CS765 Assignment 3 Report

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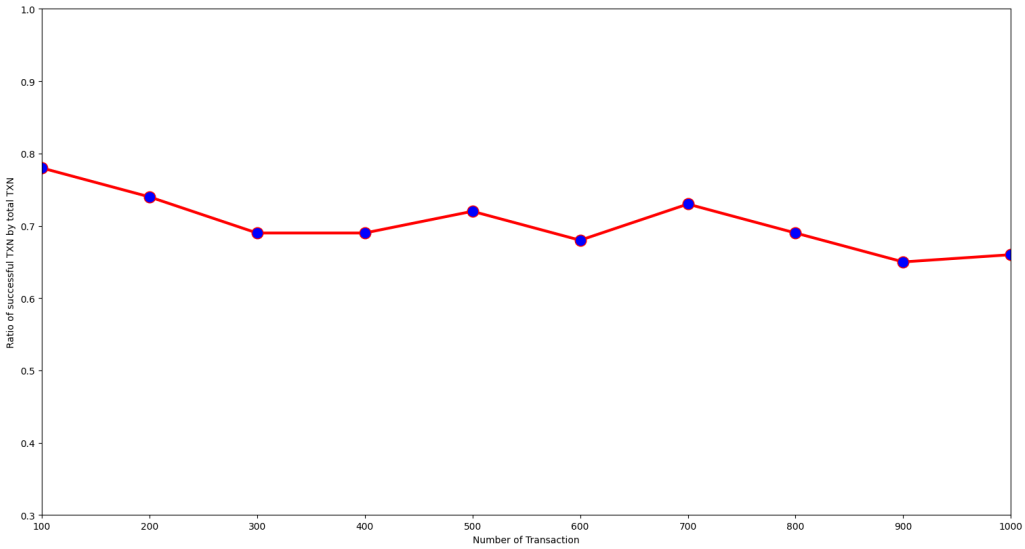
1. **Why should we use power law?**

Power law degree distribution, also known as scale-free distribution, is often observed in many real-world networks, such as the World Wide Web, social networks, biological networks, and citation networks. The power law degree distribution is characterized by a few nodes with a high degree (often called "hubs") and many nodes with low degrees.
Robustness: Networks with power law degree distribution are more robust to random node removal than networks with other degree distributions. This is because the hubs in a power law distribution have many connections, and their removal has a smaller effect on the overall structure of the network.
Efficiency: Networks with power law degree distribution can have a higher efficiency in terms of information transfer than other types of degree distributions. This is because information can travel quickly through the hubs, which have many connections, and reach the rest of the network.

Observations:



We see that as the number of total transactions increases, our overall number of failed transactions increases and hence our efficiency decreases. This result is expected because once the transactions start utilizing the links, the balance on those links decreases and hence those links are not able to fund more transactions. Also, we have to find alternate paths to carry out the transactions, which also decreases over time and hence a larger number of transactions fail.