

Data Sci Discover Project

Ryan Greenup

July 31, 2020

Contents

Links	1
Proposal	1
Question	1
Working	2
:SlowDown:	
[1]	

Links

- [Thinking About Data](#)
- [Paper](#)
- [Research Proposal](#)

Proposal

Question

Can we determine the second eigenvalue from the method parameters? For PageRank, the second eigenvalue is equal to the smoothing parameter α

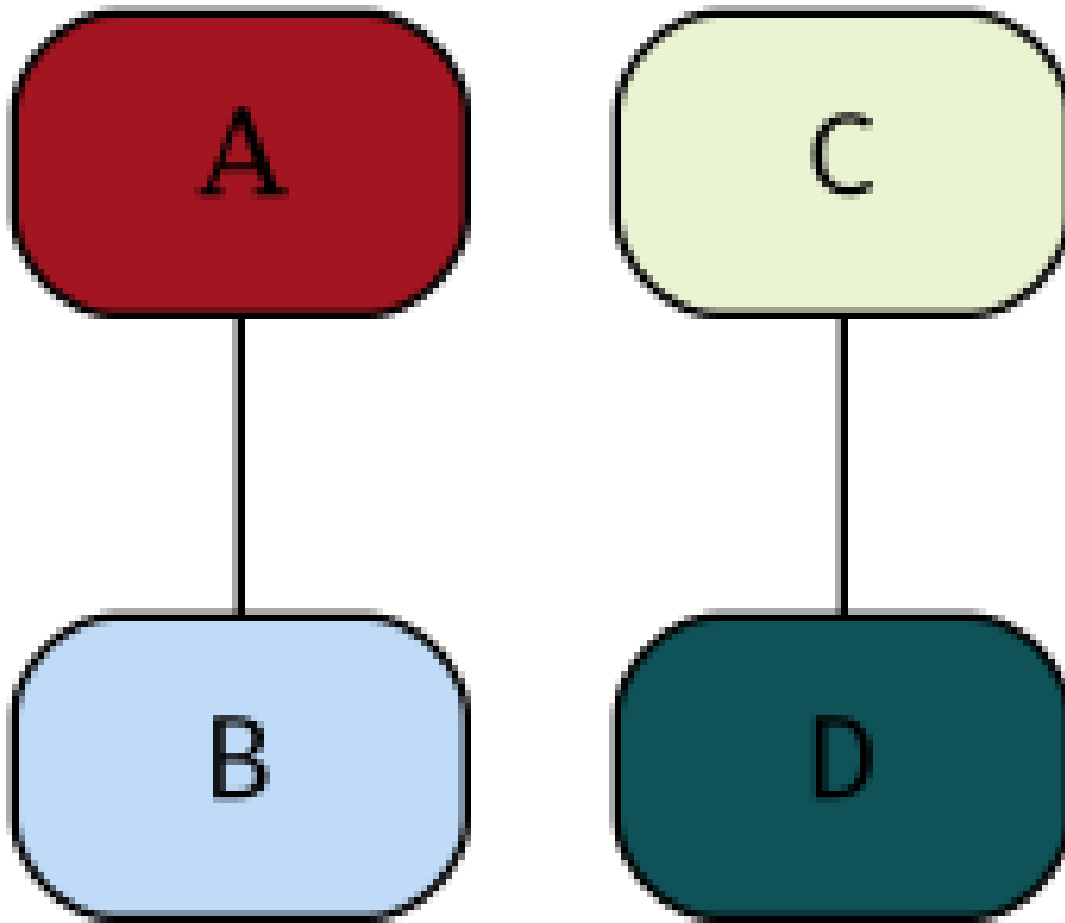
Yes. An open question for the Power Walk method is, can we determine the second eigenvalue from the method parameters? For PageRank, the second eigenvalue is equal to the smoothing parameter α . The second eigenvalue determines how long the algorithm takes to converge and how stable the solution is. To begin, implement the method for computing PageRank and then the Power Walk. It can all be done using sparse matrices, so it only requires a fraction of the memory and is each iteration is quick.

Working

Take the exemplar Graph from Figure 1:

```
1  # #+begin_src javascript :exports code
2  @startdot
3  strict digraph graphName {
4    concentrate=true
5    fillcolor=green
6    color=blue
7    style="filled, rounded"
8    A [shape=box, fillcolor="#a31621", style="rounded, filled"]
9
10   edge [
11     arrowhead="none"
12   ];
13
14   node[
15     fontname="Fira Code",
16     shape="square",
17     fixedsize=false,
18     style=rounded
19   ];
20
21
22  # A -> B [dir="both"]
23  A -> B
24  B [shape=box, fillcolor="#bfdbf7", style="rounded, filled"]
25  B -> A
26  C [shape=box, fillcolor="#eaf4d3", style="rounded, filled"]
27  C -> D
28  D [shape=box, fillcolor="#0f5257", style="rounded, filled"]
29  D -> C
30  }
31  @enddot
```

Listing 1: Code to Generate DOT Graph



$$\Gamma = I - nD_B^{-1}$$

Where we have the following:

References

- [1] Sepandar Kamvar, Taher Haveliwala, and Gene Golub. "Adaptive Methods for the Computation of PageRank". In: *Linear Algebra and its Applications*. Special Issue on the Conference on the Numerical Solution of Markov Chains 2003 386 (July 15, 2004), pp. 51–65. ISSN: 0024-3795. DOI: [10.1016/j.laa.2003.12.008](https://doi.org/10.1016/j.laa.2003.12.008). URL: <http://www.sciencedirect.com/science/article/pii/S0024379504000023> (visited on 07/31/2020) (cit. on p. 1).