Home NLP - Assignment

M.Tech, Natural Language Processing (Sir Padampat Singhania University)

Home Assignment

Programme/Branch: M.Tech. Semester: II

Subject: Natural Language Processing Subject Code: CS-5011

Date of Submission : On or before 25/03/3020

Q1. Explain following application of natural language processing in detail

(i) Machine Translation (ii) Sentimental Analysis

(iii) Information Retrieval (iv) Question Answering System

(v) Text categorization & summarization

Q2. Suppose you want to use a HMM tagger to tag the phrase, " the light book", where we have the following probabilities:

P(the|Det)=0.3, P(the|Noun)=0.1, P(light|Noun)=0.003, P(light|Adj)=0.002, P(light|Verb)=0.06, P(book|Noun)=0.003, P(book|Verb)=0.01

P(Verb|Det)=0.00001,P(Noun|Det)=0.5, P(Adj|Det)=0.3, P(Noun|Noun)=0.2, P(Adj|Noun)=0.002, P(Noun|Adj)=0.2, P(Noun|Verb)=0.3, P(Verb|Noun)=0.3, P(Verb|Adj)=0.001, P(Verb|Verb)=0.1

Work out in details the steps of the Viterbi algorithm. You can use a table to show the steps. Assume all other conditional probabilities, not mentioned to be zero. Also, assume that all tags have the same probabilities to appear in the beginning of a sentence. Explain each steps of the algorithm in detail.

Q3. Implement your lexicalized extension of the CYK algorithm with suitable example. Fill in the CKY chart below the sentence. *The rain rains down* assuming the following rules:

1. S → NP VP
2. NP → N
3. NP → DT N
4. VP → V ADVP
5. VP→ V
6. ADVP → ADV
7. DT → the
8. N → rain
9. N → rains
10. V → rain
11. N → rains
12. ADV → down

Show all the steps.

Q4. Explain Porter's Stemmer Algorithm. Give two suitable examples for each step of perter Stemmer.

Q5. (a) Draw a Parse tree structure tree representing one parse of the following sentence. Make a list of the parse structure rules that you are assuming.

(i) Is there an American airlines flight from Philadelphia to Dallas?
(ii) I would like to fly on American airlines.

(b) Modify the top-down parser to add bottom-up filtering. You can assume the use of a left-corner table. Explain in detail with suitable example.