CSCE 6215: Graph-based Natural Language Processing and Deep Learning

3 Semester Credit Hours; 3 Lecture Hours

Course Coordinator: Paul Tarau
Textbook: none
Other materials: academic papers, open source software.

Catalog description: Students explore advanced topics in graph and deep-learning based natural language processing. The course will overview current research trends and open-source tools in the field and provide a solid foundation on key theoretical methods and practical applications integrating deep learning and graph-based techniques foecussed on advanced natural language understanding tasks. A research project will apply the the techniques learned for automatic summary, keyphrase and relation extraction from text documents.

Prerequisites: CSCE CSCE 5290 or CSCE 5215 or CSCE 5210

Course outcomes:

1. Familiarity with key directions in recent research in graph and deep-learning based natural language processing
2. Practical knowledge in configuring deep-learning systems used in natural language processing tasks and their hyperparameters
3. Ability to set up and customize graph-based and deep-learning natural language toolkits using their Python-based interfaces
4. Ability to empirically evaluate the performance of summary, keyphrase and relation extraction systems

Brief list of topics to be covered: Dependency parsers, Graph centrality algorithms, Deep-learning neural networks for natural language processing, Working with Tensorflow and Pytorch, Extractive and abstractive summarization, Keyphrase extraction, Subject-verb-object relation extraction, Sentiment and entailment analysis, Graph and deep-learning based question-answering.