

Are Edge Weights in Summary Graphs Useful? - A Comparative Study (Online Appendix)

1 Appendix: Error in Node Importance

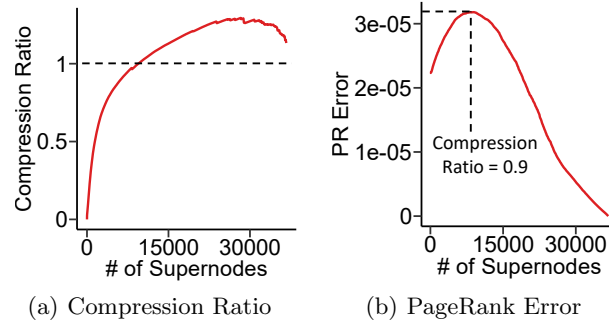


Fig. 5: The compression ratio and the error in PageRank scores in summary graphs obtained by K-GRASS.

In Fig. 3(a) of the main paper, the error in PageRank scores decreases as we compress the input graph more using K-GRASS. For further analysis of this counterintuitive phenomenon, we measure the compression ratio and the error in PageRank scores as we change the number of supernodes in the summary graph obtained by K-GRASS.

As seen in Fig. 5(a), the compression ratio is greater than 1 (i.e., the summary graph is bigger than the input graph in terms of the number of bits) until the number of supernodes reaches about 10,000. This is because, in the early stage of K-GRASS, the number of bits required for storing superedge weights increases faster than the number of bits saved by merging nodes. After merging supernodes sufficiently many times, the compression ratio begins to decrease. As seen in Fig. 5(b), the error in PageRank scores first increases as we decrease the number of supernodes, but the error starts to decrease after merging supernodes sufficiently many times. Fig. 3(a) of the main paper shows the results over a period where both the compression ratio and the error in PageRank scores decrease as we merge more supernodes.