Natural Language Processing Homework 5

Katie Chang

April 6, 2016

README

1 (Q3) Simplify

1.1 John and Mary

Given $f(John = loves(Mary, John)$

- $(\lambda x loves(Mary, x))(\text{John})$

- $loves(Mary, John)$ or alternatively, depending on semantics, "Mary loves John" or "John loves Mary".

1.2 part b

λy loves(Mary, y)
     V NP

1.3 part c

- $(\lambda j \forall x woman(x) \Rightarrow loves(x, j))$

- Assuming that we will continue with the given semantic that loves(Mary, John) means that John loves Mary.

  f : loves every woman.

  f(John) : John loves every woman.

1.4 part d

f = $\lambda y\ \lambda x$ Obviously(y(x))

In order to construct "Sue obviously loves Mary", let y = $(\lambda x loves(Mary, x))$(Sue). This maintains the encapsulation of the λx within the Obviously() semantic.

1.5 part e

f = $\lambda m(\lambda j(\lambda e$ act(e, loving), lovee(e, m), lover(e, j)))

1.6 part f

g = $\lambda f \lambda y \lambda e\ f(y)(e)$, manner(e, passionate)

1.7 part g

i. f = $\lambda x \forall y$ woman(y) $\Rightarrow$ x(y)

ii.

Every woman loves Mary.

Loves Mary.

Every woman.

1.8 part h

i. g = $\lambda f \lambda x \forall y$ f(y) $\Rightarrow$ x(y)

ii. "Every"

1.9 part i

i. λy y(Papa)

ii. Giving Papa these funny semantics specifies exactly how we will use Papa in a consistent way. This way, we won't have to worry about having separate rules such as NP goes to Det Noun that end in Papa as a terminal without a Det.

2 Q4

"Laura say -s that George might sleep on the floor ! " Breaks on Preposition; on the floor is not assigned to sleep, but instead to Laura says.

"Papa would have eat -ed his sandwich -s . " It is ambiguous. Sandwich is assigned to 'his'. This is technically okay but I'm including this to demonstrate how the ambiguity of the original sentence affects the attributes/semantics.

"Papa sleep -s every bon bon with a spoon . " It breaks at "sleeps every bon bon". Sentence is grammatical and parses correctly, but gives the error: " No consistent way to assign attributes!"

"A bon bon on the spoon entice -0 . ' No consistent way to assign attributes!;

"Every sandwich was going to have been delicious . " I actually have no idea what's wrong here. I just thing this sentence sucks.

"the fine and blue woman and every man must have eat -ed two sandwich -s and sleep -ed on the floor ."' No consistent way to assign attributes!; This is likely due to our parse as the VP cannot have attributes assigned correctly.

3 Q5

Included in the submission is the file

question5english.gra

which includes the changes to accommodate for mass nouns.

Also included is a small sentence file (question5english.sen) with three sentences that can be built with buildattrs and one that cannot.

We are able to say that "someone ate the caviar". However, due to semantics, we can't say "someone ate caviar", since mass nouns do have to be able to represent both single and plural nouns in a way. While this sentence works grammatically for plural nouns, it doesn't work for singular nouns.

This grammar works with the sentence "All caviar is delicious".

4 Q6 : english-fullquant.gra

4.1 attr

For *two*, we are ensuring that the two things that we are quantifying are not the same thing, with the *first* and *second* quantifiers on the *domain* restriction, and that the *predicate* applies to both things. Otherwise, we can end up counting a given something twice, which in reality then doesn't mean that we have two, but rather that we just counted one thing twice.

The singular *the* has semantics that ensure that, while there are two different objects t and u, the object that this *predicate* is operating on is t and not on u.

For example, let t = a book, and let u = a book, where t != u. We want to identify a specific book t, and no other book.

The plural *the* has semantics that states that the determinant applies to the exhaustive set of objects on which the *predicate* applies.

Taking the book example again, we are applying *the* to a whole set of books (within reason, ie. all of the books on a bookshelf).

4.2 ???

Edited in english-fullquant.par.

Used overleaf.com to generate LaTeX document.