead>
<tr>
<th></th>
<th>recall</th>
<th>precision</th>
<th>F1-score</th>
<th>classification F1-score type</th>
<th>normalization F1-score value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>strict match</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>0.805</td>
<td>0.968</td>
<td>0.879</td>
<td>0.831</td>
<td>0.715</td>
</tr>
<tr>
<td>Airbus, Boeing</td>
<td>0.761</td>
<td>0.909</td>
<td>0.828</td>
<td>0.817</td>
<td>0.793</td>
</tr>
<tr>
<td>GM, Chrysler, Ford</td>
<td>0.714</td>
<td>0.905</td>
<td>0.798</td>
<td>0.782</td>
<td>0.613</td>
</tr>
<tr>
<td>Stock market</td>
<td>0.636</td>
<td>0.881</td>
<td>0.738</td>
<td>0.692</td>
<td>0.58</td>
</tr>
<tr>
<td>Micro-average</td>
<td>0.72</td>
<td>0.914</td>
<td><strong>0.805</strong></td>
<td>0.773</td>
<td><strong>0.664</strong></td>
</tr>
<tr>
<td><strong>relaxed match</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>0.841</td>
<td>1</td>
<td>0.913</td>
<td>0.856</td>
<td>0.721</td>
</tr>
<tr>
<td>Airbus, Boeing</td>
<td>0.848</td>
<td>0.974</td>
<td>0.907</td>
<td>0.86</td>
<td>0.79</td>
</tr>
<tr>
<td>GM, Chrysler, Ford</td>
<td>0.789</td>
<td>1</td>
<td>0.882</td>
<td>0.849</td>
<td>0.647</td>
</tr>
<tr>
<td>Stock market</td>
<td>0.709</td>
<td>0.982</td>
<td>0.823</td>
<td>0.762</td>
<td>0.646</td>
</tr>
<tr>
<td>Micro-average</td>
<td>0.787</td>
<td>0.99</td>
<td><strong>0.877</strong></td>
<td>0.827</td>
<td><strong>0.692</strong></td>
</tr>
</tbody>
</table>

Table 27: TimePro performance
Evaluation of pipelines

- **Time Relations (TimeRelPro)**

<table>
<thead>
<tr>
<th></th>
<th>recall</th>
<th>precision</th>
<th>F1-score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>strict match</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>0.174</td>
<td>0.361</td>
<td>0.235</td>
</tr>
<tr>
<td>Airbus, Boeing</td>
<td>0.145</td>
<td>0.319</td>
<td>0.199</td>
</tr>
<tr>
<td>GM, Chrysler, Ford</td>
<td>0.194</td>
<td>0.474</td>
<td>0.275</td>
</tr>
<tr>
<td>Stock market</td>
<td>0.081</td>
<td>0.141</td>
<td>0.103</td>
</tr>
<tr>
<td>Micro-average</td>
<td>0.154</td>
<td>0.325</td>
<td>0.209</td>
</tr>
<tr>
<td><strong>relaxed match</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>0.177</td>
<td>0.366</td>
<td>0.238</td>
</tr>
<tr>
<td>Airbus, Boeing</td>
<td>0.155</td>
<td>0.341</td>
<td>0.213</td>
</tr>
<tr>
<td>GM, Chrysler, Ford</td>
<td>0.196</td>
<td>0.479</td>
<td>0.278</td>
</tr>
<tr>
<td>Stock market</td>
<td>0.084</td>
<td>0.146</td>
<td>0.106</td>
</tr>
<tr>
<td>Micro-average</td>
<td>0.158</td>
<td>0.333</td>
<td>0.214</td>
</tr>
<tr>
<td><strong>temporal awareness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>0.201</td>
<td>0.387</td>
<td>0.265</td>
</tr>
<tr>
<td>Airbus, Boeing</td>
<td>0.157</td>
<td>0.328</td>
<td>0.212</td>
</tr>
<tr>
<td>GM, Chrysler, Ford</td>
<td>0.221</td>
<td>0.484</td>
<td>0.303</td>
</tr>
<tr>
<td>Stock market</td>
<td>0.094</td>
<td>0.155</td>
<td>0.117</td>
</tr>
<tr>
<td>Micro-average</td>
<td>0.173</td>
<td>0.339</td>
<td>0.229</td>
</tr>
</tbody>
</table>

Table 28: TempRelPro performance
SemEval 2015 Task 4

- TimeLine: Cross-document Event Ordering

- iTunes
  1  2003   11778-3-launch  11778-4-launch
  2  2007   11778-4-pass
  3  2008-01 11778-7-hold
  4  2008-02 11778-2-pass  11778-5-pass
  4  2008-02 11778-3-accounts_for
Evaluation of pipelines

- SemEval 2015 Task 4
- TimeLine: Cross-Document Event Ordering

<table>
<thead>
<tr>
<th>Participant</th>
<th>CORPUS1 F1</th>
<th>CORPUS2 F1</th>
<th>CORPUS3 F1</th>
<th>F1 score</th>
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<th>TOTAL Recall</th>
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<td>5.37</td>
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<td><strong>12.42</strong></td>
<td><strong>13.88</strong></td>
<td><strong>15.94</strong></td>
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<td>23.52</td>
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Table 30: Official results of TimeLine task. The results in italics were not submitted officially to SemEval-2015 Task 4.
Evaluation summary

- Most modules perform as SOA
- NERC beyond SOA (standard & out of domain)
- Nominal coref slightly below SOA
- Timelines beyond SOA (by far)

- Most complete generic pipelines (EN, ES, NL, IT)
- Cross-lingual semantic interoperable

- Very robust processing
Cross-lingual interoperability

- **Named entities**
  - **Cross-lingual links** from DBpedia

- **Events**
  - Predicate Matrix
  - **Interoperable** event models
    - VN, FN, PB, WN (SUMO, etc.), ESO
    - Extending to **nominal** predicates (EN)
  - **Cross-lingual** PM (EN, ES, NL, IT)

- **Time**
  - **Cross-lingual** time normalization

- **Concepts**
  - **Cross-lingual** wordnets
  - MCR, MultiWordNet, OMW
Cross-lingual interoperability: Named entities

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.
Mariano Rajoy anunció ayer en Madrid que los recortes continuarán el próximo año.
Cross-lingual interoperability: Events

- Predicate Matrix is a new lexical resource resulting from the integration of multiple sources of predicate information including FrameNet, VerbNet, PropBank and WordNet.

- [http://adimen.si.ehu.es/web/PredicateMatrix](http://adimen.si.ehu.es/web/PredicateMatrix)
### Predicate Matrix

<table>
<thead>
<tr>
<th></th>
<th>Spain</th>
<th>'s</th>
<th>Iberdrola</th>
<th>wants</th>
<th>to</th>
<th>buy</th>
<th>UIL</th>
<th>Holdings</th>
<th>for</th>
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### Predicate Matrix

```
<table>
<thead>
<tr>
<th>fn:Buyer</th>
<th>Fn:Commerce_buy</th>
<th>vn:Goods</th>
<th>vn:Money</th>
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<tbody>
<tr>
<td>vn:Agent</td>
<td>vn:buy.01</td>
<td>vn:Theme</td>
<td>vn:Asset</td>
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<tr>
<td>pb:A0</td>
<td>pb:buy.01</td>
<td>pb:A1</td>
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```

<table>
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</table>
Cross-lingual interoperability: Events

Mariano Rajoy announced yesterday in Madrid that the budget cuts will continue next year.
Mariano Rajoy anunció ayer en Madrid que los recortes continuarán el próximo año.
Cross-lingual interoperability: Time

Mariano Rajoy announced *yesterday* in Madrid that the budget cuts will continue *next year*.

```xml
<timeExpressions>
  <timex3 id="tmx0" type="DATE" value="2015-03-05"/>
  <timex3 id="tmx1" type="DATE" value="2015-03-04">
    <!-- yesterday -->
  </span>
  <span>
    <target id="w4" />
  </span>
</timex3>
  <timex3 id="tmx2" type="DATE" value="2016">
    <!-- next year -->
  </span>
  <span>
    <target id="w13" />
    <target id="w14" />
  </span>
</timex3>
</timeExpressions>
```
Cross-lingual interoperability: Time

Mariano Rajoy anunció ayer en Madrid que los recortes continuarán el próximo año.
Cross-lingual interoperability: Concepts

A militant **Korean** nationalist has slashed the face of the US ambassador to South Korea at a breakfast meeting in Seoul.
Un militante nacionalista coreano ha rajado la cara del embajador estadounidense en Corea del Sur en un desayuno de trabajo en Seúl.
Open source modules and VMs

- Open source code (>30 modules)
  - [http://github.com/newsreader](http://github.com/newsreader)

- Virtual Machines for clusters (automatic deployment)
Event Detection – Main results

- EN, ES, NL and IT *generic* pipelines
- EN pipeline adapted to different *domains*
- **Cross-lingual interoperable** semantic interpretation:
  - DBpedia
  - Cross-lingual PM
  - Time normalization
  - Cross-lingual senses
- **Open source** modules and VMs
- EN, ES, NL and IT *new large-scale processing*
- **Evaluation** of NWR pipelines
  - On standard datasets (EN)
  - On wikinews & Timelines - SemEval 2015 (EN)
  - On Eventi task - Evalita 2014 (IT)
Event Detection – Future work

- EN, ES, NL, IT pipelines adapted to **financial domain**
- Improved EN, ES, NL and IT **generic** pipelines
- **Cross-lingual interoperable** semantic interpretation
- **Open source** modules and VMs
- EN, ES, NL and IT **new large-scale processing**
- **Evaluation** of NWR pipelines
  - Monolingual & Cross-lingual
- Improving **interacting** tasks
- Automatic **domain adaptation** techniques
Event Detection – Future work

- Improved EN generic pipelines
  - Topic classification – JEX
  - Wikification – dbpedia-spotlight
  - NED-reranker
  - Frame-reranker
- Implicit arguments => Egoitz
NewsReader
Building structured event indexes of large volumes of financial and economic data for making decisions
FP7-2012-ICT-315404

WP4 Event Detection

Itziar Aldabe / German Rigau / Aitor Soroa
IXA group, UPV/EHU
http://ixa.si.ehu.es