AI for Natural Language Processing (NLP)

Course Summary

Description

Today, there is a great need for the introduction of AI into all aspects of software, making the enterprise software smart. The argument one often finds in articles describing the unsatisfactory state of business software is, “If smartphones can do it, why can’t enterprise software?”

This course addresses the need for smart software for text processing.

Topics

- Text Preparation
- AI overview
- AI with TensorFlow and Keras
- NLP and Deep Learning
- Unsupervised NLP (Optional)
- Conversational AI (Optional)

Audience

The course is intended for software architects and engineers. It gives them a practical level of experience, achieved through a combination of about 50% lecture, 50% demo work with student’s participation.

Prerequisites

- Familiarity with any programming language
- Be able to navigate Linux command line
- Basic knowledge of command line Linux editors (VI / nano)

Duration

Three Days
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Course Outline

I. **Text Preparation**
   A. Bag-of-words
   B. Bag-of-n-Grams
   C. Filtering
   D. Stopwords
   E. Frequency-based
   F. Stemming
   G. Parsing and tokenization
   H. TF-IDF
   I. NLTK
   J. TextBlob
   K. SpaCy for semantic pipeline and named entity recognition

II. **AI overview**
   A. A brief history of AI
   B. Types of AI systems
   C. Training machine learning models
   D. Applying models for prediction
      - Demos and Labs

III. **AI with TensorFlow and Keras**
   A. Google democratization of AI with TensorFlow
   B. Types of neural network (Perceptron, CNN) and their use
   C. Text Processing with TensorFlow
      - Use cases and labs

IV. **NLP and Deep Learning**
   A. Word2vec
   B. Learning word embedding
   C. The Skip-gram Model
   D. Building the graph
   E. Training the model
   F. Visualizing the embeddings
   G. Optimizing the implementation
   H. Text classification with TensorFlow
   I. Linear models and SVM
   J. Working with Unicode
   K. Automatic translation (seq2seq)
   L. Text generation with RNN
   M. Named entity extraction with RNNs (sequence modeling)
   N. Bidirectional LSTM with attention
   O. Transformer architecture
   P. Context-aware representations using pretrained language models (ELMo, BERT, ULMFiT) (Transfer learning probably)

Q. Text processing pipelines

V. **Unsupervised NLP (Optional)**
   A. LDA (Latent Dirichlet Allocation)
   B. Topic modeling with gensim
   C. Applications of topic modeling

VI. **Conversational AI (Optional)**
   A. Introduction to the Rasa framework
   B. Generating natural language
   C. Understanding natural language
   D. Chatbots

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