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Section

National University of Computer and Emerging Sciences, Lahore Campus

Course:	Information Retrieval	Course Code:	CS317
Program:	BS(Computer Science)	Semester:	Fall 2019
Duration:	25 Minutes	Total Marks:	10
Paper Date:	5-Nov-19	Weight	4%
Section:	B	Page(s):	2
Exam:	Quiz 3 solution	Roll No:	

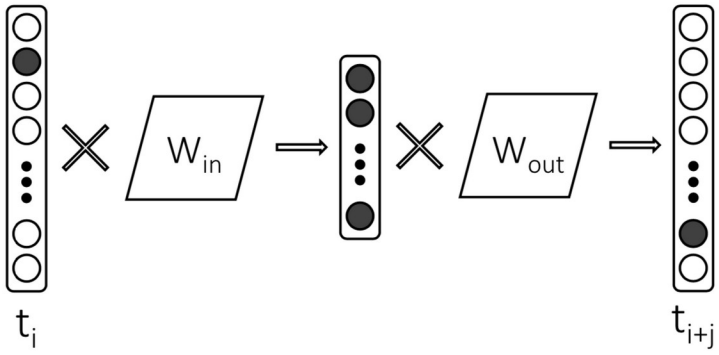
Question 1:

Briefly write down steps used by logistic regression for creating word embeddings as discussed in class. What are positive and negative examples and what objective is optimized by the classifier? [5 Marks]

Solution:

1. Treat the target word and a neighboring context word as positive examples.
2. Treat other words in corpus which do not occur in context as negative samples
3. Use logistic regression to train a classifier to distinguish those two cases
4. Use the weights of classifier (hidden layer) as the word embeddings

Objective of classifier is to maximize the similarity of target words with its context words. The similarity is measured by taking dot product of target word vector with all other words.



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Question 2:

Represent the word “apple” as vector using following corpus. Use TF.IDF weights. Assume the window size for word context is 2. [5 Marks]

Document 1: I like to ride cycle often.
Document 2: Ali and Hassan ate apple and oranges in the park.
Document 3: Ali ate apple not oranges in his house.
Document 4: Ali did not cross the street.

Solution:

Vector of apple:

Context words of apple = Hassan, ate, and, oranges, Ali, not

Dimensions	I	like	to	ride	cycle	often	Ali	and	Hassan	ate	apple	oranges	in	the
IF.IDF Weights	0	0	0	0	0	0	1*0.38	1*2	1*2	1.3*1	0	1.3*1	0	0

Dimensions	park	not	his	house	did	cross	street
IF.IDF Weights	0	1*1	0	0	0	0	0

Context Words	**IDF**
Ate	Log (4/2) = 1
Hassan	Log (4/1) = 2
And	Log (4/1) = 2
Ali	Log (4/3) = 0.38
Oranges	Log (4/2) = 1
Not	Log (4/2) = 1

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