Using Semantic Meaning to Recognize Paraphrases

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Lucic is a great figter

Lucic
is
a
great
[figter/fighter]

Gertjan van Noord @gj · May 19

That s the Lucic I loveeee

That
[s/is]
the
Lucic
I
[loveeee/love]

Lucic is a great **figter**
Lucic is a great **fighter**

That **s** the Lucic I **love**
That **is** the Lucic I **love**
That **s** the Lucic I **loveeee**
That **is** the Lucic I **loveeee**

Pair 1
Pair 2
Pair 3
Pair 4
Pair 5
Pair 6
Pair 7
Pair 8

$$\begin{array}{c} x1\ x2\ x3 \\ \hline person(x1) \\ lucic(x2) \\ thing(x3) \end{array} \wedge \begin{array}{c} x4\ x5\ x6 \\ \hline theme(x4, x2) \\ agent(x4, x3) \\ s(x4) \\ theme\ (x5, x6) \\ agent(x5, x6) \\ love(x5) \\ x2 = x6 \end{array}$$

```
model([d1],
    [f(1,a1great,[_G4019]),
    f(1,n1fighter,[_G4019]),
    f(1,n1lucic,[_G4019]),
    f(1,v1be,[_G4019]),
    f(2,r1agent,[ (_G4019,_G4044)]),
    f(2,r1experiencer,[ (_G4019,_G4044)]),
    f(2,r1theme,[ (_G4019,_G4044)])]).
```

That/DT
s/VBZ
the/DT
Lucic/NNP
I/NNP
loveeee/NNP

Maximum Entropy Model

Lexical Features
POS
Logical Model
DRS
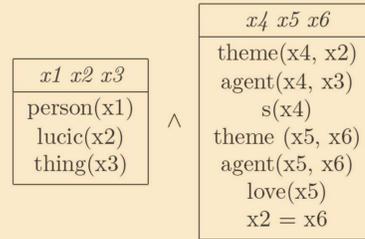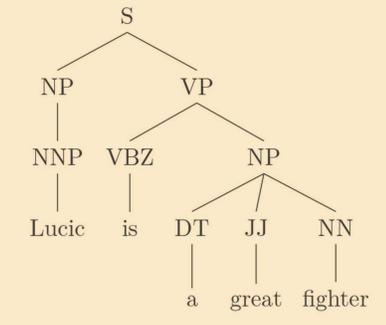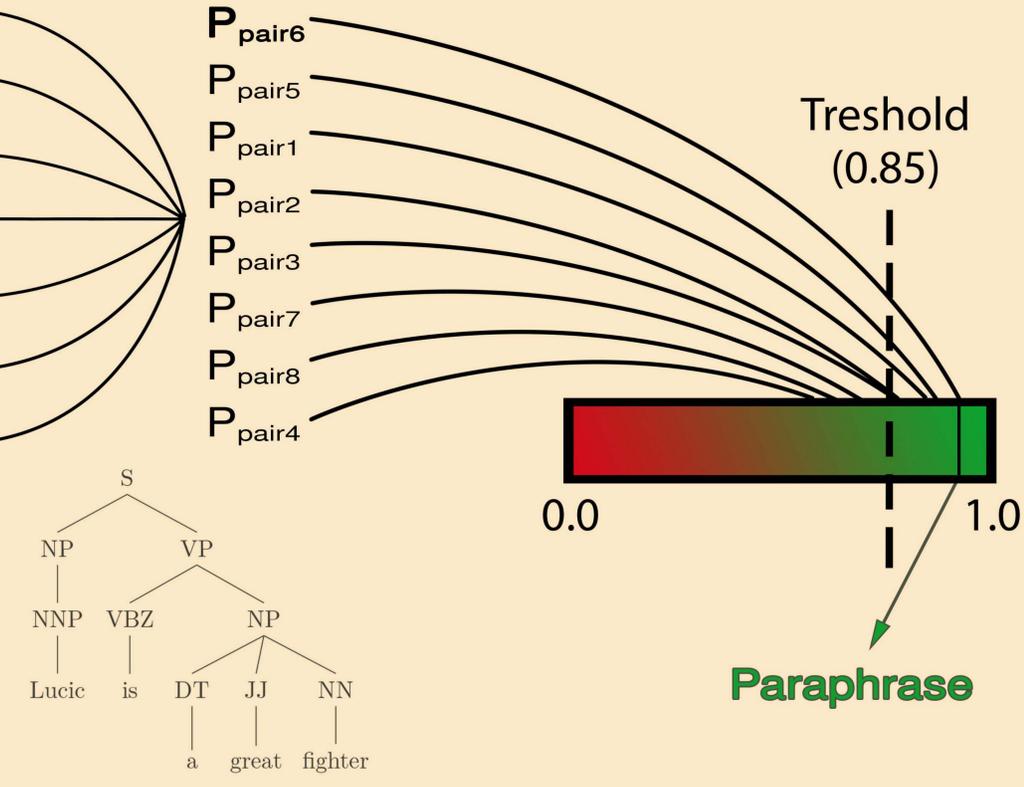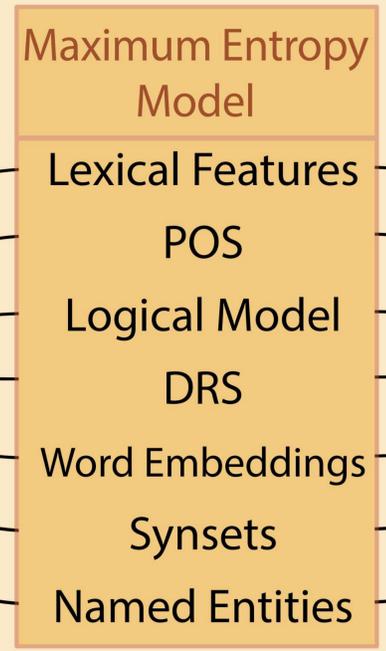Word Embeddings
Synsets
Named Entities

- S: (n) combatant, battler, belligerent, fighter, scrapper (someone who fights (or is fighting))
  - *direct hyponym* / *full hyponym*
  - *direct hypernym* / *inherited hypernym* / *sister term*
    - S: (n) person, individual, someone, somebody, mortal, soul (a human being) "there was too much for one person to do"
  - *derivationally related form*
    - W: (adj) combatant [Related to: combatant] (engaging in or ready for combat)
    - W: (v) combat [Related to: combatant] (battle or contend against in or as if in a battle) "The Kurds are combating Iraqi troops in Northern Iraq"; "We must combat the prejudices against other races"; "they battled over the budget"
    - W: (v) battle [Related to: battler] (battle or contend against in or as if in a battle) "The Kurds are combating Iraqi troops in Northern Iraq"; "We must combat the prejudices against other races"; "they battled over the budget"

P_{pair6}
P_{pair5}
P_{pair1}
P_{pair2}
P_{pair3}
P_{pair7}
P_{pair8}
P_{pair4}

Treshold (0.85)

0.0   1.0

Paraphrase

S
NP   VP
NNP   VBZ   NP
Lucic   is   DT   JJ   NN
a   great fighter

Normalization

1. IV/OOV:
   Using aspell dictionary
2. Generation:
   Lexical edit distances (lower cost of deletion)
3. Ranking:
   Learning to rank(Ngram probs, edit distances)

Results (F-scores)

	Binary	Multi-class
Without normalization	0.58	0.61
With normalization	0.60	0.62