Social Network Analysis

Proposal

Insights from the Network Analysis of International Trade

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Introduction:

In recent years, our contemporary world has been interconnected through trade and technology at unprecedented levels. Despite the global trade network being affected through sanctions and trade wars, international trade is still ongoing at unprecedented levels. The primary aim of this project is to gain insights into the structural properties of the global trade network by leveraging network analysis techniques. Specifically, we aim to explore the dynamics of international trade relationships and understand the centrality and influence of different countries within the trade network. By examining various centrality measures, the project aims to uncover patterns and trends that will assist in effective decision-making for enhancing trade relations.

Analyzing international trade through the lens of network analysis provides a holistic view of trade relationships that traditional bilateral analysis may overlook. This approach enables us to consider the interdependencies between countries and the broader structure of the trade network. Understanding these dynamics is crucial for policymakers, economists, and businesses as it can reveal vulnerabilities, strengths, and opportunities within the global trade system. Furthermore, the emergence of disruptions in international trade in terms of trade wars and sanctions makes it vitally important to understand how international trade networks functions and to gain insights in terms of making international trade networks more resilient.

Literature Review:

De Benedictis et al. (2013) laid the groundwork for using network analysis in international trade by examining the topology of the world trade network and identifying key players through centrality measures. Their static analysis provided valuable insights into the network's structure but did not capture the temporal dynamics of trade relationships.

Kim and Shin (2002) conducted a longitudinal study on globalization and regionalization from 1959 to 1996. They found that both globalization and regionalization processes strengthened over time, leading to a denser and more interconnected trade network. However, their reliance on dichotomized trade data, using thresholds of $1 million and $10 million, may have oversimplified the complexities of trade volumes and economic impacts.

A study on the international trade and world system structure used world-system theory to explore the hierarchical nature of global trade (Smith & White, 1992). The study employed eigenvector centrality to identify influential countries, challenging the traditional core-periphery model by emphasizing the dynamic roles of semi-peripheral nations. While the study provided significant theoretical contributions, it focused heavily on the core-periphery dichotomy, which may not fully capture contemporary trade complexities. World-system theory is more suitable for an approach that is consistent with interpretivism rather than positivism.

How We Are Going to Reach the Goal:

To achieve the project goal, the following steps will be followed:

1. **Data Preparation**: I will preprocess the provided dataset to ensure it is clean and suitable for analysis.

2. **Temporal Analysis**: I will analyze how the centrality measures evolve over time to identify trends and shifts in the global trade network.

3. **Visualization**: I will also create visualizations to illustrate the trade network and highlight key findings.

4. **Interpretation**: Lastly, I will interpret the results to draw meaningful conclusions and provide recommendations for policymakers and stakeholders.

Data and Methods:

The dataset has been taken from the Research and Expertise on the World Economy database. The dataset includes yearly centrality measures for 178 countries covering the period from 1995 to 2010. The dataset includes various centrality metrics such as out-degree, in-degree, out-strength, in-strength, closeness centrality, and eigenvector centrality, both weighted and unweighted. However, there are certain limitations of this dataset. First, the dataset covering the time period till only 2010 results in the analysis missing out on recent trends and updates. However, an overall understanding and insights for the future can still be derived from this existing dataset. On the other hand, the issue of anonymization is not relevant here because the country names are not personal and have to be identified, particularly, for research related to international trade networks.

Anticipated SNA Methods

The following methods will be employed based on our dataset.

- **Degree Centrality**: To measure the number of direct trade connections each country has.

- **Strength Centrality**: To assess the volume of trade associated with each country.

- **Closeness Centrality**: To determine how close a country is to all other countries in terms of trade paths.

- **Eigenvector Centrality**: To identify countries that are influential within the trade network by considering the influence of their trade partners.

- **Weighted Centrality Measures**: To account for the trade volumes and provide a more nuanced understanding of trade relationships.

1. **Temporal Network Analysis**: To analyze changes and trends in the network over time.

References

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