

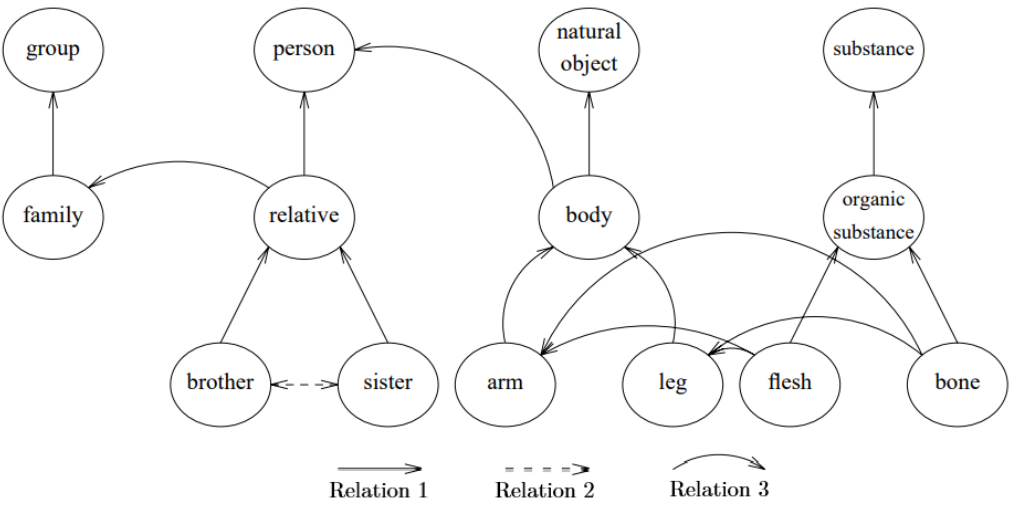
复查测验提交: Homework 5

用户	生物医学工程学院 吉泓光
课程	自然语言处理
测试	Homework 5
已开始	24-5-19 上午12:42
已提交	24-5-21 下午9:46
截止日期	24-5-21 下午11:59
状态	已完成
尝试分数	得 90 分, 满分 120 分
已用时间	69 小时 4 分钟
显示的结果	所有答案, 已提交的答案, 正确答案

问题 1 得 10 分, 满分 10 分

Below is a network representation of three semantic relations. What are the three semantic relations?

Figure 2. Network representation of three semantic relations among an illustrative variety of lexical concepts



问题	正确匹配	所选匹配
Relation 1:	<input checked="" type="checkbox"/> B. Hyponymy - subset; is-a relation	<input checked="" type="checkbox"/> B. Hyponymy - subset; is-a relation

Relation 2: ☒ A. Antonymy - opposition ☒ A. Antonymy - opposition

Relation 3: ☒ C.
Meronymy - part-of relation Meronymy - part-of relation

所有答案选项

A. Antonymy - opposition

B. Hyponymy - subset; is-a relation

C. Meronymy - part-of relation

问题 2

得 10 分，满分 10 分

Word Sense Disambiguation (WSD) aims at selecting the correct sense for a word in context, where the set of senses of each word is given. It could be formulated as

所选答案: ☒ a sequence labeling task

答案: a named entity recognition task

☒ a sequence labeling task

a relation extraction task

a sentence classification task

问题 3

得 10 分，满分 10 分

In the paper [Scaling Semantic Parsers with On-the-fly Ontology Matching](#), the authors point out a significant problem in meaning representation (MR). Let's take a look at an example with lambda-calculus:

Q1: What is the population of Seattle?

Q2: How many people live in Seattle?

MR1: $\lambda x. population(Seattle, x)$

MR2: $count(\lambda x. person(x) \wedge live(x, Seattle))$

A semantic parser might aim to construct MR1 for Q1 and MR2 for Q2. But in fact, these two questions have the same meaning, and many QA databases simply aim to produce MR1 for Q2, thereby introducing significant lexical ambiguity that complicates learning. This problem addresses which property of meaning representation?

所选答案: ☒ Canonical Form

答案: Unambiguity

☒ Canonical Form

Verifiability

Inference Ability

Expressiveness

问题 4

得 0 分，满分 10 分

Choose all pairs in which natural language sentences(NL) have consistent semantics with first-order logic formula(FOL).

所选答 ☒

案: NL: If Abigail makes noise, no one can sleep.

FOL:

$\text{MAKE-NOISE}(\text{Abigail}) \Rightarrow (\forall x \neg \text{CAN-SLEEP}(x))$

☒

NL: If Abigail makes noise, someone cannot sleep.

FOL:

$\text{MAKE-NOISE}(\text{Abigail}) \Rightarrow (\exists x \neg \text{CAN-SLEEP}(x))$

NL: None of Abigail's brothers can sleep.

☒ FOL: $\forall x \text{BROTHER}(x, \text{Abigail}) \wedge \neg \text{CAN-SLEEP}(x)$

答案: ☒

NL: If Abigail makes noise, no one can sleep.

FOL:

$\text{MAKE-NOISE}(\text{Abigail}) \Rightarrow (\forall x \neg \text{CAN-SLEEP}(x))$

☒

NL: If Abigail makes noise, someone cannot sleep.

FOL:

$\text{MAKE-NOISE}(\text{Abigail}) \Rightarrow (\exists x \neg \text{CAN-SLEEP}(x))$

NL: None of Abigail's brothers can sleep.

FOL: $\forall x \text{BROTHER}(x, \text{Abigail}) \wedge \neg \text{CAN-SLEEP}(x)$

☒

NL: If one of Abigail's brothers makes noise, Abigail cannot sleep.

FOL:

$\forall x (\text{BROTHER}(x, \text{Abigail}) \wedge \text{MAKE-NOISE}(x) \Rightarrow \neg \text{CAN-SLEEP}(\text{Abigail}))$

问题 5

得 10 分，满分 10 分

Choose all correct reductions.

所选答案: ☒ $[\lambda x. [\lambda z. zx](q)](y) = qy$

☒ $[\lambda x. axxa](y) = ayga$

答案: $[\lambda x. axxa](y) = ayxz$

$[[\lambda x. \lambda z. zx](q)](y) = qy$

☒ $[\lambda x. [\lambda z. zx](q)](y) = qy$

☒ $[\lambda x. axxa](y) = ayga$

问题 6

得 0 分, 满分 10 分

In the given CFG, each rule has a semantic attachment.

$PN \rightarrow Whiskers$	$\{\lambda x.x(Whiskers)\}$
$NP \rightarrow PN$	$\{PN.sem\}$
$V \rightarrow smiles$	$\{\lambda x.\exists e.Smiles(e) \wedge Smiler(e,x)\}$
$V \rightarrow purrs$	$\{\lambda x.\exists e.Purrs(e) \wedge Purrer(e,x)\}$
$VP \rightarrow V$	$\{V.sem\}$
$Conj \rightarrow and$	$?$
$VP_1 \rightarrow VP_2 Conj VP_3$	$\{Conj.sem(VP_2.sem)(VP_3.sem)\}$
$S \rightarrow NP VP$	$\{NP.sem(VP.sem)\}$

Notice that the subscript indices are only used to distinguish VPs. They are not part of the syntactic category.

We know that the sentence *Whiskers smiles and purrs* has a representation of

$\exists e_1.Smiles(e_1) \wedge Smiler(e_1, Whiskers) \wedge \exists e_2.Purrs(e_2) \wedge Purrer(e_2, Whiskers)$.

Which of the following semantic attachment should be placed at the question mark?

所选答案: ☒ $\{\lambda P.\lambda Q.\lambda x.\lambda y.P(x) \wedge Q(y)\}$

答案: $\{\lambda x.And(x)\}$

$\{\lambda x.x(And)\}$

$\{\lambda p.\lambda q.p \wedge q\}$

☒ $\{\lambda P.\lambda Q.\lambda x.P(x) \wedge Q(x)\}$

$\{\lambda P.\lambda Q.\lambda x.\lambda y.P(x) \wedge Q(y)\}$

问题 7

得 10 分, 满分 10 分

Choose all correct statements about semantic role labeling.

所选 ☒

答案: Semantic role labeling and joint extraction in information extraction can be solved by similar methods because they both predict spans and relations.



Semantic role labeling only identifies predicate-argument structures. It may not identify relationships between adjectives and nouns.



One sentence may contain multiple predicates. For one predicate, its arguments cannot cross each other, so we can predict them with sequence labeling.

答案:



Semantic role labeling and joint extraction in information extraction can be solved by similar methods because they both predict spans and relations.

PropBank and FrameNet are two widely used semantic role specifications. Generally speaking, roles in PropBank are more specific while roles in FrameNet are more general.



Semantic role labeling only identifies predicate-argument structures. It may not identify relationships between adjectives and nouns.



One sentence may contain multiple predicates. For one predicate, its arguments cannot cross each other, so we can predict them with sequence labeling.

问题 8

得 10 分, 满分 10 分

Find the predicate and roles for the following sentences based on [the PropBank framesets](#).

Abigail reluctantly shares a toy with Max.

Predicate: [A] Arg0: [B] Arg1: [C] Arg2: [D]

Fill in the blanks by choosing words from the sentence.

所选答案: Find the predicate and roles for the following sentences based on [the PropBank framesets](#).

Abigail reluctantly shares a toy with Max.

Predicate: **share** Arg0: **Abigail** Arg1: **toy** Arg2: **Max**

Fill in the blanks by choosing words from the sentence.

答案: Find the predicate and roles for the following sentences based on [the PropBank framesets](#).

Abigail reluctantly shares a toy with Max.

Predicate: **share** Arg0: **Abigail** Arg1: **toy** Arg2: **Max**

Fill in the blanks by choosing words from the sentence.

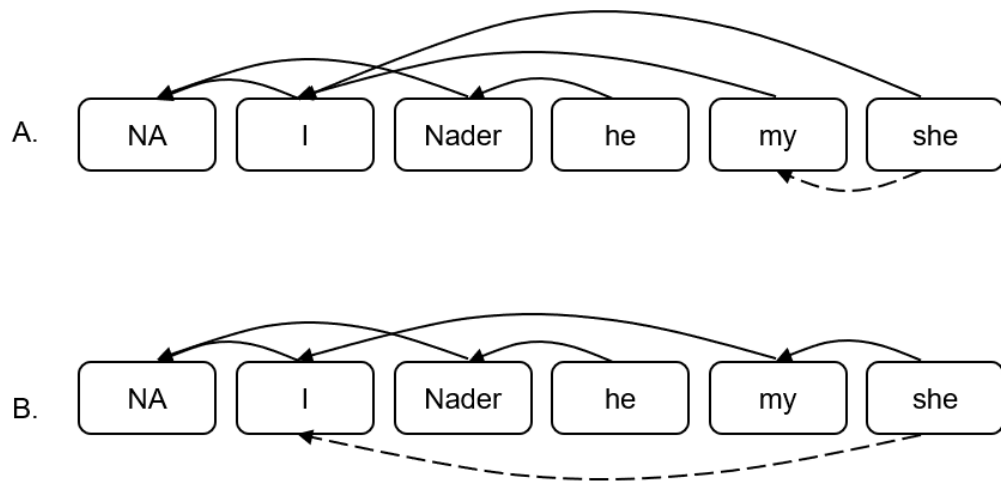
所有答案选项

- Abigail
- reluctantly
- share
- a
- toy
- with
- Max

问题 9

得 10 分, 满分 10 分

In mention ranking, we predict an antecedent for each mention in the text (represented by solid lines). Which of the following coreference links represented by the dashed lines can be inferred according to the transitive closure?



所选答案: ☒ Both of them

答案: A

Neither of them

☒ Both of them

B

问题 10

得 10 分, 满分 10 分

In mention ranking, we predict an antecedent for each mention in the text. Below is a prediction from Jim, but he corrupts it with some ink by accident. Can you read how many clusters of mentions are there in this prediction? (Assume Jim has the gold mention detection)



- 所选答案: ☒ 3
- 答案: ☐ 1
- ☐ 2
- ☒ 3
- ☐ 4
- ☐ Cannot be determined

问题 11

得 10 分，满分 10 分

Please match task names and definitions.

问题	正确匹配	所选匹配
Named entity recognition	<input checked="" type="checkbox"/> A. Tag entities in text with their corresponding type	<input checked="" type="checkbox"/> A. Tag entities in text with their corresponding type
Coreference resolution	<input checked="" type="checkbox"/> C. Cluster mentions in text that refer to the same underlying real world entities	<input checked="" type="checkbox"/> C. Cluster mentions in text that refer to the same underlying real world entities
Entity linking	<input checked="" type="checkbox"/> D. Assign a unique indentity to entities mentioned in text	<input checked="" type="checkbox"/> D. Assign a unique indentity to entities mentioned in text
Relation extraction	<input checked="" type="checkbox"/> B. Predict attributes and relations for entities in a sentence.	<input checked="" type="checkbox"/> B. Predict attributes and relations for entities in a sentence.

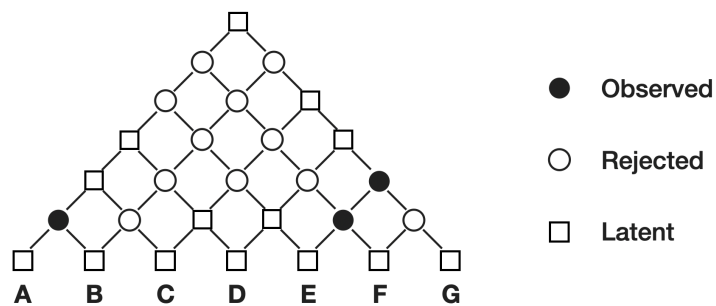
所有答案选项

- A. Tag entities in text with their corresponding type
- B. Predict attributes and relations for entities in a sentence.
- C. Cluster mentions in text that refer to the same underlying real world entities
- D. Assign a unique indentity to entities mentioned in text

问题 12

得 0 分，满分 10 分

Given the following partially-observed constituency parse tree, what are the observed entity spans?



所选答案: ☒ AB

☒ EF

答案:

☒ AB

☒ EF

FG

☒ EFG

BCDE

BCDEF

BCDEFG

2024年5月29日 星期三 下午07时32分32秒 CST

← 确定