Course Title: Language Processing for e-learning

Credit: 3-1-0 (4 Credit)

Course Description

Text is an important media for delivering education. Thus innovative use of text processing techniques has drawn interest of many researchers in text processing domain in developing effective and interesting e-learning applications. The course will explore text processing techniques like syntactic and semantic analysis, entity extraction, discourse processing, question answering, computational affect analysis etc. and their applications to e-learning domains. As e-learning has got enormous research and business opportunities, aspiring entrepreneurs and researchers will get acquainted with recent challenges and advances in developing text processing-based e-learning applications.

Course Objective

Upon completion of the course the students will be able to

a) Identify different text processing techniques for developing an e-learning applications
b) Design e-learning systems through text analysis
c) Experiment with benchmark datasets available for different e-learning tasks
d) Assemble different text processing techniques to develop an e-learning application
e) Analyze architectures of different text-based e-learning applications

Course Content

Introduction (3): Introduction to e-learning, text processing challenges in e-learning

Text Processing Fundamentals (4): Morphological analysis, POS tagging, parsing, lexical resources, ontology, machine learning tools.

Computer Assisted Language Learning (CALL) (5): Categorization, Pedagogic perspective, Vocabulary, Grammar learning and error correction, discourse processing, second language acquisition.

Readability Level Assessment (5): mental lexicon, cognitive models, visual word recognition, readability measures, language modelling, text cohesion, Coh-Metrix.

Text Adaptation (5): Encyclopedic annotations of text, paraphrasing, text entailment, syntactic and discourse level simplification

Automatic Question Generation (5): Question categorization, vocabulary assessment, MCQ generation, factual question generation, Evaluation metrics.

Automatic essay/answer grading (5): Writing dimensions and evaluation features, Lexical, syntactic and discourse processing, Research prototypes: e-Rater, C-Rater, BETSY, reliability and validity, norming and scaling, Bayesian analysis.

E-learning and Web 2.0 (4): Educational metadata standards, ontology and semantic web, metadata annotation of learning materials, ontology learning

Dialogue-based Tutoring (4): Natural language ITS, mixed initiative dialogues, mixed mode dialogues, AutoTutor, BEETLE, CIRCSIM-Tutor, learner affect analysis.

Books

1. Handbook of Natural Language Processing, Nitin Indurkhya, Fred J. Damerau
2. Computer-Assisted Language Learning: Context and Conceptualization, Michael Levy
3. Automated Essay Scoring: A cross disciplinary perspective, MD Shermis, J Burstein

References

1. Reconstructing readability: Recent developments and recommendations in the analysis of text difficulty. Educational Psychology Review, 24, Benjamin, R. (2012).
2. Early decomposition in visual word recognition: Dissociating morphology, form, and meaning. Language and Cognitive Processes, 23(3):394–421, Marslen-Wilson, W., Bozic, M., and Randall, B. (2008).
3. Coh-metrix: Analysis of text on cohesion and language. Behavior Research Methods, 36(2):193–202, Graesser, A., McNamara, D., Louwerse, M., and Cai, Z. (2004).
4. Reformulating Discourse Connectives for Non-Expert Readers, Advaith Siddharthan and Napoleon Katsos, HLT'10
5. Ontology Extraction for Knowledge Reuse: The e-Learning Perspective, Matteo Gaeta et al, IEEE Transactions on SMCA, 41(4).
6. Intelligent Tutoring Systems with Conversational Dialogue, Graesser et al., AI Magazine Volume 22 Number 4 (2001)