

CPE 372/641 Natural Language Processing

Conclusion

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Natural language processing (NLP)

is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human (natural) languages

Major applications and tasks in NLP:

- Machine translation
- Named entity recognition
- Part-of-speech tagging
- Parsing
- Question answering
- Sentiment analysis
- Speech recognition
- Information retrieval
- Information extraction
- Automatic summarization

Types of applications in NLP

Group 1	Group 2	Group 3
Cleanup, Tokenization	Information Retrieval and Extraction (IR)	Machine Translation
Stemming	Relationship Extraction	Automatic Summarization/ Paraphrasing
Lemmatization	Named Entity Recognition (NER)	Natural Language Generation
Part of Speech Tagging	Sentiment Analysis/Sentence Boundary Disambiguation	Reasoning over Knowledge Based
Query Expansion	World sense and Disambiguation	Quation Answering System
Parsing	Text Similarity	Dialog System
Topic Segmentationand Recognition	Coreference Resolution	Image Captioning & other Multimodel Tasks
Morphological Degmentation (Word/Sentences)	Discourse Analysis	

NLP (NLG) at Google

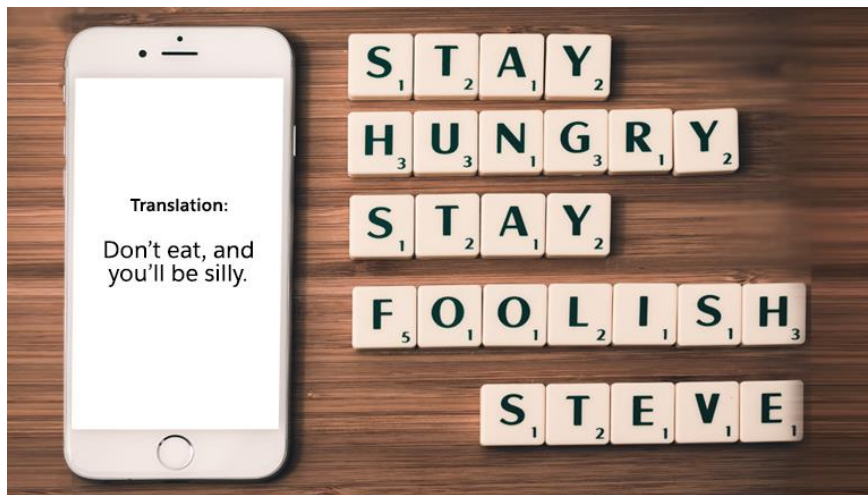
<https://youtu.be/MNvT5JekDpg>

What have we learned?

- From characters to words to sentences
 - Regular expressions
 - Finite State Machine
 - Minimum Edit Distance
 - Morphological Processing
 - Semantic Representation, FOPC
 - Semantic vectors
 - Syntactic Structures and Parsing
 - Information retrieval
 - Question answering
 - Sentiment analysis
 - Machine Translation

What haven't we learned?

- Something 'beyond' sentence level:
 - Discourse = understanding whole paragraph, text, pronoun resolution
 - Pragmatics = language use
 - Idioms, metaphors
- Analyze 'tone' of messages
- Grammar checker



Future Direction

- NLP moves from rules-based towards machine learning/deep learning/neural
- Not much territory left for rule-based

Summary

- Even so, machine learning for NLP can learn from **human knowledge of language (model) (just like what you saw in the video)**.
- If you use tools that allow you to create chatbots, but if you don't add NLP capabilities or knowledge as mentioned above, the conversation with your chatbot is **not** 'natural' at all.