

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

Started on

Thursday, 13 October 2022, 2:56 PM

State

Finished

Completed on

Thursday, 13 October 2022, 3:36 PM

Time taken

39 mins 46 secs

Grade

8.67 out of 10.00 (87%)

Question 1

Correct

Mark 1.00 out of 1.00

Flag question

The disjunctive probability of either outcome A or B being the case (i.e. $p(A \vee B)$) can be greater than the probability of each of the individual outcomes on their own (i.e. greater than $p(A)$ and greater than $p(B)$).

Select one:

☒ True

☐ False

The correct answer is 'True'.

Question 2

Incorrect

Mark 0.00 out of 1.00

Flag question

The conditional probability of outcome A being the case given we know B is the case (i.e. $p(A|B)$) can be greater than the probability of A being the case with no other information (i.e. greater than $p(A)$).

Select one:

☐ True

☒ False

The correct answer is 'True'.

Question 3

Correct

Mark 1.00 out of 1.00

Flag question

In terms of set-theoretic notation, which of the following is the correct formulation of the conditional probability $p(B|A)$?

Select one:

☒ a. $\frac{|A \cap B|}{|A|}$

☐ b. $\frac{|A \cap B|}{|B|}$

The correct answer is: $\frac{|A \cap B|}{|A|}$

Question 4

Partially correct

Mark 0.67 out of 1.00

Flag question

Which of these are applications of text classification?

Select one or more:

☒ a. Deception detection from someone's email.

☐ b. Sentiment analysis using facial expression analysis only.

☒ c. Cancer diagnosis detected from doctor's note.

☐ d. Cancer diagnosis from X-rays.

☒ e. Spam detection.

☒ f. Deception detection from the pitch of someone's voice.

The correct answers are: Spam detection., Cancer diagnosis detected from doctor's note., Deception detection from someone's email.

Question 5

Correct

Mark 1.00 out of 1.00

Flag question

Which stage of supervised text classification should be done first out of the following?

Select one:

☒ a. Defining the feature extraction process.

☐ b. Applying the machine learning model on unseen data to classify it in a real-world scenario.

☐ c. Optimising the model on heldout/validation data.

☐ d. Evaluating the machine learning model on a test set.

☐ e. Training the machine learning model.

The correct answer is: Defining the feature extraction process.

Question 6

Correct

Mark 1.00 out of 1.00

Flag question

If the likelihood of outcome A, $p(A)$ is 0.2 and the likelihood $p(A|B)$ is 0.8, what is the likelihood $p(A \wedge B)$?

Select one:

☐ a. 0.16

☐ b. 0.6

☒ c. Not enough information given to know.

☐ d. 1.0

☐ e. 0.25

The correct answer is: Not enough information given to know.

Question 7

Correct

Mark 1.00 out of 1.00

Flag question

A Bayesian classifier is one which uses the prior probability, the likelihood, and the evidence to calculate the probability.

The correct answer is: posterior

Question 8

Correct

Mark 1.00 out of 1.00

Flag question

Using the notation TP for true positives, TN for true negatives, FP for false positives and FN for false negatives, fill in the missing part of the equation below for the formula for the Recall of a classifier's predictions (only use TP, TN, FP or FN). Recall = TP / TP + .

The correct answer is: FN

Question 9

Correct

Mark 1.00 out of 1.00

Flag question

Consider the table of word counts for a small vocabulary of 7 words over a corpus of positive and negative tweets.

	#DOCS	bieber	love	hate	#sarcasm	hi	lol	nlp	#Total words in docs
POSITIVE	400	40	30	23	40	120	300	30	583
NEGATIVE	100	12	4	20	38	27	1	3	105

$$c_{NB} = \operatorname{argmax}_{c_j \in C} \log(P(c_j)) + \sum_{i \in positions} \log(P(x_i | c_j))$$

	$\log(P(c_j))$	$\sum_{i \in positions} \log(P(x_i c_j))$	$\log(P(c_j)) + \sum_{i \in positions} \log(P(x_i c_j))$
POSITIVE			
NEGATIVE		?	

You are applying a Naive Bayes Classifier trained on this data to the tweet "**love beieber #sarcasm**". What is the value for the part of the equation indicated by the ? in the table- i.e. the sum of the logs of the likelihood of each word in the tweet given the class NEGATIVE? Assume that the word counts have already had 1 added to them already in smoothing. Use log base e and give your answer to 2 DECIMAL PLACES.

Answer:

Yes, correct for log base e.

The correct answer is: -6.45

Question 10

Correct

Mark 1.00 out of 1.00

Flag question

Consider the table of word counts for a small vocabulary of 7 words over a corpus of positive and negative tweets.

	#DOCS	bieber	love	hate	#sarcasm	hi	lol	nlp	#Total words in docs
POSITIVE	400	40	30	23	40	120	300	30	583
NEGATIVE	100	12	4	20	38	27	1	3	105

$$c_{NB} = \operatorname{argmax}_{c_j \in C} \log(P(c_j)) + \sum_{i \in positions} \log(P(x_i | c_j))$$

	$\log(P(c_j))$	$\sum_{i \in positions} \log(P(x_i c_j))$	$\log(P(c_j)) + \sum_{i \in positions} \log(P(x_i c_j))$
POSITIVE	?		
NEGATIVE			

You are applying a Naive Bayes Classifier trained on this data to the tweet "**love beieber #sarcasm**". What is the value for the part of the equation indicated by the ? in the table- i.e. the log of the prior for the class POSITIVE? Use Log base e and give your answer to 2 DECIMAL PLACES.

Answer:

Yes, correct for using log base e.

The correct answer is: -0.22

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