

CiteRank: A Google-inspired ranking algorithm for citation networks

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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

- [1] Redner, S., Citation Statistics from 110 Years of Physical Review, Physics Today 58, 49 (2005).
- [2] Zhu, Han, Xin-Rang Wang and Jian-Yang Zhu, The effect of aging on network structure, Phys. Rev. E 68, 056121 (2003)