Building Deep Learning models for NLP

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Introduction

What is Natural Language Processing?

Natural Language Processing (*NLP)* is a subfield of *Artificial Intelligence* that is focused on enabling computers to understand and process human languages (audio, text, sign …)

NLP is important for scientific, economic, social, and cultural reasons. Language underlies the main ways of communications (news, social media, videos…), we talk with others using a (or a few) language and we express our sentiments and feelings by text/voice, among many other cases.

Introduction

NLP tasks

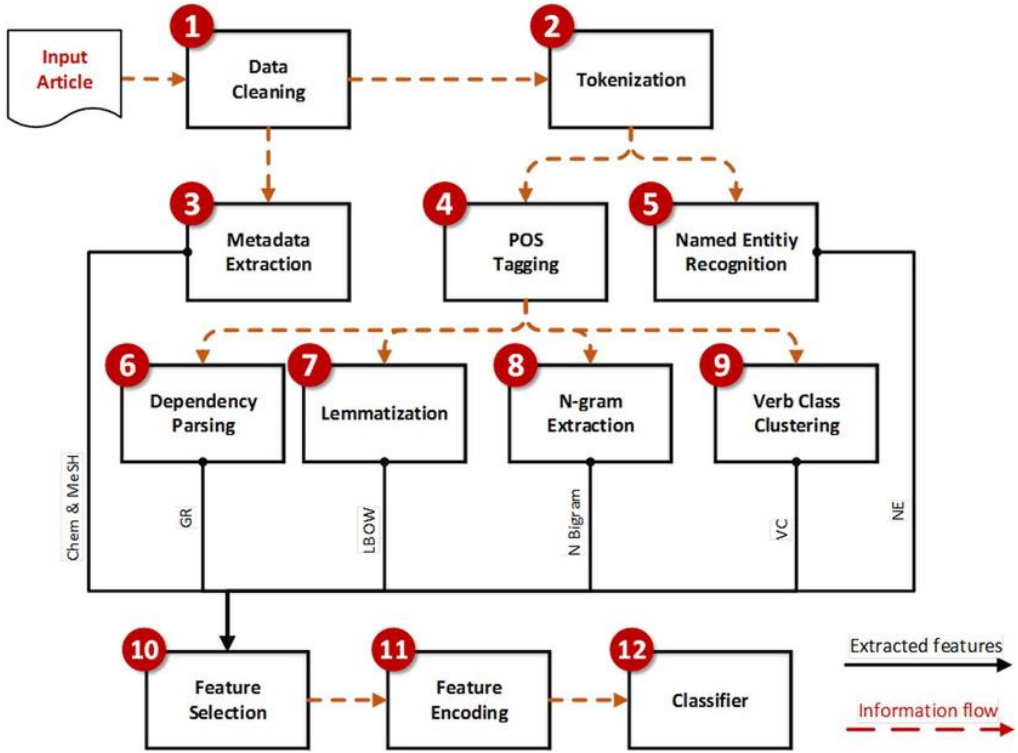
Introduction

NLP tasks

- Document classification
- Text normalization
- POS tagging
- Named entity extraction
- Machine translation
- Language generation
- Automatic Speech Recognition
- Sentiment analysis
- Trend analysis
- Spelling corrector
- Automatic summarization
- Social media analysis
- Virtual assistants
- Semantic similarity

Introduction

NLP general pipeline

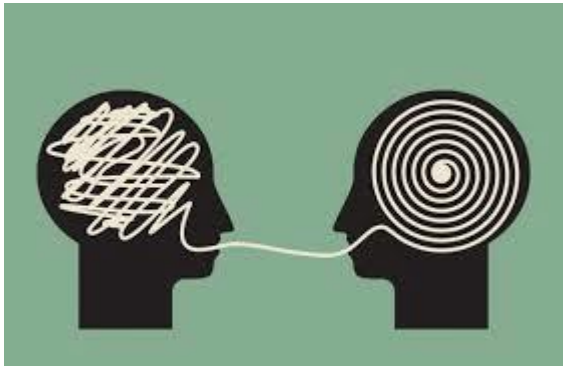


source: https://www.researchgate.net/figure/The-NLP-pipeline-for-automatic-classification-of-document-abstracts-Chem-Chemical_fig1_314225820

Introduction

NLP challenges

- Misspellings
- Multiple intents in one utterance
- Polysemy
- Context understanding
- False positives
- Not enough data
- Mainly unsupervised
- Evaluation
- Differences between languages



Introduction

NLP state-of-the-art

- Better unsupervised char/word/sentence representation models (BERT, ELMo, GPT-2, ...)
- New ANN topologies (transformers, transformers, ...) and pretrained models
- More and more complex ANN arquitectures by combining other simpler or by using, e. g., VAEs, GANs, etc.
- Available open source frameworks (pre-trained models, stanford core nlp, ...)
- Huge amount of available data (social media, news, chats, audio transcriptions, corpus, ...)
- Virtual assistants and chatbots in a wide range of sectors

Projects

Time to have fun