CiteRank: A Google-inspired ranking algorithm for citation networks

Dylan Walker  
Department of Physics & Astronomy,  
Stony Brook University,  
Stony Brook, NY 11794  
1.631.344.3852  
dwalker@grad.physics.sunysb.edu

Huafeng Xie  
New Media Lab,  
The Graduate Center,  
CUNY  
365 5th Ave, RM7388  
New York, NY 10016  
1.212.817.1964  
hxie1@gc.cuny.edu

Koon-Kiu Yan  
Department of Physics & Astronomy,  
Stony Brook University,  
Stony Brook, NY 11794  
1.631.344.3852  
kyan@bnl.gov

Sergei Maslov  
Department of Physics  
Brookhaven National Lab  
Upton, NY 11973  
1.631.344.3742  
Maslov@bnl.gov

ABSTRACT

Due to their rapid growth, many information networks have become untenable to navigate without some sort of ranking scheme. One solution to the problem of ranking exists in the form of Google’s PageRank algorithm. In this work, we extend PageRank ideas to another example of an information network, namely, citation networks. Unlike hyperlinks, citations cannot be updated after the point of publication. Because of this, citation networks exhibit strong aging characteristics [1],[2] that make direct application of the PageRank algorithm unfavorable. To account for this, we modify the PageRank algorithm to a new ranking method, CiteRank. The advantages and performance of CiteRank over the conventional method of ranking citation networks are assessed. We optimize parameters of our algorithm to achieve the best correlation with actual citation accrual for two different citation networks. Despite the variation between the two citation networks considered, we find universal behavior in the correlation between rank and citation accrual.

Keywords  
Citation Network, Ranking, Aging

REFERENCES
