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| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course:** | **Information Retrieval** | **Course Code:** | **CS317** |
| **Program:** | **BS(Computer Science)** | **Semester:** | **Fall 2019** |
| **Duration:** | **25 Minutes** | **Total Marks:** | **12** |
| **Paper Date:** | **22-Oct-19** | **Weight** | **3.3%** |
| **Section:** | **B** | **Page(s):** | **2** |
| **Exam:** | **Quiz 2** | **Roll No:** |  |

**Question 1:**

How is the average precision related to precision recall curve? Show the relation using mathematical derivation [4 Marks]

**Solution:**

Average Precision approximates the area under precision recall curve.

Area under precision recall curve can be expressed using following integral.

Where P(r ) is Precision at recall r

Following summation id discrete approximation of this integral

Since is constant so we can write it outside the summation

= 1/R where R = total relevant documents

This is formula of average precision

**Question 2:**

Compute mean average precision of following lists of documents for 2 queries. Leftmost is top ranked document. [4 Marks]

Q1 = R NR R NR NR R NR NR

Q2 = NR R NR NR NR NR R NR

Total relevant for query 1 = 8

Total relevant for query 2 = 15

**Solution:**

Average Precision for Q1 = (1 + 2/3 + 3/6)/8 = 0.27

Average Precision for Q1 = (1/2 + 2/7 )/15 = 0.05

Mean Average Precision = 0.32

**Question2:**

Consider following collection of 3 documents. [4 Marks]

|  |  |
| --- | --- |
| Document | Words |
| D1 | |  | | --- | | a b b a b b c | |
| D2 | |  | | --- | | a a b a b a | |
| D3 | |  | | --- | | b b b b b b c c | |

Query = < a b >

Use Witten Bell smoothing to find similarity of document D3 with query.

**Solution:**

For document D3

N = 8, V = 2

Prob (a) = N/(N+V) \* 0 + V/(N+V) \* 6/21 = 0 + 2/10 \* 6/21 = 0.057

Prob (b) = N/(N+V) \* 6/8 + V/(N+V) \* 12/21 = 8/10 \* 6/8 + 2/10 \* 12/21 = 0.71

Prob (a,b) = Prob (a) \* Prob (b) = 0.04