1729

fractal

Analytics Vidhya

SESSION

Text Classification

SPEAKER

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Speaker at Top Events

Agenda

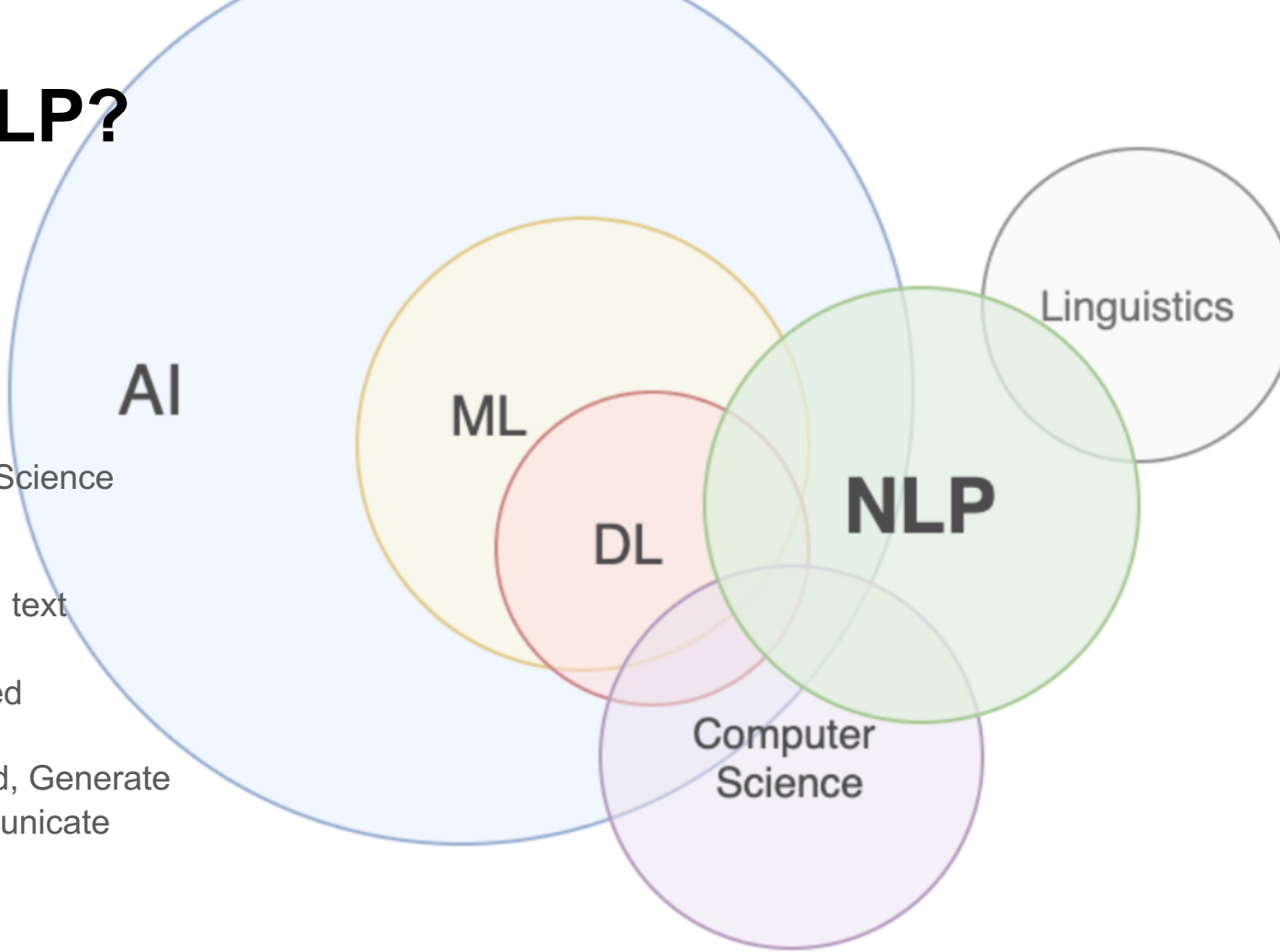
- What is NLP
- Applications of NLP
- Complexities
- NLP Workflow
- Context
- Deep Learning and NLP

Natural Language

- Highly Unstructured in Nature
- Way of Communication
- Too Many Variations
- Difficult to Ingest/Parse
- Available All Around Us

What is NLP?

- Intersection of :
  - Linguistics
  - Computer Science
  - AI
- NLP is about:
  - Processing text
  - Analyzing unstructured information
  - Understand, Generate and Communicate



Applications

1. **Text Classification**
   Sentiment Analysis, Spam Detection, Document Categorization
2. **Information Retrieval**
   Search, Chat-bots, Question Answering
3. **Text Summarization**
   News Excerpts, Document/Book Summary, Topic Modeling
4. **Machine Translation**
   English to Hindi, German to French…
5. **Text Generation**
   Creative writing, Headline creation, Meme text
6. **Speech Analysis**
   AI Assistants, Speech to Text

Language and its Complexities

Typical NLP Workflow

Preprocessing

Cleanup

Standardization

Feature Engineering

Tokenization

Text Representation

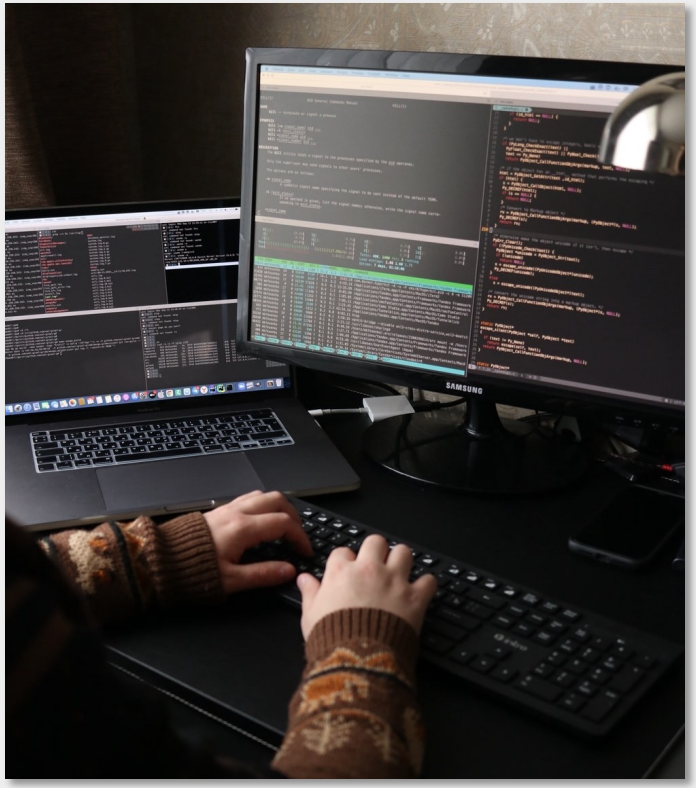
Modeling

Train

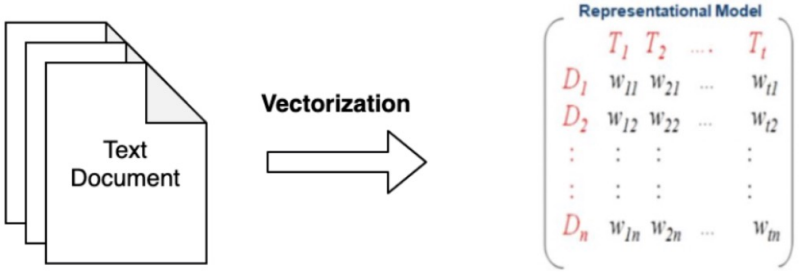
Evaluate and Deploy

Time for Some Action

Hands-on - I



Text Representation Models



- Textual data is not directly ingestible
- We need methods to transform text into useful format
- Text Representation Models help in “vectorizing” textual data

Text Representation Models

Bag of Words

- Matrix Transformation of textual data
- Ordering of words is ignored
- Matrix:
  - Columns are words of the vocabulary
  - Rows are documents/sentences
  - Cell values are count of occurrences

	This	Is	Sentence	One	Two
This is sentence one	1	1	1	1	0
This is sentence two	1	1	1	0	1

TF-IDF

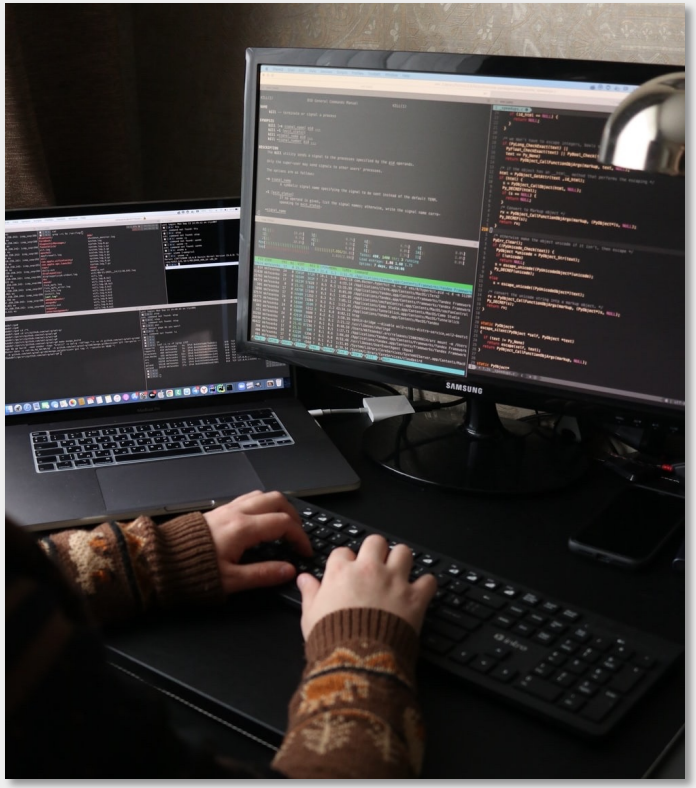
- Improvement on top of BoW
- Counts are normalized based on inverse document frequency
- More robust to noise

Co-Occurrence Matrices

- Matrix:
  - Column are words of the vocabulary
  - Rows are words of the sentence
  - Cell values are number of times a word in the given row exists in the context of the words in the columns
- Good at capturing word associations

Time for Some Action

Hands-on – II and III



Context

- Did you see the look on her face?
- The new clock-face on my watch is amazing
- It is time to face my demons
- How many new faces did you see in office today?

Non-Local Interactions

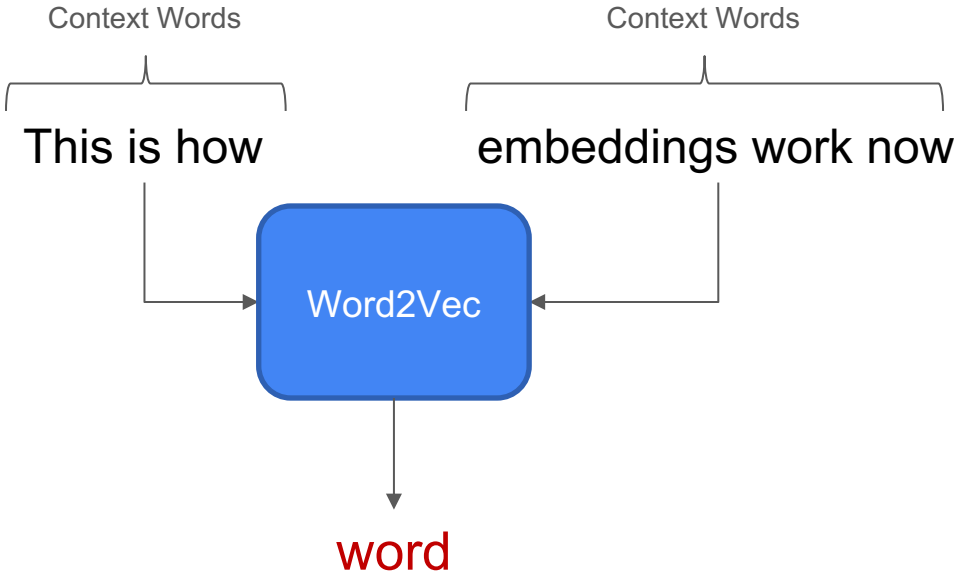
The man who ate pepper sneezed

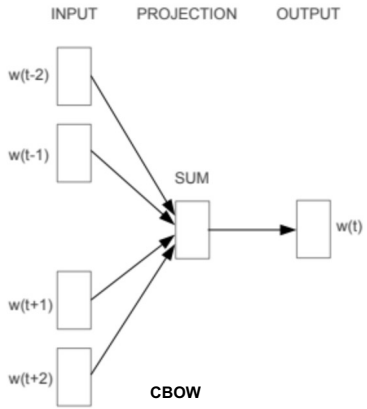
The cat who bit the dog barked

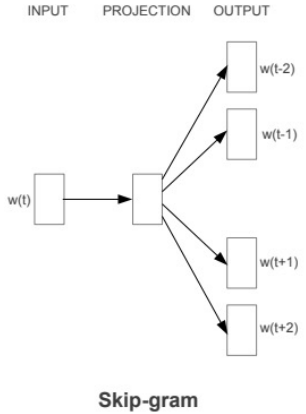
Word Embeddings

Word2Vec

- Vector representation based on local context
- Variations:
  - CBOW
  - Skip-Gram
- Dense representations







Word Embeddings

Word2Vec

- Vector representation based on local context
- Variations:
  - CBOW
  - Skip-Gram
- Dense representations

GloVe

- Based on Global and Local contexts
- Dense representation with performance on par with Word2Vec

FastText

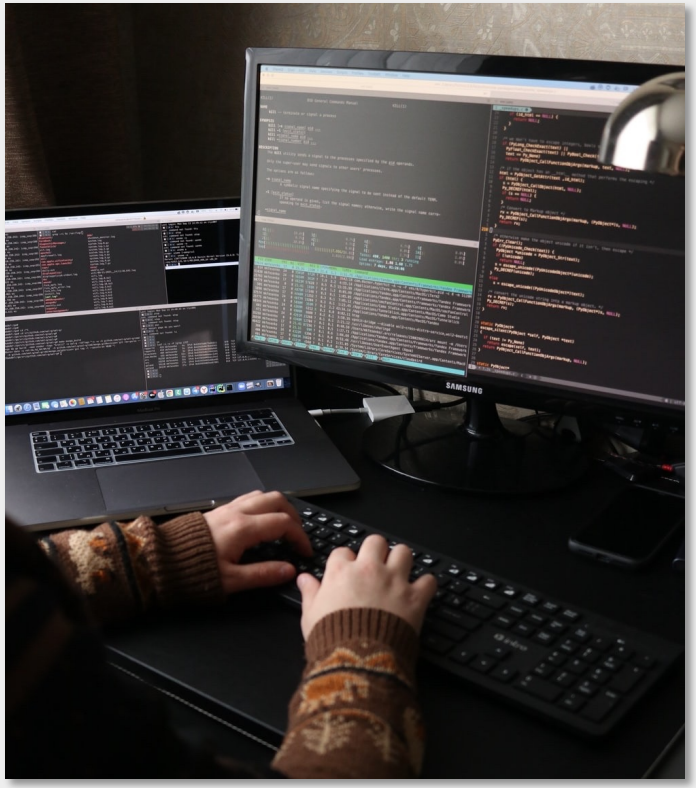
- Extension of Word2Vec setup
- Handles out of vocabulary terms better than Word2Vec and GloVe

Deep Learning and NLP

- *Attention is All You Need*
- Transformers
- BERT and Friends

Time for Some Action

Hands-on - IV



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