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ECS763U/ECS763P - Natural Language Processing - 2022/23 - Semester 1

Started on

Sunday, 25 December 2022, 10:31 PM

State

Finished

Completed on

Sunday, 25 December 2022, 10:50 PM

Time taken

19 mins 10 secs

Grade

7.33 out of 10.00 (73%)

Question 1

Correct

Mark 1.00 out of 1.00

Flag question

Which of these are properties of natural language as a data type (select all that apply)?

Select one or more:

☒ a. Creative

☐ b. Formal

☐ c. Restrictive

☒ d. Free

☒ e. Ambiguous

☐ f. Unambiguous

The correct answers are: Ambiguous, Free, Creative

Question 2

Correct

Mark 1.00 out of 1.00

Flag question

Which of these are methods to reduce the number of features that a text classifier might use?

Select one or more:

☒ a. Use minimum document frequency to define the feature set.

☒ b. Use stems of words in place of the words.

☐ c. Use bigrams (two word sequences) as features instead of unigrams (single words).

☒ d. Using maximum document frequency to define the feature set.

☐ e. Increase the size of the vocabulary.

☐ f. Parse the sentences in the text.

The correct answers are: Use minimum document frequency to define the feature set., Use stems of words in place of the words., Using maximum document frequency to define the feature set.

Question 3

Incorrect

Mark 0.00 out of 1.00

Flag question

Consider the training data below for a language model consisting of three sentences. Note the padding around the words- you should consider both the beginning and end of sentence markers as words.

To obtain the counts on the sentences each one will be scanned through and each word counted as per the two functions C in the formula for a bigram model shown below. Remember that in the count in the denominator the word $\langle /s \rangle$ for the end of sentence will never be counted. Note that the size of vocabulary V will not include the beginning padding marker $\langle s \rangle$ but can contain the end of sentence marker $\langle /s \rangle$. After the counts have been collected, according to a Laplace (add-one) smoothed bigram model, what is the raw (i.e. not log) probability value for $p(Mary|likes)$. Give your answer to 1 DECIMAL PLACE.

$$p(w_i | w_{i-1}) = \frac{C(w_{i-1}, w_i) + 1}{C(w_{i-1}) + V}$$

(note beginning $\langle s \rangle$ and end-of-sentence $\langle /s \rangle$ markers, treat them as words):

 $\langle s \rangle$ John likes Mary and Bill $\langle /s \rangle$
 $\langle s \rangle$ Mary likes John and Mohammed $\langle /s \rangle$
 $\langle s \rangle$ Mary and John like Mohammed and Bill $\langle /s \rangle$

Answer: 0.5

The correct answer is: 0.2

Question 4

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following are measures of the utility of a feature which can be used in feature selection for a text classifier?

☒ a. Pointwise Mutual Information

☒ b. Chi squared

☒ c. Information Gain

☐ d. Bias vector

☐ e. Loss curve

☐ f. Gradient Descent

Your answer is correct.

The correct answers are: Pointwise Mutual Information, Information Gain, Chi squared

Question 5

Incorrect

Mark 0.00 out of 1.00

Flag question

In the below sentence showing the word/POS pair, select the appropriate Penn Treebank style POS tag in the missing position indicated by ? Bill/NN wanted/VBD to/? go/VB home/NN.

Select one:

☐ a. TO

☐ b. MD

☐ c. IN

☐ d. RB

☐ e. JJ

The correct answer is: TO

Question 6

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following is true of deep neural nets (DNNs) but not of classical machine learning?

☐ a. DNNs require evaluation on a test set for performance checks

☒ b. DNNs do not require lots of manually defined feature interactions

☐ c. DNNs require manual or experimental hyperparamter selection and optimization

☐ d. DNNs can be used for sentiment analysis

☐ e. DNNs can be used for fake review detection

The correct answer is: DNNs do not require lots of manually defined feature interactions

Question 7

Correct

Mark 1.00 out of 1.00

Flag question

In this question refer to the Context Free Grammar lexicon and production rules below. According to these rules, is the following sentence is grammatical or ungrammatical according to this grammar?: " book flight from Paris'

Production Rules

$S \rightarrow VP\ NP$
 $VP \rightarrow Verb$
 $PP \rightarrow Prep\ Noun$
 $PP \rightarrow Prep\ Noun\ PP$
 $NP \rightarrow NP\ PP$
 $NP \rightarrow Det\ Noun$

Lexicon

$Verb \rightarrow book\ | \ need$
 $Det \rightarrow the\ | \ a$
 $Noun \rightarrow train\ | \ flight\ | \ Paris\ | \ London\ | \ I$
 $Prep \rightarrow to\ | \ from$

Select one:

☐ a. ungrammatical

☒ b. grammatical

The correct answer is: ungrammatical

Question 8

Correct

Mark 1.00 out of 1.00

Flag question

Select all of the below which are vector weighting methods.

Select one or more:

☐ a. Shannon-Jensen Divergence

☐ b. Cosine similarity

☒ c. Positive Pointwise Mutual Information

☒ d. TF-IDF

☒ e. Laplace smoothing

☐ f. Kullback-Leibler Divergence

The correct answers are: Positive Pointwise Mutual Information, TF-IDF, Laplace smoothing

Question 9

Correct

Mark 1.00 out of 1.00

Flag question

Select all of the following statements which are consistent with the distributional hypothesis of language meaning.

Select one or more:

☒ a. You shall know a word by the company it keeps.

☒ b. Words that appear in the same contexts can be assumed to be synonymous.

☐ c. Meaning is determined by a logical form attached to each word or constituent.

☒ d. A word's meaning can be approximated by the distribution of the contexts it occurs in.

☐ e. The meaning of a sentence is determined by its denotation according to a formal model of the world.

☐ f. The syntax of a language determines the meaning of sentences.

The correct answers are: You shall know a word by the company it keeps., A word's meaning can be approximated by the distribution of the contexts it occurs in., Words that appear in the same contexts can be assumed to be synonymous.

Question 10

Partially correct

Mark 0.33 out of 1.00

Flag question

According to the Soon et al 2001 boolean features, which of the following are TRUE for the \langle antecedent i, anaphor j \rangle candidate pair \langle John, she \rangle in the sentence: 'John told Lucy she had to go to school.'

Select one or more:

☐ a. i and j have the same semantic class "person"

☐ b. i and j are string matched

☐ c. i is a pronoun

☒ d. i and j have number agreement

☒ e. i and j have gender agreement

☒ f. j is a pronoun

The correct answers are: j is a pronoun, i and j have number agreement, i and j have the same semantic class "person"

Finish review

◀ 11.2 Reading (Optional): Traum and Larsson 2003 - The Information State Update Approach to Dialogue Management

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