Congratulations! You passed!

Next Item

1. Choose true statements about text tokens.

1 / 1 points

- [x] A model without stemming/lemmatization can be the best

  Correct
  This is true. Word2vec embeddings, for instance, are trained on raw tokens.

- [ ] Lemmatization is always better than stemming

  Un-selected is correct

- [x] Stemming can be done with heuristic rules

  Correct
  Yeah, Porter stemmer works this way.

- [x] Lemmatization needs more storage than stemming to work

  Correct
  This is true, you have to store information about all possible word forms in the vocabulary.

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2. Imagine you have a texts database. Here are stemming and lemmatization results for some of the **words**:

1 / 1 points

Word	Stem	Lemma
operate	oper	operate
operating	oper	operating
operates	oper	operates
operation	oper	operation
operative	oper	operative
operatives	oper	operative
operational	oper	operational

Imagine you want to find results in your texts database using the following queries:

1. **operating system** (we are looking for articles about OS like Windows or Linux)
2. **operates in winter** (we are looking for machines that can be operated in winter)

Before execution of our search we apply either stemming or lemmatization to both query and texts. Compare stemming and lemmatization for a given query and choose the correct statements.

- [x] Lemmatization provides higher precision for **operates in winter** query.

  Correct
  This is true, but it would loose a lot of other relevant forms.

- [ ] Stemming provides higher precision for **operating system** query.

  Un-selected is correct

- [ ] Stemming provides higher F1-score for **operating system** query.

  Un-selected is correct

- [x] Stemming provides higher recall for **operates in winter** query.

  Correct
  This is true, lemmatization would only find exact matches with **operates** and lose a lot of relevant forms like **operational**.

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3. Choose correct statements about bag-of-words (or n-grams) features.

1 / 1 points

- [x] Classical bag-of-words **vectorizer** (object that does vectorization) needs an amount of RAM at least proportional to T, which is the number of unique tokens in the dataset.

  Correct
  This is true, you have to store a hash map {token: index} to be able to vectorize new texts.

- [ ] Hashing **vectorizer** (object that does vectorization) needs an amount of RAM proportional to vocabulary size to operate.

  Un-selected is correct

- [x] We prefer **sparse** storage formats for bag-of-words features.

  Correct
  This is true. We have a lot of zeros in these features, that's why we can store them efficiently in sparse formats (look at sklearn.feature_extraction.text.TfidfVectorizer and scipy.sparse.csr_matrix).

- [ ] For bag-of-words features you need an amount of RAM at least proportional to $N \times T$, where N is the number of documents, T is the number of unique tokens in the dataset.

  Un-selected is correct

- [ ] You get the same vectorization result for any words permutation in your text.

  Un-selected is correct

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4. Let's consider the following texts:

1 / 1 points

- good movie
- not a good movie
- did not like
- i like it
- good one

Let's count **Term Frequency** here as a distribution over tokens in a particular text, for example for text "good one" we have TF = 0.5 for "good" and "one" tokens.

Term frequency (TF)

- $\mathrm{tf}(t,d)$ – frequency for term (or n-gram) t in document d
- Variants:

weighting scheme	TF weight
binary	$0, 1$
raw count	$f_{t,d}$
term frequency	$f_{t,d} / \sum_{t' \in d} f_{t',d}$
log normalization	$1 + \log(f_{t,d})$

Inverse document frequency (IDF)

- $N = |D|$ – total number of documents in corpus
- $|\{d \in D : t \in d\}|$ – number of documents where the term t appears
- $\mathrm{idf}(t,D) = \log \frac{N}{|\{d \in D : t \in d\}|}$

What is the **sum** of TF-IDF values for 1-grams in "good movie" text? Enter a math expression as an answer. Here's an example of a valid expression: *log(1/2)*0.1*.

Preview

$-0.5\log(3) - 0.5\log(2) + 1.0\log(5)$

0.5*(log(5/3)+log(5/2))

Correct Response

Your answer, 0.5*(log(5/3)+log(5/2)), is equivalent to the instructor's answer (0.5 * log(5/3))+(0.5 * log(5/2)).

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5. What models are usable on top of bag-of-words features (for 100000 words)?

1 / 1 points

- [x] Naive Bayes

  Correct

- [x] SVM

  Correct

- [ ] Gradient Boosted Trees

  Un-selected is correct

- [x] Logistic Regression

  Correct

- [ ] Decision Tree

  Un-selected is correct