Running Frog on the CLIN26 NER task

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FROG

Open source memory-based NLP modules developed for Dutch
All NLP modules are based on Timbl software package

Developed by ILK Research Group (Tilburg University), the CLiPS Research Centre (University of Antwerp) and Language Machines (CLS/CSLT, Radboud University Nijmegen)

Available at:

http://languagemachines.github.io/frog/
FROG architecture

Tokenizer

- MBT PoS-tagger
- MBLEM lemmatizer

- MBNER entity labeler
- MBMA analyzer-decompounder

- MBChunker

- Multi-word Chunker
- MBDP dep. parser
### Frog output

<table>
<thead>
<tr>
<th>Token number (resets every sentence)</th>
<th>Token</th>
<th>Lemma</th>
<th>Morphological segmentation</th>
<th>PoS tag</th>
<th>Confidence score of the PoS tag</th>
<th>Named entity type</th>
<th>Base phrase chunk in BIO encoding</th>
<th>Token number of head word in dependency graph</th>
<th>Type of dependency relation with head word</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Marie</td>
<td>Marie [Marie] SPEC(deeleigen)</td>
<td>1.000000</td>
<td>B-PER</td>
<td>B-NP 2</td>
<td>su</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>vroeg</td>
<td>vragen [vraag] WW(pv,verl,ev)</td>
<td>0.532544</td>
<td>0</td>
<td>B-VP 0</td>
<td>ROOT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>zich</td>
<td>zich [zich] VNW(refl,pron,obl,red,3,getal)</td>
<td>0.999740</td>
<td>0</td>
<td>B-NP 2</td>
<td>se</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>af</td>
<td>af [af] VZ(fin)</td>
<td>0.996853</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>svp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>of</td>
<td>of [of] VG(onder)</td>
<td>0.733333</td>
<td>0</td>
<td>B-SBAR 4</td>
<td>vc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>hij</td>
<td>hij [hij] VNW(pers,pron,nomin,vol,3,ev,masc)</td>
<td>0.999659</td>
<td>0</td>
<td>B-NP 8</td>
<td>su</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>nog</td>
<td>nog [nog] BW( )</td>
<td>0.999730</td>
<td>0</td>
<td>B-ADVP 8</td>
<td>mod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>zou</td>
<td>zullen [zal] WW(pv,verl,ev)</td>
<td>0.999947</td>
<td>0</td>
<td>B-VP 5</td>
<td>body</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>komen</td>
<td>komen [kom][en] WW(inf,vrij,zonder)</td>
<td>0.861549</td>
<td>0</td>
<td>I-VP 8</td>
<td>vc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>. .</td>
<td>. [.] LET( )</td>
<td>0.999956</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>punct</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MBNER module

Trained on SoNaR1 corpus manually annotated with Named Entities using the simple flat IOB-tag structure

- Persons (PER) 14,292
- Organizations (ORG) 9,947
- Locations (LOC) 26,013
- Products (PRO) 3,872
- Events (EVE) 1,103
- Miscellaneous (MISC) 7,281
- Total 62,508

+ additional name list of 912 Entities gathered from the trial data and the English NewsReader MEANTIME corpus (without any translation)
Results

Micro average: gm boeing stock
Precision 48.2 44.6 46.7
Recall 68.9 56.3 53.3
F1 56.7 49.8 49.8

**FIN**: 0-14% F1 score as Frog was not trained on this tag (only in name list)

**PER**: high recall, low precision as Frog ‘invents’ new person tags

Overall:
- Frog misses certain entities and inserts others due to differences in training annotations
- Frog cannot handle nested entities