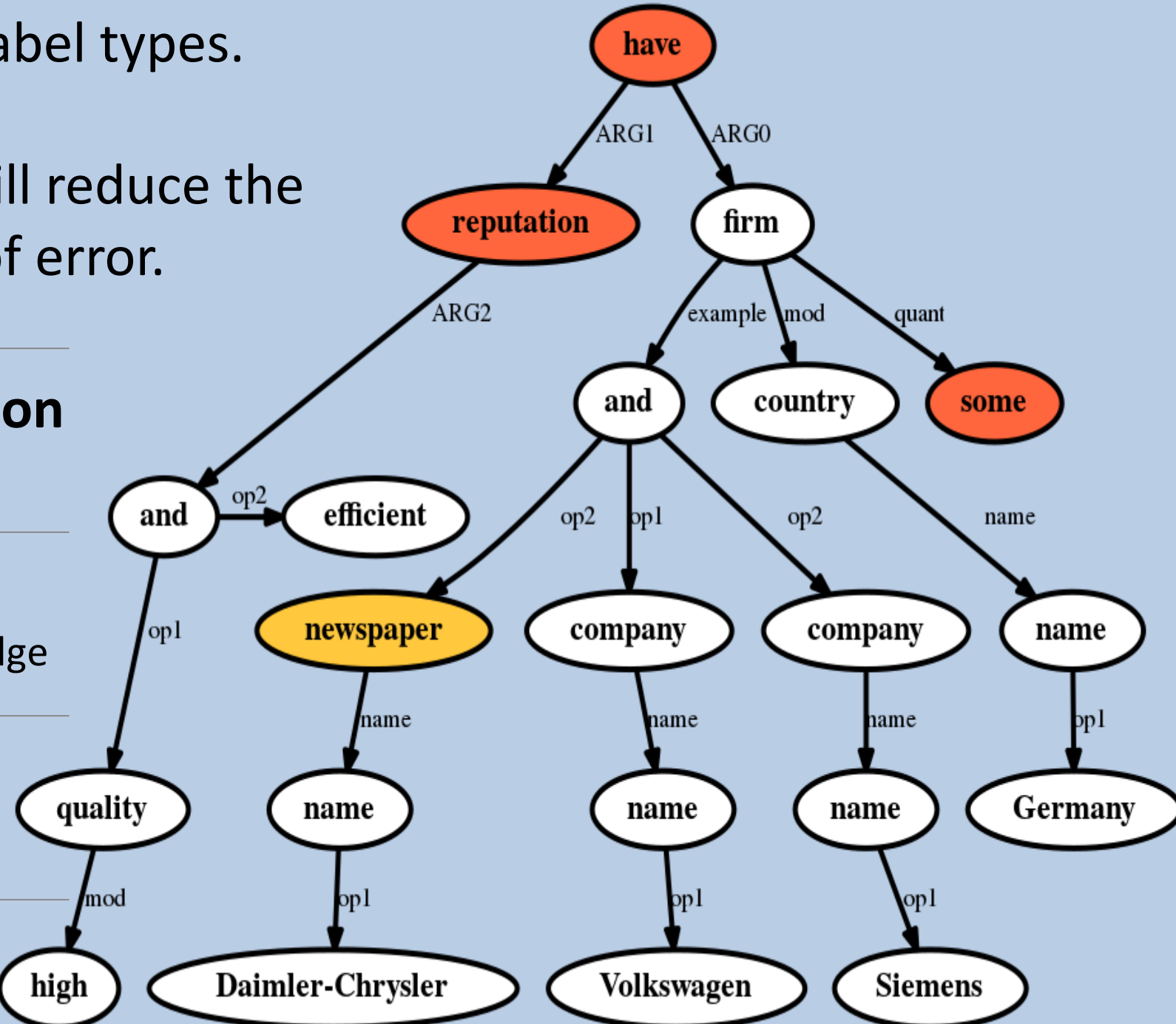
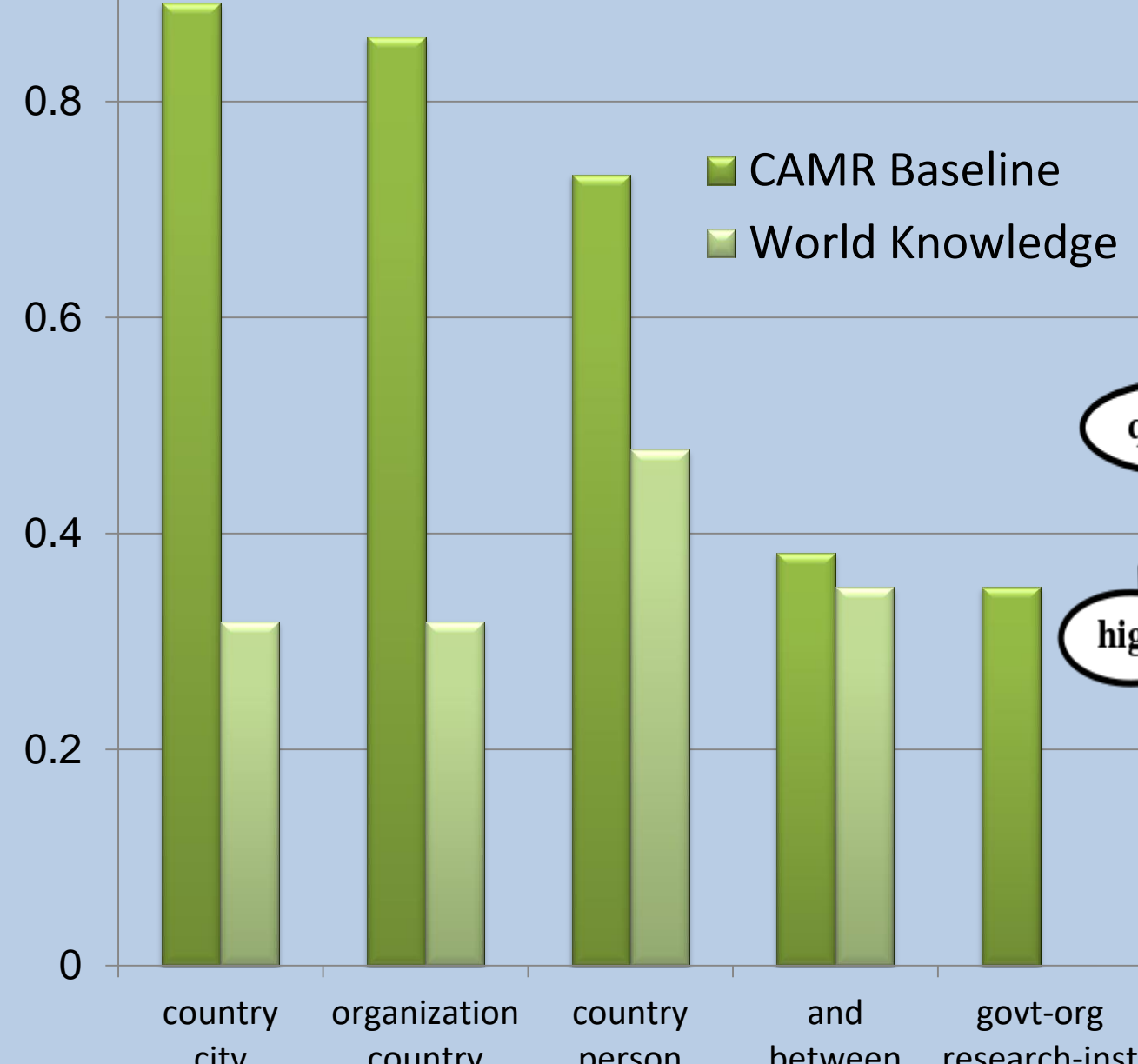


Motivation

Current parsers often assign wrong label types.

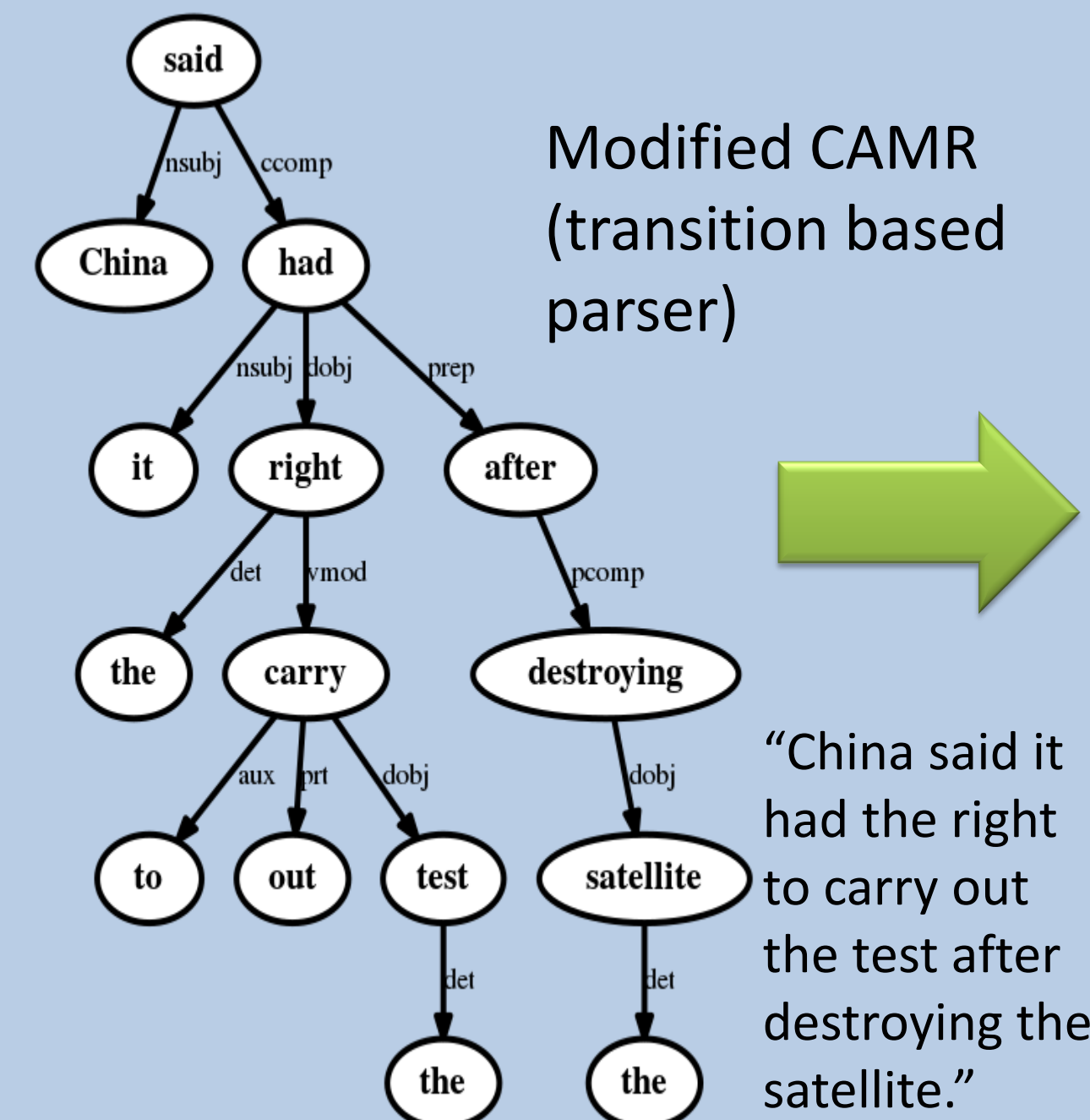
Incorporation of world knowledge will reduce the number of occurrences of this type of error.

Frequent Concept Label Confusion



"Some German firms such as Volkswagen, Siemens and Daimler-Chrysler have a reputation for high quality and efficiency"
– Orange error requires World Knowledge.

Data and Parser

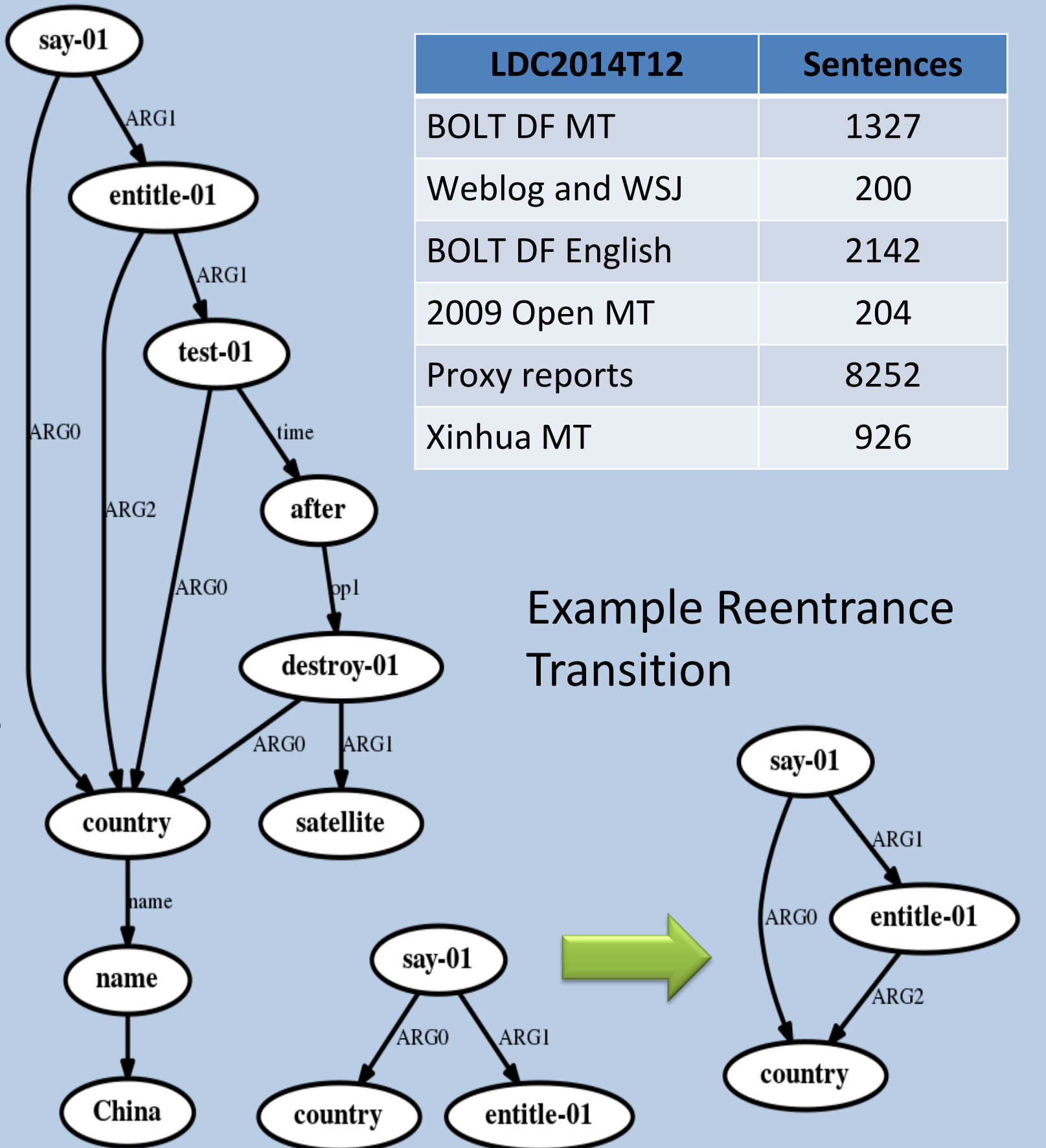


AMR Properties:

1. Directed and acyclic
2. Node labels are concepts with WSD
3. Edges represent relations

LDC2014T12	Sentences
BOLT DF MT	1327
Weblog and WSJ	200
BOLT DF English	2142
2009 Open MT	204
Proxy reports	8252
Xinhua MT	926

Example Reentrance Transition



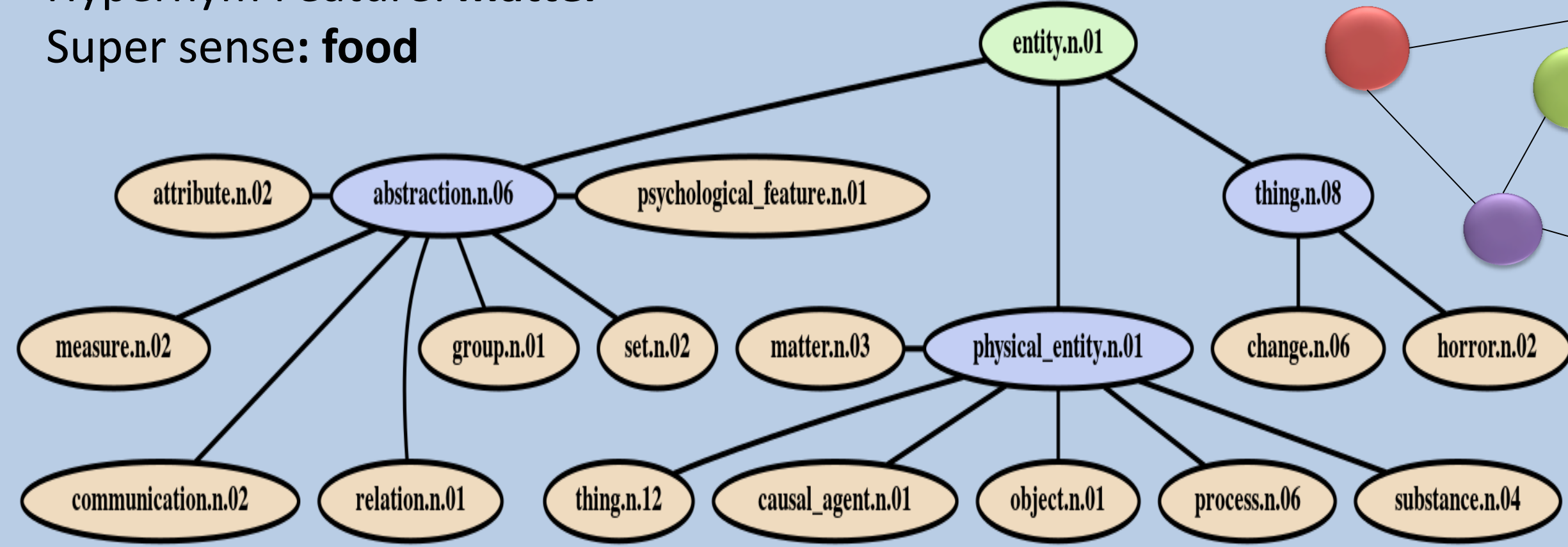
Hypernyms and Super senses

Hypernym Trace Example

"pizza" → dish → nutriment → food → substance
→ **matter** → physical entity → entity

Hypernym Feature: **matter**

Super sense: **food**



Noun Super Senses: Group, Person, Artifact, Cognition, Food, Act, Location, Time, Event, Communication and 16 others

Verb Super Senses: Stative, Cognition, Communication, Social, Motion, Possession, Change, Emotion and 6 others

World Knowledge

Entity Links and Embeddings

Under a law passed by Parliament last week the verdicts of military courts can now be appealed.

High confidence link
Entity Link = True
Embedding = [0.5 0.2 ... 0.9]

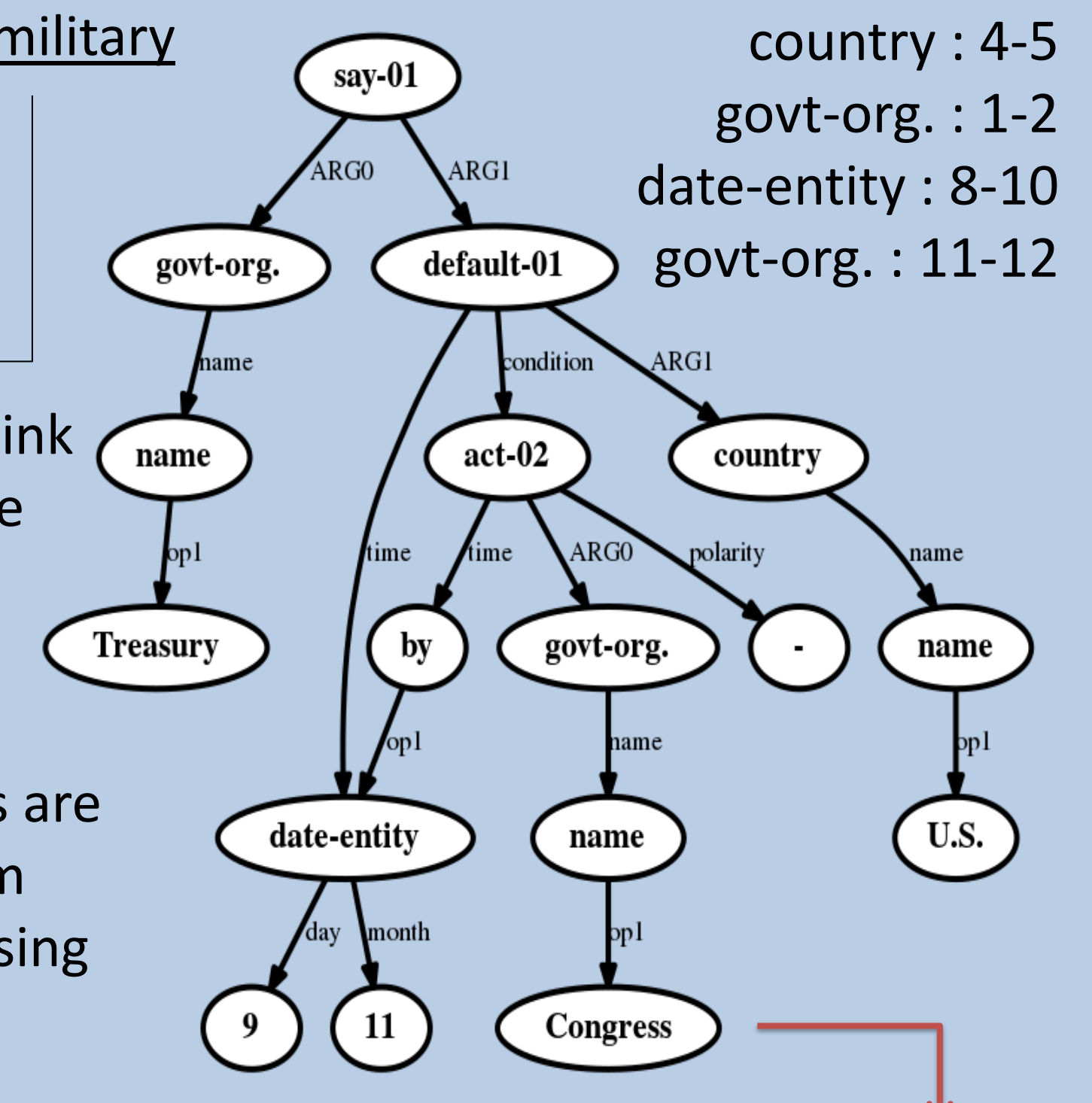
Low confidence link
Entity Link = False
Embedding = [0]

Embeddings are created from node2vec using Wikipedia



Named Entity Features

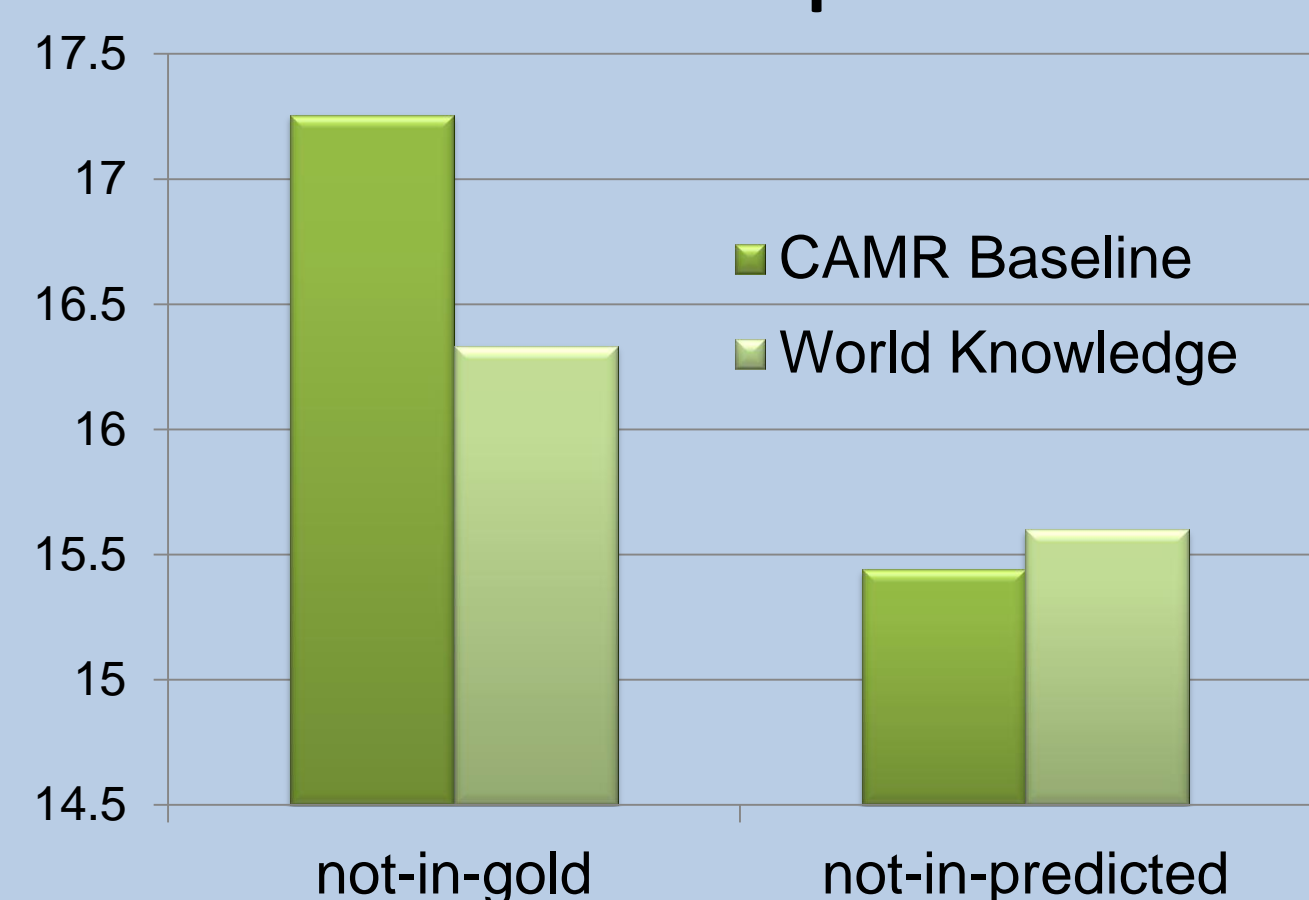
Alignments of tokens to concepts:



The	Treasury	said	the	U.S.	will	default	on	Nov.	9	if	Congress	doesn't	act	by	then.
O	B-gov	O	O	B-country	O	O	O	B-date	I-date	O	B-gov	O	O	O	O

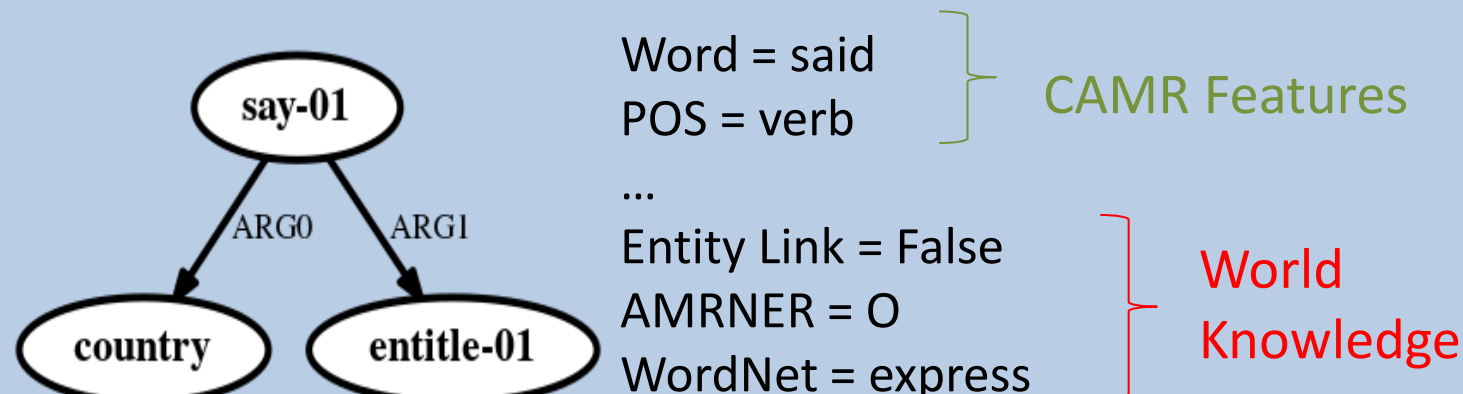
Integration and Results

Unmatched Concept Label Errors



Slight SMATCH improvement
Large improvement for NE sub-score

For a given context window, we add our new features for each node



Metric	CAMR	Adagrad	Entity Link	Named Entities (NE)	Word Net (WN)	NE + WN	ALL
SMATCH	65	66	66	66	66	66	65
Unlabeled	71	72	72	72	72	72	71
No WSD	66	67	67	67	67	67	66
Named Entities	75	76	77	77	77	81	77
Negations	14	16	16	16	13	15	14
Concepts	80	80	80	80	80	81	80
Re-entrancy	36	37	38	36	40	37	36
SRL	58	59	59	59	59	58	58

Oracle Experiments

Generated NER is imperfect. An oracle shows us the limitations of these features.

Oracle settings:

1. 9-class: classes from our experiments (**yellow**)
2. All Named Entities: concepts with name edges (**red** and **yellow**)
3. All non-Entities: concepts without names (**green**)
4. All labels from 2 and 3

Metric	9-Class	All Named Entities	All Non-Entities	Combined
SMATCH	67	65	68	69
Unlabeled	73	71	74	74
No WSD	68	66	69	70
Named Entities	79	77	78	79
Negations	15	15	16	15
Concepts	81	80	85	85
Re-entrancy	37	36	37	37
SRL	60	59	61	61

