Data Analytics

Assignment 8

Social Networks Analysis

Group members:

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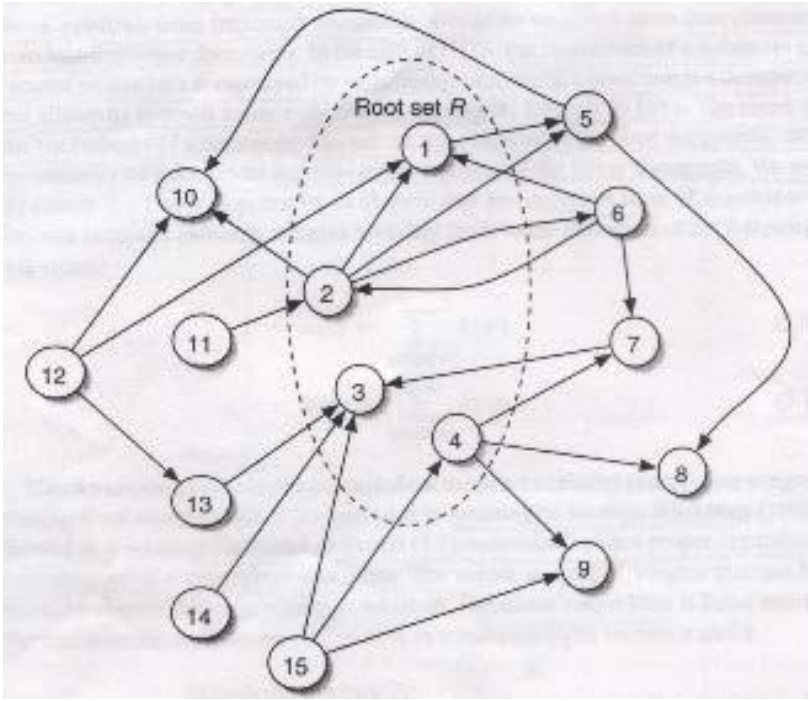
Using System: RStudio

1. **Apply the HITS algorithm to the following network (there is no one correct answer).**



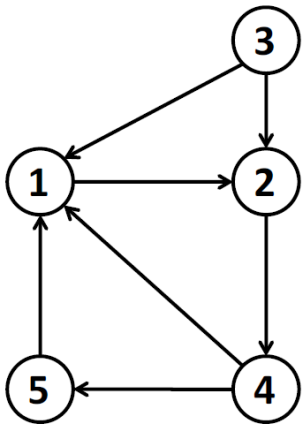
Root Set R={1,2,3,4}
Extend it to form the base set S

Step 1: Write a R algorithm to implement the HITS algorithm
The coding is attached in the file "Assignment8.r". After 15 times iteration, the difference is already less than 0.01. After 100 times iteration, the result is listed below.

	Hubs	Authorities
1	0.11398053	0.60152741
2	0.65925390	0.17198262
3	0.00000000	0.04470976
4	0.19428212	0.02493810
5	0.28827903	0.29687315
6	0.38191468	0.25311183
7	0.01716572	0.22122315
8	0.00000000	0.18527298
9	0.00000000	0.09953016
10	0.00000000	0.56557724
11	0.06603046	0.00000000
12	0.52556691	0.00000000
13	0.01716572	0.20178448
14	0.01716572	0.00000000
15	0.06495367	0.00000000

Step 2: Analyze the result
Because the idea is that a good hub points to good authorities and a good authority is pointed to by a good hub. So the good hubs are 2 and 12 and the good authorities are 1 and 10.

2. **Find the Hubs and Authorities of the graphs below given by HITS. Are the results consistent with the notions of Hubs and Authorities?**
   Graph 1:



Based on figure 2.1 and 2.2 below, 3 and 4 are the biggest two in the Hubs, while 1 and 2 are the top two in the Authorities.

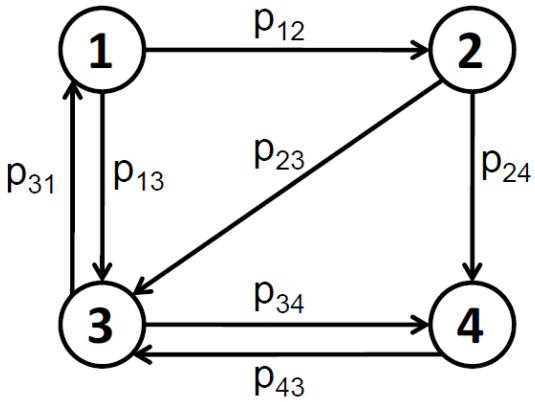
	Hubs	Authorities
3	0.6574263441	0.000000000
4	0.5761511092	0.001185781
5	0.4280495702	0.291702088
1	0.2293767739	0.843090182
2	0.0006020388	0.451782503

Figure 2.1

	Hubs	Authorities
1	0.2293767739	0.843090182
2	0.0006020388	0.451782503
5	0.4280495702	0.291702088
4	0.5761511092	0.001185781
3	0.6574263441	0.000000000

Figure 2.2

Graph 2:



Based on figure 2.3 and 2.4 below, 2 and 1 are the biggest two in the Hubs, while 3 and 4 are the top two in the Authorities.

	Hubs	Authorities
2	0.6554960	0.2725706
1	0.5421548	0.1684579
4	0.4051188	0.4980112
3	0.3350701	0.8057990

Figure 2.3

	Hubs	Authorities
3	0.3350701	0.8057990
4	0.4051188	0.4980112
2	0.6554960	0.2725706
1	0.5421548	0.1684579

Figure 2.4

Obviously, the results of the two graphs are not consistent with the notions of Hubs and Authorities.