Formal Evaluation of ImplIE   **April 1, 2015**
on Newswire Test Set   **S. Soderland**

We evaluated the Implicit Relation Information Extractor (ImplIE) on a blind test set of 9,000 sentences from the 2009 TAC-KBP corpus newswire documents. The same set of sentences was used for each configuration of ImplIE.
- Open Extractions – high precision
- Open Extractions – high recall
- Type Constrained – high precision
- Type Constrained – high recall

ImplIE begins by tagging user-specified semantic classes based on keyword lists. Our experiments used the following classes:
    city, jobTitle, nationality, province, religion, school

The Open Extraction systems found all entities that are modified by a term tagged with a specific class, using a set of dependency path patterns. For example, "French journalist Paul Dupuis reported …" produces the following extractions:
    (French journalist Paul Dupuis; nationality; French)
    (journalist Paul Dupuis; jobTitle; journalist)
We tried various methods of delimiting the NP for the entity, and trimmed the NP to include both the modified noun (e.g. DuPuis) and the tagged term (e.g. journalist).

The Type Constrained system is intended to have stronger semantic interpretation than the Open Extraction system. We limit nationality to have only person or groups of persons as the entity, and judge the extraction as correct if the person has that nationality. We tagged an Open Extraction for nationality to be correct if the entity is somehow associated with the nationality. So (Japanese yen; nationality; Japanese) is correct for an Open Extraction, but incorrect for a Type Constrained extraction. Our system uses a combination of NER tags and WordNet classes to filter the entity types.
    nationality, jobTitle must have person
    city, province, religion, school may have person or organization

We started with a version of ImplIE with a set of rules and sets of keywords that had a tendency to overgeneralize. Our development began with refining the rules and the keywords to improve the precision, resulting in our High Precision system. We then relaxed the rules and reinstated many of the keywords that had been eliminated to produce our High Recall system.

relation	open extractions high recall		open extractions high precision		type constrained high recall		type constrained high precision	
	extractions	precision	extractions	precision	extractions	precision	extractions	precision
city	454	0.636	356	0.709	163	0.758	130	0.815
jobTitle	636	0.776	477	0.900	458	0.878	388	0.951
nationality	1,892	0.880	1,787	0.901	593	0.865	568	0.898
province	195	0.633	132	0.766	94	0.739	72	0.861
religion	36	0.909	42	0.800	34	0.880	32	0.844
school	33	0.400	11	0.750	16	0.333	9	0.444
total	3,246	0.806	2,806	0.868	1,358	0.842	1,199	0.899