

# 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

THIS is the Introduction area. We should write a very nb introduction here.

## II THE 2ND SECTION

This is a simple section.

### A. The 2nd Section 1st Subsection

This is a simple subsection. This is a simple  
subsection. This is a simple subsection. This is a  
simple subsection. This is a simple subsection. This  
is a simple subsection. This is a simple subsection.  
This is a simple subsection. This is a simple subsec-  
tion. This is a simple subsection. This is a simple  
subsection. This is a simple subsection. This is a  
simple subsection. This is a simple subsection. This  
is a simple subsection. This is a simple subsection.  
This is a simple subsection. This is a simple subsec-  
tion. This is a simple subsection. This is a simple  
subsection. This is a simple subsection. This is a  
simple subsection. This is a simple subsection. This  
is a simple subsection. This is a simple subsection.  
This is a simple subsection. This is a simple subsec-  
tion. This is a simple subsection. This is a simple  
subsection. This is a simple subsection.

\*We should thank Miss.Ye here



Fig. 1. This is a figure.

### B. The 2nd Section 2nd Subsection

This is a simple subsection too.

### III THE 3RD SECTION

This is a simple section.

### A. The 3rd Section 1st Subsection

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.

## IV THE 4TH SECTION

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(XT)
  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  $i = 1, \dots, N$ 
   $\hat{\mathbf{H}} \leftarrow B \cdot (\mathbf{X}^T \mathbf{W}) / (\|\mathbf{X}\| + \|\mathbf{W}\| - \mathbf{X}^T \mathbf{W})$ 
   $\beta \leftarrow \left( I/C + \hat{\mathbf{H}}^T \hat{\mathbf{H}} \right)^{-1} (\hat{\mathbf{H}}^T B \cdot \mathbf{T})$ 
  return  $\mathbf{W}, \beta$ 

PREDICT(X)
   $\mathbf{H} \leftarrow (\mathbf{X}^T \mathbf{W}) / (\|\mathbf{X}\| + \|\mathbf{W}\| - \mathbf{X}^T \mathbf{W})$ 
  return  $\text{SIGN}(\mathbf{H}\beta)$ 

```

---

## References

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