

Developing A Network Model for the Iraqi Political Coalitions

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ABSTRACT

Data science has become a dominant tool in many different disciplines. Many methods and approaches are available and can be used in analyzing data. Network science approach is currently considered a powerful tool that is able to visualize and analyze complex data through investigating the relations among data objects. This kind of methods considers data as nodes that are connected by edges among them, and these connections are created based on a particular strategy. In this work, we generate a network model for the Iraqi parties using the IHEC public dataset. The model consists of nodes and edges connecting them. The performance of the generated network model was evaluated using two-level of measurements; Network-Level measurements (i.e., density, average degree, degree distribution, average path length, and average clustering coefficient) and Node-Level measurements (i.e., betweenness centrality and degree centrality). The visualization and the analysis of the network showed interesting facts about the collaboration patterns among the Iraqi parties. This work also showed that network science is useful in analyzing complex and highly related data. It can also reveal some hidden patterns that might be existed within the data.

Keywords: Iraqi Parties, Iraqi Elections, Political Networks

1. INTRODUCTION

The current technological revolution has affected our life in many different aspects. As a result, we witness introducing sophisticated tools that can address a variety of problems and issues in our life. Network science is one of the areas that has shown a great progress in the recent years. It is used in analyzing colorful of data types and considered a multidisciplinary. Moreover, political data is considered complex and complicated that needs advanced tools in the analysis. Therefore, network science approaches can be adapted for such a complex data. On the other hand, the collaboration patterns among Iraqi parties have shown unstable behavior especially after the year of 2003 and was based on religion, sect, region, etc. [1] [2]. Furthermore, the geosocial nature of Iraq is colorful of components from its north to the south. Therefore, analyzing such a system is not an easy task. According to IHEC [3], there are 204 registered parties in Iraq along with many different affiliations. This number of parties is considered to be big taking into considerations the population size and the area of Iraq. In the big countries the number of parties is significantly less such that in Brazil there are 30 parties [4] and in the United States there is only two parties [5]. The way of forming parties in Iraq is different than what can be seen in most of the worldwide countries [6]. As a result, the collaboration patterns and forming coalitions is an important aspect to be investigated in the Iraqi political system. This issue has not been investigated in the literature using mathematical and engineering methods.

For all the aforementioned, it is needed to investigate and understand the Iraqi parties' political collaboration patterns. Furthermore, complex networks field is considered a multidiscipline field [7]. This because a problem can be formed as a network or a graph (G) that includes nodes (N) and edges (E) [8][9]. In this work, we aim at using the concepts of complex networks in the analysis of the Iraqi political parties. In complex networks, there is a specific kind of networks formed for political purposes called *Political Networks*. A political network of parties can be formed as nodes and edges among them. The

general way followed in this work is that when two parties work under the same coalition there is a tie between them as we will see in Section III. Figure 1 shows how parties connect with each other based on the coalition they work for.

The organization of this paper is as follows; the next section presents the related works. Section III describes about how the networks created in this paper. Section V explains and analyses the generated networks. Finally, we conclude this paper in Section IV.

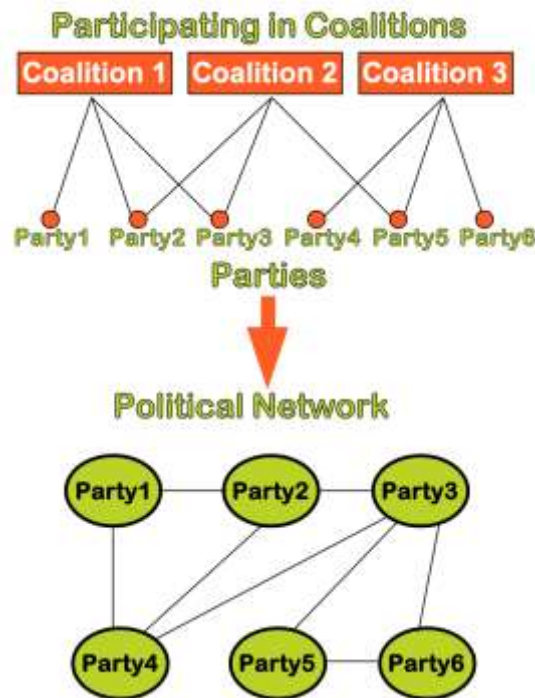


Figure 1: The way of forming and generating a political network. Two parties are considered to be connected if they belong to the same coalition.

2. RELATED WORKS

Understanding the political collaboration pattern of the Iraqi parties needs for a more attention by the research community. Many researchers around the world have targeted this kind of research using traditional statistical analysis and other tools [10]. A study performed by Abdulwahab in [1], he studied the impact of the Iraqi parties' transitions after the year of 2003 on the general performance of the government. He showed how their ideology transitioned from being opposition to being an effective party in the current government. Another study that took the Iraqi parties as their target research is the study of [6]. She showed how the small Iraqi parties tend to cluster and participate with the most influential parties in Iraq aiming at achieving their goals and become part of the political process in Iraq. In [10], the author tries to explore the ways on how to promote the status of a party in the society. He involved Iraqi political parties from most of the Iraqi components in his study.

However, some of the studies in field of political networks used the concepts of complex networks in analyzing and understanding the political collaboration patterns among parties/politicians. These concepts are considered to be more advanced and able to provide researchers with much details on an issue that the

traditional statistics can provide. The study of Olivera et. al [11] used the concepts of complex networks in the analysis of the Brazilian parties. In their study, they revealed the impact of moving from a party or coalition to another one and the effect of loyalty on the general performance of the party/coalition. The previous study of the aforementioned one was performed by Barbosa et al. [4], they studied the impact of moving a politician between two or more parties on promoting the general performance of both the party and the politician in the government.

3. RESEARCH METHOD

3.1 Dataset and Network Creation

In this work, we use a dataset that was taken from the Independent High Electoral Commission (IHEC) in Iraq [3]. IHEC is considered as the main official source of information on the Iraqi parties. In Iraq, for a party to start working and join the political process it has to be registered in IHEC in order to be able to practice its activities officially. The number of registered parties has significantly increase after the mentioned year. Till the date of writing this paper, the number parties that are officially working in Iraq is 204. Our dataset contains information on the Iraqi parties and some information about them such as party establishing year, the number of seats won, the size of party (number of members), and the coalitions participated in. It should be mentioned that our plan in analyzing the political network in Iraq supposed to be for the 2021 elections. However, the data was not ready from the source (IHEC). Therefore, we used the data of 2018 elections. Here, our goal is not to have descriptive or classical statistics, our goal is to see the pattern of forming the coalitions and how different parties are connected to each other.

Finally, we formed the structure of the dataset to be appropriate for visualization purposes. To this end, we created nodes and edges, where a node represents a party and the edges are created when there exists coalition among them. In fact, this approach of forming data is followed in many works in the literature such as [5].

3.2 Iraqi Parties Network

As a complex network, a political network can be represented as vertices (nodes) and relations (edges) among them. The political network of Iraqi parties is formed in the way that each vertex denotes a party where P_1, P_2, \dots, P_n are the network nodes. The relations among parties R_1, R_2, \dots, R_m are determined by a strategy. This strategy states that two parties are considered to be connected if and only if they are participated in a coalition. It should be mentioned that a party can participate in more than one coalition (e.g., Al-Hal Party) [6] [3]. After preparing the nodes and the relations among them, we generated and visualized the political network of the Iraqi parties. According to the dataset, we have 204 nodes and 121 edges among them. Figure 2 depicts the Iraqi Parties Network (IPN) and how they are connected with each other according to their coalitions.

After visualizing the IPN, we involved some of the complex network's measurements for the sake of our political network to be analyzed. These measurements are important to reveal the patterns of the collaboration among the Iraqi parties. Each measurement retrieves a particular feature from the network. The Average Clustering Coefficient (C) of a network takes the range 0 to 1 and shows nodes' tendency to cluster with other network nodes [12]. In our political network, the closer the value of C to 1 the stronger tendency for nodes to attach to other nodes. Since we are dealing with a network of nodes and relations among them, the Average Path Length (l) of a network represents the average number of steps for all the shortest paths among a pair of parties as explained in [12]. In the same context, the Diameter (O) of a network reflects all the shortest paths between the farthest pair of parties in the network [13]. While the Density (D) of a network shows the ratio of the number of links to the number of possible links in that network [13]. On the other hand, we use some centrality measurements for the sake of our analysis. One of these measurements is Betweenness Centrality (C_B) [14], which represents a reflection of how a

particular node is influential in a network. It measures the importance of the position of a particular node in a network. It reveals the importance of a particular node in the flow of information within a network. The other centrality measurement is Degree Centrality (C_D), which depicts the frequency of links for node [14].

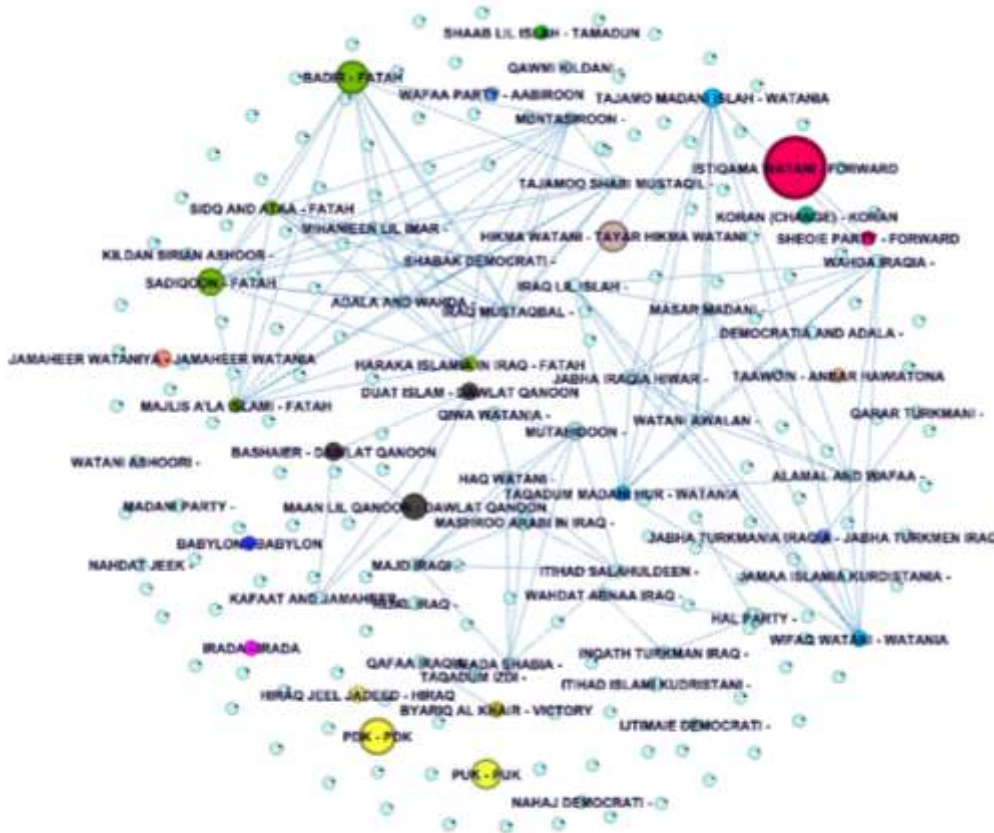


Figure 2: IPN network, nodes represent all the Iraqi parties registered in IHEC. The relations among them reflect their participation in the Iraqi coalition of the 2018 elections. The nodes with no labels represent the parties that did not win the 2018 election, while the other nodes represent the parties that won the election. Different colors mean different coalitions these parties belong to.

Table I presents the characteristics of the IPN network in terms of the measurements mentioned above. According to the value of C , the network seems to be highly connected. This means that the majority of the parties worked under coalition and there are a few parties work alone (see Figure 2). This finding reflects a high level of collaboration among the parties that led them to win the elections. This is also clear from the value of O that shows the farthest distance obtained from the pairs of the connected components within the network, which is short. Also, the value of l reflected the same fact mentioned. Moreover, the value of network density D tells us that there are a lot of potential connections among the Iraqi parties. To this end, it is needed to increase the level of collaboration among parties and decrease the number of potential connections aiming at making most the connections real.

For a microscopic view to the IPN network, we extracted only the winner parties and visualized them separately. We call the generated network as sub-IPN that is considered as a subset of the IPN and includes the winner parties as well as the connections among them. Figure 3 depicts the sub-IPN network

in which the colors represent different coalitions and nodes size reflects the number of seats each party gained in the 2018 elections. The larger the size of nodes, the more seats won by a party.

Table I: The characteristics of the Iraqi Parties Network (IPN)

# of Nodes	# of Edges	C	Average C_D	O	D	l
204	121	0.947	1.186	2	0.006	1.071

Table II presents the characteristics of sub-IPN network. In fact, it is reasonable to see improvements in the measurements used for the IPN network (see Table I) comparing to the values obtained from sub-IPN network. The number of nodes in this network is 63, while the edges are the same in IPN network. It can be observed that about only 30% of the parties in Iraq (out of 204 parties) won in the 2018 elections. The remaining 70% of the Iraqi parties did not attach to influential coalitions/parties and preferred to work alone. This leads them not to win in the 2018 elections since the strategy they followed was not efficient.

Table II: The characteristics of the IPN clusters, which represent the connected parties that won in the elections

# of Nodes	# of Edges	C	Average C_D	O	D	l
36	121	0.967	3.81	2	0.061	1.056

In this work, we see an interesting case that should be mentioned and explained. There are 3 parties (Al-Hal, Mutahidoon, and Mashroo Arabi) in the IPN whose strategy in attaching to coalitions was efficient and they won in the elections. A brief summary on this special case can be seen in Table III. These parties belong to the same component (Sunnis) and their leaders are from Nineveh and Anbar provinces. Also, these parties participated in more than one coalition in the recent election, which is the other thing they have in common. They gained 20 seats in the Iraqi parliament, which is considered as a noticeable achievement comparing to the other parties in Iraq.

Table III: The characteristics of the IPN clusters, which represent the connected parties that won in the elections

Part Name	Establishing Year	Seats Gained	Coalitions Attached to	Party Leader
Al Hal	2008	8	Baghdad, Nineveh Hawi., Anbar Hawi.	Jamal Al-Karbooli
Mashroo Arabi	2014	6	Qarar Iraqi, Tahaluf-Arabi-Kirkuk	Khamees Al-Khanjar
Mutahidoon	2017	6	Qarar Iraqi, Tahaluf-Arabi-Kirkuk	Usama Al-Nujaifi

this number of seats. However, we believe that the politician Usama Al Nujaifi who is influential and an important character in the Iraqi social settings especially in Nineveh province (the second populated province in Iraq) is the main reason behind this success. The performance of Al Nujaifi was much enough to be reflected in the elections especially his support to the Iraqi IDs during the recent war. Another good example of this case, Hadi Al Amiri who leads Badir organization under Fatah coalition gained 21 seats in the elections. It is a great achievement for this party to win this number of seats. This reflects the positive performance of Al Amiri and his role in the recent war against ISIS gangs, which made him influential. This case is applicable for most of the influential characters in Iraq since the success of a party depends on the leader of that party as well as the collected performance of its members [16].

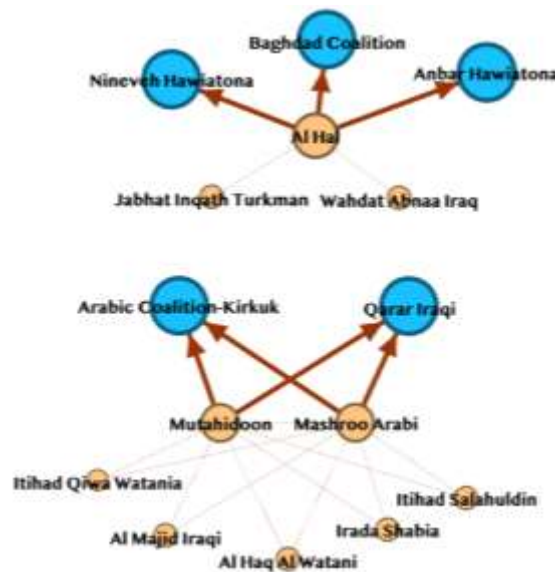


Figure 4: A graph representing how Al Hal, Mutahidoon, and Mashroo Arabi parties connected and participated with parties and coalitions. The biggest blue nodes denote coalitions and the other nodes represent parties. The big arrows represent the participation of a party in a coalition, while the regular lines represent the collaboration among parties.

On the contrary, Al Watan party that established in 2004 [17] under the leading of Mishaan Al Jubouri did not win any seats in the 2018 elections. This means the performance of Al Watan party leader was not good enough to win in the elections. This confirms what has been mentioned in the previous paragraph.

Now, as a final step of our analysis, we select the best-connected parties among all the registered Iraqi parties. In complex networks point of view, the best-connected parties are the ones that have the highest values of betweenness centrality measurement. This measurement, as mentioned, reflects how influential the position of a party in the flow of relations to its parties/coalitions within the IPN network. Table IV presents the best-connected parties in the IPN network. The 11 parties shown in the table represent the parties that obtained the highest levels of betweenness centrality (best positioned parties) of which the values are significantly decreased for the rest parties list. The table also shows the degree centrality, coalitions, and the number of seats for each party. It can be observed the domination of Fatah coalition and its collaborated parties in IPN network. This is also clear when we see the biggest cluster of Fatah in Figure 2. Another interesting finding in this analysis can be noticed from the highest levels of betweenness

centrality obtained by Fatah parties in Table IV that gave the power to Fatah coalition in the 2018 elections. It should be mentioned that Fatah coalition won 47 seats in the 2018 Iraqi parliament [3], which is the second highest number of seats obtained after Forward coalition (54 seats).

The top two best connected parties (Mutahidoon and Mashroo Arabi) shown in Table IV reflect the fact that participating and collaborating with more than one party or coalition is considered as an effective strategy to adopt and eventually gain seats in elections.

Table IV: The best-connected Iraqi parties according to their betweenness centralities for the IPN network

Part Name	Betweenness	Degree	Coalitions	Seats
Mutahidoon	2.00	7	Qarar Iraqi, Tahaluf-Arabi-Kirkuk	6
Mashroo Arabi	2.00	7	Qarar Iraqi, Tahlaluf-Arabi-Kirkuk	6
Masar Madani	0.25	9	Watania	1
Badir Org.	0.25	10	Fatah	21
Haraka Islamia	0.25	10	Fatah	2
Muntasiroon	0.25	10	Fatah	1
Adala and Wahda	0.25	11	Fatah	1
Sadiqoon	0.25	11	Fatah	15
Shabak Democracy	0.25	10	Fatah	1
Iraq Mustaqbal	0.25	10	Fatah	1
Mihaneen Lil-Imar	0.25	10	Fatah	1

4. CONCLUSIONS

In this paper, we involve the concepts of complex network in investigating the political performance of the current Iraqi parties in terms of the political collaboration among them. We aimed to generate and visualize a political network for the Iraqi parties and involved some Measurements in the analysis. A network called IPN is generated and visualized representing the collaboration of the Iraqi parties in forming coalitions that participated in the 2018 elections. The finding showed for a party, it is important to attach and collaborate with the most influential parties and coalitions in order to get more power. This collaboration pattern is found in 3 parties that participated in more than one coalition and gained more seats in the 2018 Iraqi parliament. Moreover, the political performance of a particular party mainly depends on its leader regardless the seniority of that party.

This paper can be summarized by the following:

- The uses of complex networks concepts can be considered as an effective tool to deeply investigate and understand political data. It has the ability to show what cannot be seen when using the traditional statistical analysis. Also, according to the literature, complex networks is one of the efficient ways for modelling multidisciplinary data as shown in [18][19][20][21].
- The characteristics of the Iraqi parties network (IPN) showed some strong clusters, each of which reflects a coalition participated in the recent elections.
- For a party, participating in more than one coalition can be considered as an effective way in gaining more seats. As a good example is the case of Al Hal, Mutahidoon, and Mashroo Arabi parties.
- About 70% of the Iraqi parties did not win the elections due to their collaboration with inconvenient coalitions and parties.
- The performance of a party mainly depends on the leader of that party, which is clear from the cases of Mutahidoon party and Badir organization.
- The seniority of a party is not an important factor of success (e.g., Al Watan party).
- The best-connected parties in Iraq are the ones that work under Fatah coalition.

ACKNOWLEDGMENT

The author is grateful to the IHEC of Iraq for providing the data used in this work. The author also thanks the University of Mosul/ College of Engineering for the support in doing this research article.

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