21CSE20	NATURAL LANGUAGE PROCESSING	L	T	P	C
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Course Objectives

- To introduce the fundamental concepts and techniques of Natural language Processing for analyzing words based on Morphology and CORPUS.
- To examine the NLP models and interpret algorithms for classification of NLP sentences byusing both the traditional, symbolic and the more recent statistical approach.
- To get acquainted with the algorithmic description of the main language levels that includes morphology, syntax, semantics, and pragmatics for information retrieval and machine
- translation applications.

UNIT I	INTRODUCTION TO NLP	9 Hours

Introduction to various levels of natural language processing, Ambiguities and computational challenges in processing various natural languages. Introduction to Real life applications of NLP such as spell and grammar checkers, information extraction, question answering, and machine translation. Character Encoding, Word Segmentation, Sentence Segmentation, Introduction to Corpora, Corpora Analysis.

UNIT II	MORPHOLOGY	9 Hours

Inflectional and Derivation Morphology, Morphological Analysis and Generation using finite state transducers. POS Tagging, Maximum Entropy Models for POS tagging, Multi-word Expressions.

UNIT III	LANGUAGE MODELING	9 Hours

The role of language models. Simple N-gram models. Estimating parameters and smoothing.Evaluating language models.

UNIT IV	SYNTAX & SEMANTICS	9 Hours

Introduction to phrases, clauses and sentence structure, Shallow Parsing and Chunking, Shallow Parsing with Conditional Random Fields (CRF), Lexical Semantics, Word SenseDisambiguation, WordNet, Thematic Roles, Semantic Role Labelling with CRFs.

UNIT V	APPLICATIONS	9 Hours

NL Interfaces, Text Summarization, Sentiment Analysis, Machine Translation, Question answering.

UNIT VI	RECENT TRENDS	9 Hours

Course Outcome:

1. Understand the principles and Process the Human Languages Such as English and other Indian Languages using computers.
2. Creating CORPUS linguistics based on digestive approach (Text Corpus method)
3. Demonstrate understanding of state-of-the-art algorithms and techniques for text-based processing of natural language with respect to morphology.
4. Perform POS tagging for a given natural language.
5. Select a suitable language modelling technique based on the structure of the language.
6. Check the syntactic and semantic correctness of sentences using grammars and labelling.
7. Develop Computational Methods for Real World Applications and explore deep learning based NLP

Text Books:

- Daniel Jurafsky and James H. Martin "Speech and Language Processing", 3rd edition,Prentice Hall, 2009.

Reference Books:

- Chris Manning and HinrichSchütze, "Foundations of Statistical Natural Language Processing", 2nd edition, MITPress Cambridge, MA, 2003.
- NitinIndurkhya, Fred J. Damerau "Handbook of Natural Language Processing", Second Edition, CRC Press, 2010.
- James Allen "Natural Language Understanding", Pearson Publication 8th Edition. 2012.