RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VII-Semester

Department Elective CSIT –702 (D) Natural Language Processing

Objective: To gain the knowledge for developing advanced technology of computer systems like Speech recognition and machine translation.

Course Outcomes: After the completion of this course, the students will be able to:

   To tag a given text with basic Language features
1. To design an innovative application using NLP components
2. To implement a rule based system to tackle morphology/syntax of a language
3. To design a tag set to be used for statistical processing for real-time applications
4. To compare and contrast the use of different statistical approaches for different types of NLP applications.

UNIT I
Introduction to Natural Language Understanding- Levels of language analysis- Syntax, Semantics, Pragmatics, Applications, Ambiguity, Morphology, Parsing with Finite State Transducers, Regular Expressions, Stemmer, Spelling errors.

UNIT II
Computational Phonology: speech sound, phonetic transcription, text to speech, Pronunciation Variations, Bayesian Method to spelling and pronunciations, Minimum Edit Distance, Weighted Automata, N-grams.

UNIT III
HMM and speech recognition, Viterbi algorithm, Acoustic processing of speech, Feature Extraction, Speech Synthesis; Part-of-Speech Tagging: rule based, stochastic, transformation based.

UNIT IV
Syntax Processing: Parsing with CFG, CKY parsing and the Earley parser, Probabilistic parsing; Semantic Processing: Meaning representation, First Order Predicate Calculus. Lexical Semantics: Internal structure of words, thematic roles, Primitive decomposition, WordNet.

UNIT V
Word sense disambiguation; Information Retrieval: Vector space model, Improving user queries; Pragmatic Processing: Discourse; Natural Language Generation, Machine Translation.

Recommended Books:
[1] D. Jurafsky and J.H. Martin; Speech and Language Processing; Processing; Prentice Hall; 2000.
[2] C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing",
[3] James Allen."NaturalLanguage Understanding",AddisonWesley,1994.
[4] Richard M Reese, Natural Language Processing with Javall, OReilly Media, 2015.
[5] Tanveer Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford University Press, 2008.