Social Network Data Analytics

**Social Network Analysis as a research method in political science.**

**An attempt to use it in coalition research**

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Abstract:

With increasing success and application in the fields including but not limited to biological and technological fields. Thus SNA was extended to be implemented in political science as well. This subsequently resulted in the institutionalization of this field resulting in the organization and creation of councils for the same.

The different spheres of political landscape includes the following but not limited to:

1. Media-Politics analysis
2. Relationship via Facebook or Twitter between parties, governments, media, electoral staffs have increased post the US presidential campaign.

We try to establish a relationship between the various attributes of the coalition government amongst the different countries of Europe. The relationships are depicted in the form of graphs with nodes being different parties, countries and the edges being the some factor of similarity taken into consideration. Our projects involves the official data from the European government – Representative Democracy Data Achieves, which makes our project on legitimate and real life data. Significant emphasis is laid on the following:

* **Direct Interactions:** Record direct meetings and negotiations.
* **Mediated Interactions:** Include media-reported interactions.
* **Speculated Interactions:** Add inferred or speculated relationships.

Finer Intricacies:   
(results, interpretation and visualizations)

country\_analysis function:

This function scrapes the vital information about a country that determines the type, nature and level of coalition that will be formed. It performs a **detailed analysis of a country’s cabinet data** from a given Data Frame. It extracts key information like cabinet names, the political parties involved, the most common decade for cabinet formations, and the types of governments and coalitions formed. For the specified country, it also identifies whether the cabinet has a majority, coalition, and if the Prime Minister is a technocrat.

Furthermore, it uses data filtering, counts, and mappings to provide meaningful insights, such as the **number of parties**, **most frequent government types**, and **new government formation reasons**.

Bipartisan Graph:

This graph illustrates the affiliation network with the parties as people and the coalition as a foci. This enables us to interpret the relationship and the overlapping of parties on multiple coalitions. With significant number of a parties involved in multiple coalitions indicate that a particular party could be influenced by many coalitions and thus considered a volatile party.

Conflict Management Graph:  
Forming a government is a significant task and hence once a coalition government is formed its of utmost priority to sustain the same. But any coalition is susceptible to internal conflicts with different parties adopting different mechanisms to resolve them. Based on the nature of the country and the coalition mechanism in place the parties can join hands to form the coalition for the government formation. Based on the mechanism different colours are used to illustrate the same. With several parties in account suggests a more stringent form of coalition mechanism.

Cabinet Duration:

This term refers to the remaining time for the parties of a country have prior to the commencement of the parliamentary elections. This is high influencing factor that state the need and the desperation of a political party to form the coalition. With strained time remaining indicate the need to form coalition if the simple majority of the party is about to fail in the elections to come.

Party collaborations:  
This code builds and analyses a **party collaboration network** for Bulgaria based on cabinet composition data from a Data Frame. It starts by extracting the names of political parties that participated in various cabinets and adds them as **nodes** to the graph. Edges are created between parties that served together in the same cabinet, with the weight of each edge increasing with repeated co-occurrences, representing the frequency of collaboration between parties.

The edges are **color-coded** based on their weights: *green* indicates strong collaboration (weight ≥ 5), *orange* denotes moderate collaboration (weight ≥ 2), and *blue* signifies weak collaboration (weight < 2). This classification helps visually emphasize which parties collaborate most often.

The analysis includes several **network measures**. First, the **triadic closure** count checks how often two parties have a common neighbour without being directly connected. A high count (above 10) suggests potential for new coalitions to form. The **Jaccard coefficient** is also used to find party pairs with high similarity (coefficient > 0.3), indicating frequent joint participation in cabinets. Additionally, **closeness centrality** identifies influential parties with high centrality scores (above 0.4), meaning these parties have better access or influence within the political network.

For visualization, the **spring layout** algorithm is applied to position nodes, and edges are drawn with their respective colors. A **legend** is added to explain the edge colors, and the graph is titled *“Party Collaboration Network in Bulgaria.”* After displaying the graph, the code prints insights about potential coalitions, influential parties, and frequently collaborating parties based on the **Jaccard coefficient**. This approach provides both **visual and analytical insights** into the political landscape, emphasizing coalition patterns and party influence in Bulgaria.

Type of Federation:

Coming together vs Holding together:  
The most vital factor to analyse if a coalition would be formed or not. The country is said to be stable if the country has holding together federation where a country decides to divide its powers between the central and the state/provincial governments whereas the former gives equal powers to all the provinces. This is an highly influential factor for the coalition formation. Eg- In holding together federation like India the parties need to form several coalitions both in the central and the state level to win the elections on the contrary in coming together federations like USA, coalition in major states is suffice to form the government.

Thus, edges are built among countries with similar type of federation that enables us to interpret the level and the need of the coalition formation. The nodes are the countries here.

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