O. Kravchuk, Master student
T. Blindaruk, Master student
I. Suhoniak, PhD in Engr., As. Prof., research advisor
L. Mohelnytska, PhD in Phil., As. Prof., language advisor
Zhytomyr State Technological University

ANALYZING UKRAINIAN PARLIAMENT NETWORK

In the era of global computerization, we generate a lot of data which could be used to improve human life. Recently Big Data has been used to analyze and influence the society. A vivid example of Big Data usage is Barack Obama's successful 2012 election campaign. Big data was used to analyze the electorate preferences and to correct the candidate's program. Big Data is widely used by US National Security Agency as well [1].

Nowadays more and more corporations and government institutions provide open access to their data. A star rating system has been developed for describing Open Data quality [2]. There are 5 stages in it:

- 1 stage (1 star): data is available on the web (whatever format) with an open license;
- 2 stage (2 stars): data is available as machine-readable structured data (e.g. excel instead of image scan of a table);
- 3 stage (3 stars): data is available in well-known formats (e.g. CSV, JSON, XML, YAML) and can be processed automatically;
- 4 stage (4 stars): data is stored according to open standards (e.g. W3C - RDF and SPARQL) to identify your data;
- 5 stage (5 stars): data is linked to the data from other sources.

In this paper we research 'Open Data Portal of Verkhovna Rada of Ukraine' based on Open Data. The goal of our research is to find hidden relations between deputies in Verkhovna Rada of Ukraine.

The network of the parliament is a graph with edges represented by deputies. To build links between graph edges the following principles are taken into account: authorship based links; voting based links with a threshold; and voting based links with different vote types – 'for', 'against' and 'abstained'.

Vote based links between deputies were researched:

- voting 'for' and 'against' for bills which were accepted and received 50-55% of the votes;
- identical votes between deputies. Some links were removed by a threshold;
- voting for the popular bills (bills which were selected from mass media);
- voting for bills by different headings:
    - Multilateral international agreements;
    - Security and defense;
    - Sectoral development;
    - Humanitarian policy;
    - Bilateral international agreements;
    - State construction;
    - Economic policy;

- Organizational issues;
- Legal policy;
- Social policy;
- Constituent powers;

Python library ‘igraph’ was used for modeling and construction of graphs. Network visualization and visual analysis were carried out with the use of ‘Gephi’ application.

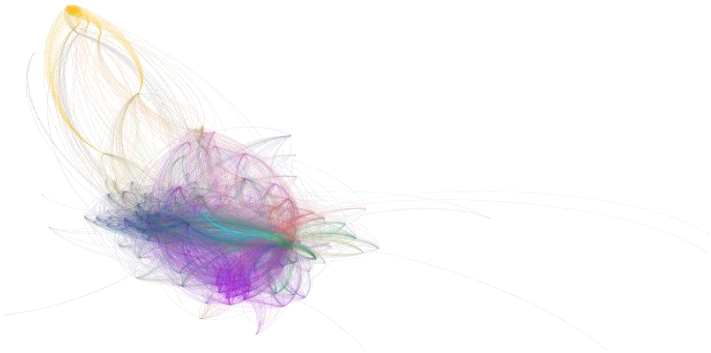

Fig. 1 Vote based links between deputies

In order to prove or declaim the idea of parliament division different from the official one (i.e. fractions, coalition and opposition), we tested the following hypothesis and received the results:

- authorship based links are impossible to check due to insufficient information (around 6%);
- ‘all types of vote based links between deputies show negative results, the graph structure is not divided;
- ‘For’ vote based links show negative results, the graph structure is not divided;
- voting based links with the use of threshold show parliament split into opposition and coalition with a 10% threshold. The Parliament splits into opposition and coalition with 20% threshold. Strong groups inside fractions are formed while using a 70% threshold.
- analysis of voting based links for bills under different headings revealed 3 different groups. The first group of headings shows the Parliament split into opposition and divided coalition. The second group shows the Parliament split into opposition and coalition. The third group of headings shows the same interest to the voting from different fractions in the parliament;
- voting based links for bills which have 50-55% of all votes ‘for’ demonstrate that fraction ‘People Front’ votes more organized to prevent the bill from being approved.
- analysis of popular bills discovered regularity conservation of Parliament division for data sets of smaller size;

REFERENCES

1. En.wikipedia.org. (2018). Big data. [online] Available at: https://en.wikipedia.org/wiki/Big_data [Accessed 14 Mar. 2018].
2. W3.org. (2018). Linked Data - Design Issues. [online] Available at: https://www.w3.org/DesignIssues/LinkedData.html [Accessed 15 Feb. 2018].