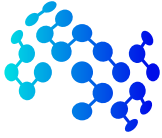




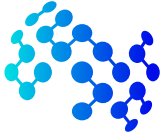
Core Courses Syllabi

NLP705 - Topics in Advanced Natural Language Processing

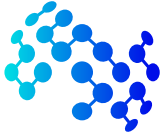
Title	Topics in Advanced Natural Language Processing
Code	NLP705
Loading	4 Credit-hours
Prerequisites	<ul style="list-style-type: none">• NLP 701 Natural Language Processing• Understanding of calculus, algebra, probability and statistics• Programming in Python or similar language
Catalog Description	This course focuses on recent advances in Natural Language Processing and on developing skills for performing research to advance the state of the art in Natural Language Processing. This course builds upon concepts from Natural Language Processing (course code: NLP 701) and assumes familiarity with fundamental concepts in question answering, text summarization and opinion mining.
Goal	This graduate course aims to inculcate a deeper understanding of the advanced Natural Language Processing methods, so the students are capable of researching, developing, and implementing these methods for solving real-world problems. Additionally, a significant goal of this course is to enhance students' teamwork skills by requiring them to participate in group projects.
Contents	The course covers three modules: (I) Question Answering, (II) Document Summarization, (III) Opinion Mining
Recommended Textbooks	<ol style="list-style-type: none">1. Chris Manning et al, <i>Foundation of statistical natural language processing</i>, MIT Press, 1999.2. Ian Goodfellow, Yoshua Bengio, and Aaron Courville. <i>Deep Learning</i>, MIT Press, 2016.
Recommended References & Supplemental Material	Relevant research papers, tech reports, and surveys for each topic, where needed, are identified in the teaching plan ahead. In addition, the following textbook may be useful: C. Bishop, <i>Pattern Recognition and Machine Learning</i> , Berlin: Springer-Verlag, 2006.



Teaching Week	Topics
1	<p>Question Answering</p> <p>Lectures</p> <ul style="list-style-type: none">• Overview of Question Answering• Relevant papers and assigned reading:<ul style="list-style-type: none">- Bordes et al, <i>Large-scale Simple Question Answering with Memory Network</i>, arXiv 2015- Pranav Rajpurkar et al, <i>SQuAD: 100,000+ Questions for Machine Comprehension of Text</i>, EMNLP-2016 <p>Lab</p> <ul style="list-style-type: none">• Discussion on choosing a relevant paper to implement for the project• Start project-1 work
2	<p>Question Answering</p> <p>Lecture</p> <ul style="list-style-type: none">• Question Answering – Reading comprehension• Reading group activity on selected papers related to “Question Answering”<ul style="list-style-type: none">- Golub and He, <i>Character-Level Question Answering with Attention</i>, EMNLP-2016 <p>Lab</p> <ul style="list-style-type: none">• Continue project-1 work
3	<p>Question Answering</p> <p>Lecture</p> <ul style="list-style-type: none">• Question Answering – Question answering over the knowledge base• Group discussion on the relevant papers<ul style="list-style-type: none">- Chen et al, <i>Reading Wikipedia to Answer Open-Domain Questions</i>, ACL-2017 <p>Lab</p> <ul style="list-style-type: none">• Continue project-1 work
4	<p>Question Answering</p> <p>Lecture</p> <ul style="list-style-type: none">• Question Answering – Evaluation• Group discussion on the relevant papers <p>Lab</p> <ul style="list-style-type: none">• Preparation of presentation on project-1 work• Continue project-1 work



Teaching Week	Topics
5	<p>Question Answering</p> <p>Assessment 1.1</p> <ul style="list-style-type: none">• Presentation of the projects by different groups <p>Lab</p> <ul style="list-style-type: none">• Peer review of project reports <p>Assessment 1.2</p> <ul style="list-style-type: none">• In-class exam covering module I – Question Answering.
6	<p>Text Summarization</p> <p>Lecture</p> <ul style="list-style-type: none">• Overview of Text Summarization• Discussion of papers:<ul style="list-style-type: none">- Cheng and Lapata, <i>Neural Summarization by Extracting Sentences and Words</i>, ACL-2016- Ramesh Nallapati et al, <i>Abstractive Text Summarization using Sequence-to-sequence RNNs and Beyond</i>, CoNLL-2016 <p>Lab</p> <ul style="list-style-type: none">• Discussion on choosing a relevant paper to implement for the project• Start Project-2 work
7	<p>Text Summarization</p> <p>Lecture</p> <ul style="list-style-type: none">• Text Summarization – Extraction-based summarization• Reading group activity on selected papers related to “Text Summarization”<ul style="list-style-type: none">- M. Rush et al, <i>A Neural Attention Model for Abstractive Sentence Summarization</i>, EMNLP-2015 <p>Lab</p> <ul style="list-style-type: none">• Continue Project-2 work
8	<p>Text Summarization</p> <p>Lecture</p> <ul style="list-style-type: none">• Text Summarization – Abstraction-based summarization• Group discussion on the relevant papers<ul style="list-style-type: none">- Qingyu Zhou et al, <i>Neural Document Summarization by Jointly Learning to Score and Select Sentences</i>, ACL-2018 <p>Lab</p> <ul style="list-style-type: none">• Continue Project-2 work



Teaching Week	Topics
9	Text Summarization Lecture <ul style="list-style-type: none">Text Summarization – Learning MethodsGroup discussion on the relevant papers Lab <ul style="list-style-type: none">Preparation of presentation on project-2 workContinue project-2 work
10	Text Summarization Assessment 2.1 <ul style="list-style-type: none">Presentation of the projects by different groups Lab <ul style="list-style-type: none">Peer review of project reports Assessment 2.2 <ul style="list-style-type: none">In-class exam covering module II – Text Summarization
11	Opinion Mining and Sentiment Analysis Lecture <ul style="list-style-type: none">Overview of Opinion Mining and Sentiment AnalysisDiscussion of relevant papers:<ul style="list-style-type: none">M Hu and B. Liu, <i>Mining and summarizing customer reviews</i>, KDD 2004Preslav Nakov et al, <i>SemEval-2016 Task 4: Sentiment Analysis in Twitter</i>, SemEval 2016 Lab <ul style="list-style-type: none">Discussion on choosing a relevant paper to implement for the projectStart Project-3 work
12	Opinion Mining and Sentiment Analysis Lecture <ul style="list-style-type: none">Sentence-level Opinion Mining and Sentiment AnalysisGroup discussion on the relevant papers<ul style="list-style-type: none">Pavlopoulos and Androutsopoulos, <i>Multi-Granular Aspect Aggregation in Aspect-Based Sentiment Analysis</i>, EACL-2014 Lab <ul style="list-style-type: none">Continue project-3 work



Teaching Week	Topics
13	<p>Opinion Mining and Sentiment Analysis</p> <p>Lecture</p> <ul style="list-style-type: none">• Word/Phrase-level Opinion Mining and Sentiment Analysis• Group discussion on the relevant papers<ul style="list-style-type: none">- Zhai et al, <i>Clustering Product Features for Opinion Mining</i>, WSDM 2011 <p>Lab</p> <ul style="list-style-type: none">• Continue project-3 work
14	<p>Opinion Mining and Sentiment Analysis</p> <p>Lecture</p> <ul style="list-style-type: none">• Opinion Mining and Sentiment Analysis – Learning Methods <p>Lab</p> <ul style="list-style-type: none">• Preparation of presentation on project-3 work• Continue project-3 work
15	<p>Opinion Mining and Sentiment Analysis</p> <p>Assessment 3.1</p> <ul style="list-style-type: none">• Presentation of the projects by different groups <p>Lab</p> <ul style="list-style-type: none">• Peer review of project reports <p>Assessment 3.2</p> <ul style="list-style-type: none">• In-class exam covering module III – Opinion Mining and Sentiment Analysis