

Unveiling the PageRank Algorithm: Principles, Performance, and Enhancements

Wu Zelin, Wu Zekai, Li Pengda *

December 21, 2023

Abstract—This is the abstract area. We should write a very nb abstract here.

Keywords—Keyword1, Keyword2, Keyword3

I INTRODUCTION

IN the past decade, the field of information technology has dramatically changed. One of the force is the super robust and fast Web search algorithms which are capable of handling massive and enomorous data. Amony many of these algorithms, PageRank is the fundamental and the most commonly used algorithm in the web and information retrieval.

PageRank is algorithm developed by Larry Page and Sergey Brin in the late 1990s to measure the importance of web pages. It was originally created for the Google search engine and is named after one of the founder of Google Larry Page. Google search engine uses the algorithm to analyze the relevance and importance of web pages and regard it as one of the factors to evaluate the effectiveness of web page optimization. Although Other algorithms are applied to rank web pages nowadays, the PageRank is also one of the oldest and famous algorithms.

In this paper, we make the following simple insights and research:

- The operation mode of the PageRank and the principles it used
- PageRank's algorithmic determinism of the importance of the web pages

*We should thank Miss.Ye here

- The impact of damping factors on search results and page rankings
- Explore the possibility of other factors that can improve PageRank performance except for link analysis

In the next section, PageRank is briefly reviewed and analyzed.

II RELATED WORK

We should introduce some nb works here. And we should cite some papers here.

A. Subsection 1

In this section we should introduce some nb works here.

B. Subsection 2

This is a simple subsection too.

III MAIN METHOD AND THEORY

We should introduce our methods and Theories here.

A. Subsection 1

This is a simple subsection. We can make a citation here. [1]

Fig. 1 is a figure. You can see it at the top of the page.

B. The 3rd Section 2nd Subsection

This is a simple subsection too.



Fig. 1. This is a figure.

IV EXPERIMENT

This is a simple section.

A. The 4th Section 1st Subsection

This is a simple subsection.

This is an equation:

$$e^{\pi i} + 1 = 0 \quad (1)$$

You can ref it by see(1).

B. The 4th Section 2nd Subsection

This is a simple subsection too.

This is a algorithm:

Algorithm 1 Weighted Tanimoto ELM.

TRAIN($\mathbf{X}\mathbf{T}$)

select randomly $W \subset \mathbf{X}$

$N_{\mathbf{t}} \leftarrow |\{i : \mathbf{t}_i = \mathbf{t}\}|$ **for** $\mathbf{t} = -1, +1$

$B_i \leftarrow \sqrt{\text{MAX}(N_{-1}, N_{+1}) / N_{\mathbf{t}_i}}$ **for** $i = 1, \dots, N$

$\hat{\mathbf{H}} \leftarrow B \cdot (\mathbf{X}^T \mathbf{W}) / (\|\mathbf{X}\| + \|\mathbf{W}\| - \mathbf{X}^T \mathbf{W})$

$\beta \leftarrow (I/C + \hat{\mathbf{H}}^T \hat{\mathbf{H}})^{-1} (\hat{\mathbf{H}}^T B \cdot \mathbf{T})$

return \mathbf{W}, β

PREDICT(\mathbf{X})

$\mathbf{H} \leftarrow (\mathbf{X}^T \mathbf{W}) / (\|\mathbf{X}\| + \|\mathbf{W}\| - \mathbf{X}^T \mathbf{W})$

return $\text{SIGN}(\mathbf{H}\beta)$

V RESULTS

This is the results area. We should write some very nb results here.

VI CONCLUSION

This is the conclusion area. We should write a very nb conclusion here.

References

- [1] S. Zhan, S. Li and W. Wang, *A Very Nb Book*. Shanghai, P.R.C., East China Normal Univ. Press, 2022.