COMP-6730 Advanced Database System
CELF Hill-Climbing Algorithm Implementation

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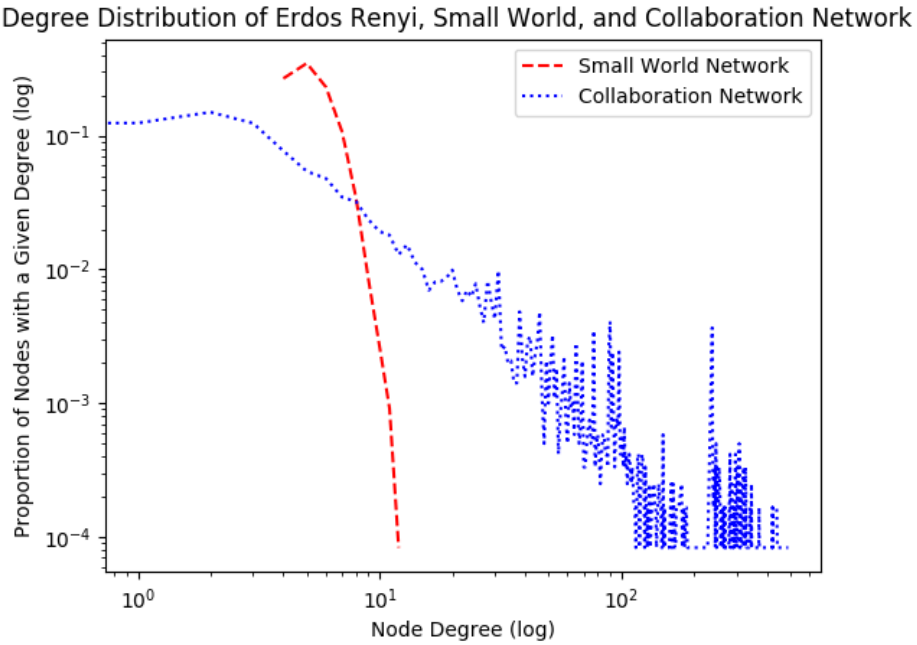
1 Degree Distribution of Small-world Random Network and Collaboration Network



The Collaboration Network has a much longer tail than the Small-world Random Network. The Collaboration Network graph also roughly follows the power law: As degree increases, the degree distribution increases exponentially.

2 Clustering Coefficient

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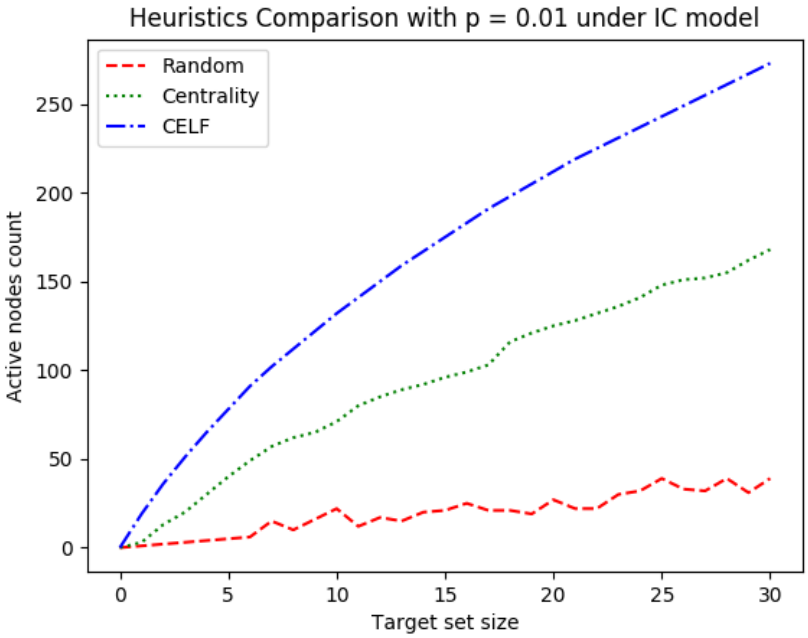
Clustering Coefficient for Small World Network: 0.304468
Clustering Coefficient for Collaboration Network: 0.611483
Snap Clustering Coefficient for Small World Network: 0.304468
Snap Clustering Coefficient for Collaboration Network: 0.611483
```

3 Algorithm Comparison



Using the Independent Cascade Diffusion Model, we have the following result:

Random Algorithm performs the worst out of the three, even in the collaboration network which contains nodes with high average degrees.

The Degree Centrality Algorithm performs a lot better than the Random Algorithm. In a social network, people with high connection count are good influencer and can help maximize influence.

The CELF Algorith outperform all of the algorith by a large margin. CELF was developed to tackle the inefficient Greedy-Approximation Algorith to find the small set of most influential nodes. CELF employ "sub-modularity" of the influence function using a "lazy-forward" optimization(Jure et al).