Assignment-1 Rubric

CS 498: Computational Advertising

October 15 2018

Question - 1

This question included 3 sub-parts, part (a) and (b) required computing the Authority and Hub-scores at the end of two iterations of the HITS algorithm, and the third part required an explanation for the change in authority order of nodes A and B.

Part - a)

End of Iteration-1

A	1/5
B	1/5
C	3/5

D	1/11
E	1/11
F	3/11
G	3/11
H	3/11

End of Iteration-2

A	1/11
B	1/11
C	9/11

D	1/29
E	1/29
F	9/29
G	9/29
H	9/29

Part - b)

End of Iteration-1

A	1/6
B	1/6
C	4/6

D	1/18
E	5/18
F	4/18
G	4/18
H	4/18

End of Iteration-2

A	1/23
B	5/23
C	17/23

D	1/74
E	22/74
F	17/74
G	17/74
H	17/74

Part - c)

The reason for B gaining a greater authority score is the transfer of authority from node C via E, which now has a greater hub-score. A does not gain any new connections, thus the normalization results in a lower authority score.

Getting the normalized scores right at the end of iteration-2 got you one point in each of parts (a) and (b). If the intermediate step (iteration-1) was correctly computed, 2 points were awarded. Part (c) was worth a single point.

Question - 2

This question also included 3 sub-parts, **part (a) was worth 2 points if you got the normalized hub and authority scores right. Partial credits were awarded if the final result was incorrect or not appropriately normalized**.

Part - a)

End of Iteration-1

A	3/5
B	2/5

C	3/13
D	3/13
E	5/13
F	2/13

End of Iteration-2

A	11/18
B	7/18

C	11/47
D	11/47
E	18/47
F	7/47

Part (b) asked you to compute the hub and auth scores for two different configurations of the network. Each was worth 1.5 points for the final normalized values, partial credits were assigned if the final results were incorrect. Finally, a single point was reserved for the explanation for why X receives a higher score in one config.

Part - b) Config 1

End of Iteration-1

A	3/6
B	2/6
X	1/6

C	3/14
D	3/14
E	5/14
F	2/14
Y	1/14

End of Iteration-2

A	11/19
B	7/19
X	1/19

C	11/48
D	11/48
E	18/48
F	7/48
Y	1/48

Part - b) Config 2

End of Iteration-1

A	4/8
B	3/8
X	1/8

C	4/26
D	4/26
E	7/26
F	3/26
Y	8/26

End of Iteration-2

A	23/49
B	18/49
X	8/49

C	23/154
D	23/154
E	41/154
F	18/154
Y	49/154

Part - b) Explanation

Y becomes a important hub when it is connected to other authoritative nodes in the network, and transfers their authority to node X.

Part - c) **In part (c) you were awarded 1 point each for proposing a strategy that achieves the desired result, and for computing the normalized hub and authority scores for your strategy after 2 iterations of the HITS algorithm. 2 points were awarded for explaning your strategy. Any explanation that captured the key idea of authority transfer from the most authoritative node via multiple newly introduced hubs (resulting in X becoming the second most authoritative node, while B does not participate in this exchange) was awarded full credit.**

One possible strategy to achieve the desired result - Connect nodes Y and Z both to X and A. Do not connect either of them to B. The explanation for this case would be that A transfers authority to X via both newly introduced hubs Y and Z, boosting the authority score of X relative to node B. Node B does not receive any new connections and is thus diminished in relative authority to X when we normalize across the authority nodes. The more paths we introduce between A and X, the greater the authority score of X in comparison to B.

Question - 3

The following were the possible points in the programming question.

- All hidden test-cases succeed and the submission is efficient (both matrix implementations and efficient dictionary implementations were accepted) - **10/10**
- All hidden test-cases succeed, the student makes an effort to optimize but the runtime is similar to a non-optimized submission - **8.5/10**
- All hidden test-cases succeed, the submission is a direct implementation of the HITS equations with no optimization effort - **7/10**
- Only the sample test case succeeds, student has attempted to implement the matrix version of HITS - **3/10**
- Only the sample test case succeeds, student has attempted to implement a simple version of HITS - **2/10**
- Sample test case does not succeeed - **No credit**

Question - 4

What is the strategy? - 1 point
Pick the common movies reviewed by the prolific reviewers.

Does it work in both large and small graphs? - 1 point
Always works in large graphs, picking the common movies between prolific reviewers is guaranteed to provide you the highest hub-score possible with a fixed budget for the number of movies. The strategy may work in smaller graphs as well, but can cause significant drops in the authority scores of other nodes when a new node is introduced. Thus it is more reliable for larger graphs.