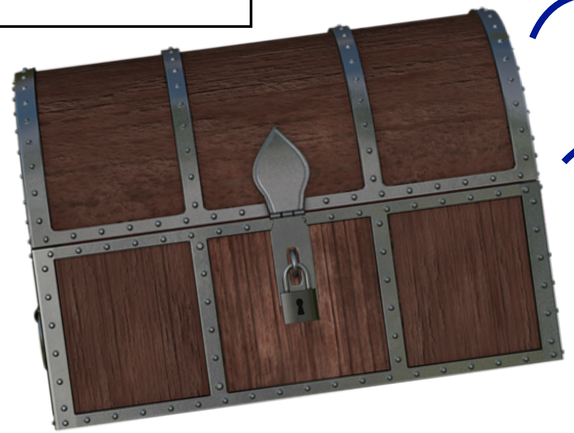
Applied Text Mining in Python

Generative models and LDA

Generative Models for Text

Pr(text | model)

the	0.1
is	0.07
harry	0.05
potter	0.04
movie	0.04
plot	0.02
time	0.01
rowling	0.01

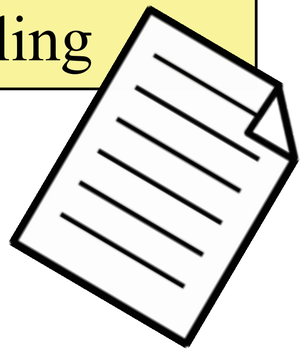


Inference, Estimation

the harry potter movie is harry is

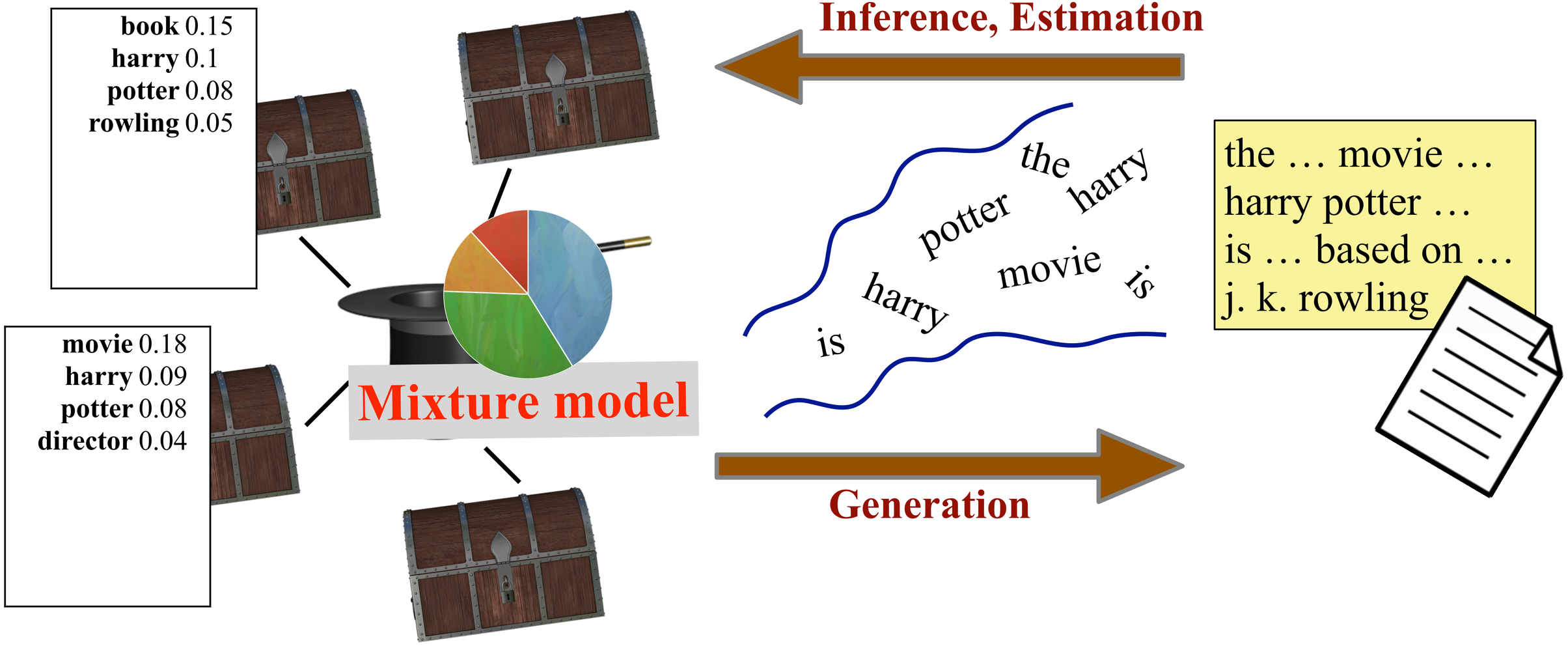
Generation

the … movie …
harry potter …
is … based on …
j. k. rowling



Generative Models can be Complex

Pr(text | model)



Latent Dirichlet Allocation (LDA)

- Generative model for a document d
  - Choose length of document d
  - Choose a mixture of topics for document d
  - Use a topic's multinomial distribution to output words to fill that topic's quota

Topic Modeling in Practice

- How many topics?
  - Finding or even guessing the number of topics is hard
- Interpreting topics
  - Topics are just word distributions
  - Making sense of words / generating labels is subjective

Topic Modeling: Summary

- Great tool for exploratory text analysis
  - What are the documents (tweets, reviews, news articles) about?
- Many tools available to do it effortlessly in Python

Working with LDA in Python

- Many packages available, such as gensim, lda
- Pre-processing text
  - Tokenize, normalize (lowercase)
  - Stop word removal
  - Stemming
- Convert tokenized documents to a document - term matrix
- Build LDA models on the doc-term matrix

Working with LDA in Python (2)

- **doc_set: set of pre-processed text documents**

```
import gensim
from gensim import corpora, models

dictionary = corpora.Dictionary(doc_set)
corpus = [dictionary.doc2bow(doc) for doc in doc_set]
ldamodel = gensim.models.ldamodel.LdaModel (corpus, num_topics=4,
id2word=dictionary, passes=50)
print(ldamodel.print_topics(num_topics=4, num_words=5))
```

- **ldamodel can also be used to find topic distribution of documents**

```
topic_dis = ldamodel[new_doc]
```

Take Home Concepts

- Topic modeling is an exploratory tool frequently used for text mining
- Latent Dirichlet Allocation is a generative model used extensively for modeling large text corpora
- LDA can also be used as a feature selection technique for text classification and other tasks