Motivations

Learning Objective: Investigate and assess the application of computational mathematical models and network graph representations.

➢ What other fields or disciplines could benefit from increased digitization of data collection and analysis using network models?
➢ How can network visualizations most effectively and intuitively communicate complex relationships in large datasets to reveal new insights?

Research Objective: Investigate the patterns and relationships of trade flows between metropolitan areas within the United States can be analyzed by representing the data as a network graph.

Backgrounds

Research Tools and Resources:

In preparation for conducting research, I have familiarized myself with the following

Reading Material
➢ **Networks 2nd Edition** - By Mark Newman
➢ **Research Publications** - provided by Mentor

Technologies
➢ **Pycharm** - IDE for developing code
➢ **NetworkX** - Python Library for implementing networks
➢ **HPC Research Cluster** - Training/Workshops advertised by the course

Current Progress

Project Thus Far:

➢ Gained a comprehensive understanding of network graph principles, including representations, metrics, and models.

➢ Investigated practical techniques such as using Python and Gephi to support construction, manipulation, and examination of network graphs through code implementation.

➢ Formulated a focused research question amenable to network-based investigation given project constraints and Data availability.

Future Plans

Project Timeline and Projections:

Moving forward, analysis is being conducted on inter-metropolitan commodity flow data obtained from the United States Census Bureau. Examining and modeling this data using network analysis techniques enables identification and interpretation of patterns and trends in trade relationships between metropolitan areas within the United States.

- March 22, 2024: Establish Research Parameters
- April 5, 2024: Code Implementation of Network
- April 12, 2024: Network Analysis and Conclusions

Thank You

Q & A

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE