Natural Language Processing Homework 5

Katie Chang

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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

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.