Assignment 3

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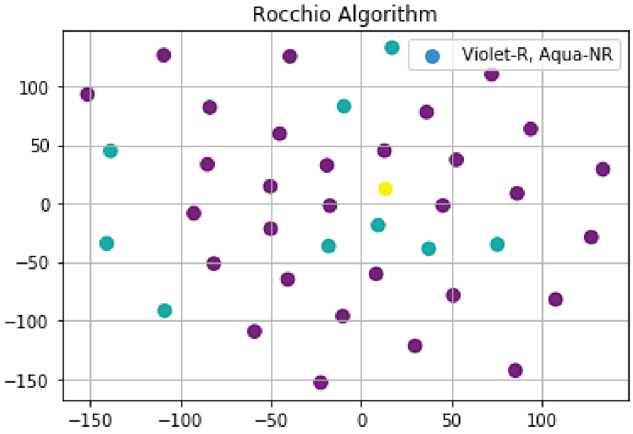
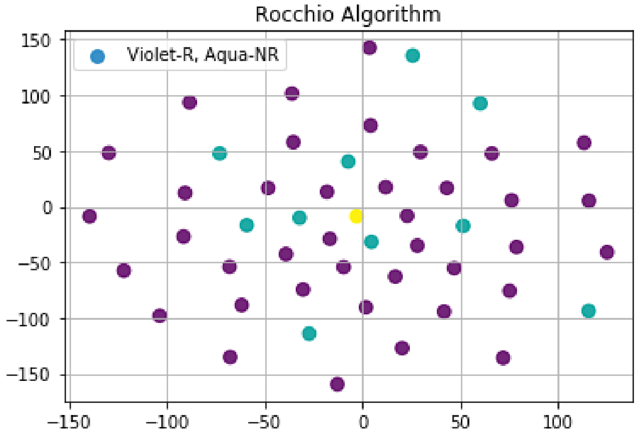
Question 1:

Inferences:

- After certain number of steps, the query tends to move closer to the relevant documents and farther from the non-relevant documents.
- Cosine similarity works better with TF-IDF vectors





Preprocessing Used:

- Lowercase
- Remove Punctuation
- Lemmatize
- Convert numbers
- Again remove punctuation
- Lemmatize
- Remove stop words
- Stem

Alpha – 0.5

Beta – 0.3
Gamma – 0.2
Assumption: The documents that are not marked as non-relevant are considered as relevant from the displayed top 10.

Process:

- Find Relevant and Non-Relevant Documents
- Compute Centroids
- Apply formula
- The query vector will tend to move closer to the relevant documents and away from the non-relevant documents.

Q_m = alpha*Q + beta*Q_R – gamma*Q_nr

Statistics:
Vocab size: ~20k
Number of Docs: 2000
To create corpus: 150 sec
To Vectorize: 30sec
To calculate cosines: 2sec

Question 2:

Dataset:

- Microsoft URL Dataset, in which each query-url pair is in list form.
- Each pair has information regarding the URL, and there is also relevance mentioned.
- Each pair is of 136 dimensions.

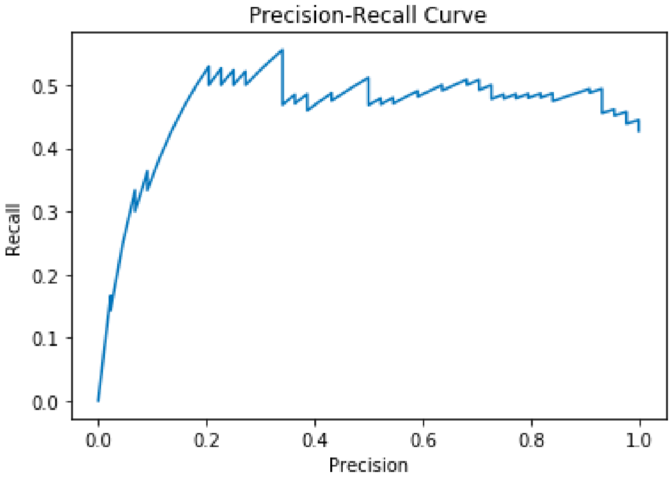
Procedure:

- Load file
- Read file
- Iterate the file
    - Split the string using space
    - Check if the first name is qid:4
    - If it is
        - Extract the 1st and 75th feature
        - 1st is the relevance, and 75th is Rank
    - Else
        - Quit
    - Store the values
- Now sort the stored valued according to the rank.
- Calculate precision and recall at every point
- Plot precision – Recall curve.

Analysis:

- Total number of relevant docs – 43
- Total qid:4 available are 103

- Recall will always keep increasing
- Precision might vary.


Precision-Recall Curve
Recall
Precision