

The Representation of Political Parties

A Network Analysis of Mastodon and the Dutch House of Representatives elections

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Abstract. The abstract should briefly summarize the contents of the paper in 15–250 words summarizing the research question, method and main findings.

Keywords: Social Web · Social Network · Network Analysis · Mastodon · Dutch Elections · Political Parties · User-generated Content.

1 Introduction

On November the 22th 2023 around 77.7% (13,473,750 eligible voters casted 10,475,139 votes in total) of the Dutch Population went to a polling station in their municipality to vote for their political party of choice for the Dutch House of Representatives [3]. Of the 26 parties that participated in the election, 15 parties received enough votes for a seat in the House of Representatives.

Prior to elections viewpoints and topics of particular parties are discussed on Social Networking Sites (SNS). E.g. users post their support (or anti-support) for a specific political party, discuss topics that are mentioned in parties election manifesto, and discuss candidates that are on the election list.

One of these relatively new and emerging Social Networking Sites is Mastodon¹ a self-hosted social network with microblogging features similar to X² (formerly known as Twitter) which we use for this research. Analysing Mastodon is interesting for two main reasons. (1) Since it's release, especially, the last two years Mastodon has seen a massive surge in increase of users and activity (e.g. posts, interaction) on the Platform, from around 3.500.000 in october 2022 to 8.100.000 users in october 2023 [1]. One main reason for this exponential growth is the acquisition of Twitter by Elon Musk [5] with many users from Twitter transitioning to Mastodon. (2) Elections for the Dutch house of representatives only occur every 4 years. When Mastodon was initially released the number of users and activity on the platform was relatively low compared to other SNS's. As mentioned before,

¹ <https://joinmastodon.org/>

² <https://twitter.com/>

the last two years the platform grew and we’ve even seen dutch political parties create Mastodon instances for their party members (e.g. Bij1 ³, Piratenpartij ⁴) which means Mastodon increasingly becomes more representative of the dutch voting population (eligible voters).

In order to investigate this social web related topic, this study aims to answer the research question: *"To what extent is the relatively new Social Networking Site Mastodon representative of the election voting of the dutch population?"*. To answer this research question in-depth, the following sub-questions were formulated:

- **R1:** *What’s the distribution of political parties on the platform and do they align with the outcome of the election?*
- **R2:** *What political topics are discussed in posts and are they representative of the election manifesto of political parties?*
- **R3:** *Do the topics that are discussed on the platform align with popular voting guides?*

The sub-questions are relevant to the main research question as they provide a more detailed and specific understanding of the topic. For our research we use Mastodon as a Social Networking site (SNSen) as case study and main data source but this research can be further expanded to any new social network if the platform has an API that exposes similar platform data and has the characteristics of a typical social network.

In order to answer the research questions this paper begins with an examination of prior research on Mastodon as a platform and literature using related methods, in this case mainly network analysis, followed by the methodological set-up about how we gathered and pre-processed relevant API data from Mastodon and other election related datasets. Next, a network analysis of the Mastodon platform is performed by focussing on Mastodon activity and instances this study (1) creates an overview of political parties present on the network, personal accounts of specific politicians and activity of users corresponding to political parties; (2) election related topics discussed on Mastodon and cross-referenced with topics that are in voting guides and election manifesto’s. After which the results (comparisons) are presented accompanied by visualizations to further understand the data. In the paper’s concluding section, the most important findings are concluded, limitations are discussed, privacy and ethical considerations are taken into account, followed by recommendations for future work.

2 Related Work

Literature section with a short overview of other papers discussion related questions or using related methods or data

³ <https://social.bij1.org/about>

⁴ <https://mastodon.social/@Piratenpartij@social.globalpirates.net>

3 Methodology

3.1 Data collection (datasets)

To gather social web data from Mastodon the official public Mastodon API ⁵ using the Mastodon.py ⁶ wrapper for Python is used. Mastodon is an ActivityPub-based ⁷ Twitter-like federated social network node. The API wrapper is feature complete for Mastodon the Mastodon API version 3.5.5. First a user account is created on the platform by completing the sign-up for an account flow on the Mastodon official website *joiningmastodon.org*. The account is created on the general and largest public server (provider) *mastodon.social* operated by the Mastodon gGmbH non-profit.

To interact with the Mastodon servers through Python using the Mastodon.py wrapper an application registration is performed which gives a client key and client secret to allow logging in and accessing API data using access tokens. For this research we mainly used API methods for:

- **Accounts, relationships and lists:** allows for getting information about accounts and associated data as well as update that data
- **Instance-wide data and search:** fetch information associated with the current instance as well as data from the instance-wide profile directory
- **Streaming:** allow access to the streaming API. For the public, local and hashtag streams,

Arguments and parameters used in functions written for the Mastodon API methods are related to the dutch elections (e.g. names of political candidates, popular topics from parties) further expanded upon in the data preprocessing and results section of this research. To check, validate and cross-reference the sub-questions the data is complemented with five additional election related data sources:

- **Institut Public de Sondage d’Opinion Secteur (IPSOS) exitpoll:** a market research company which, commissioned by the ‘Nederlandse Omroep Stichting’ ⁸ (NOS; English: Dutch Broadcasting Foundation) publishes market research about the elections (e.g. which voters switch between parties, which municipalities has switched the most between parties) [4]. This gives a comprehensive insight of voting behaviour from the recent election.
- **Government Open Data (overheid.nl):** specifically the datasets from The Dutch Electoral Council ⁹ (Dutch: Kiesraad), the government body that is responsibly for counting of the votes and publishing the results [2]. This gives the official results of parties and candidates from the recent elections.
- **ProDemos voting guide (stemwijzer):** a voting guide called Stemwijzer ¹⁰ with pre-defined topics. By answering 30 statements with agree, disagree

⁵ <https://docs.joinmastodon.org/client/intro/>

⁶ <https://mastodonpy.readthedocs.io/en/stable/>

⁷ <https://www.w3.org/TR/activitypub/>

⁸ <https://nos.nl/>

⁹ <https://www.kiesraad.nl/>

¹⁰ <https://home.stemwijzer.nl/>

or no opinion, voters can compare their positions with those of political parties. Many of these voting guides exist, ProDemos is most requested and partly funded by the dutch government [6]. This gives insight in important topics from political parties for the recent elections.

- **Electoral Council (kiesraad)**: the Kiesraad ¹¹ is a central electoral committee, an advisory body and acts as a central polling station during the dutch house of representatives election. For this research we used the published Candidacy for the House of Representatives election list and the Political Party Registrar.
- **Netherlands Bureau for Economic Policy Analysis (cpb)**: the dutch economics bureau (CPB) ¹² performs election manifestos analysis to determine how feasible manifestos of political parties are. This gives an overview of topics that are in the election manifestos of political parties.

3.2 Data preprocessing (scope)

From the dutch-election gathered data sources first a relevant scope for this research is determined. For a datetime timeline of data we use data from Mastodon’s initial release of 16 March 2016 (7 years ago). This means we analyse three House of Representatives elections. In 2017 with a turn-out rate of 81,57% of dutch population, in 2021 with a turn-out rate of 78,71% of dutch population and the most recent as of writing this paper in 2023 with a turn-out rate of 77,75% of dutch population. Usually dutch elections take place every four years (thus next elections had been expected to be held in 2025) but a snap election was called after the fourth Rutte cabinet collapsed due to immigration policy disagreements between the coalition parties.

In total during this timeframe a total of 42 unique parties could be voted on during the elections. 28 parties in 2017, 37 parties in 2021 and 26 parties in 2023. For this research we created a subset of political parties based on incumbent parties (‘zittende partijen’ in dutch) based on the results of most recent and previous elections. This gives a total of 20 parties. This research also has taken synonyms and abbreviations of parties into account (e.g. Forum voor Democratie is often abbreviated to ‘FvD’ or GL-PvdA is still often mentioned with full names after the merger in 2022 as Groenlinks and Partij voor de Arbid) *Table 1* displays an overview of parties used for this research. For analysis of topics we manually created an aggregated dataset, as shown in *Table 2* of main topics and potential subtopics based on the topics mentioned in the voting guide and analysis of the election manifestos of the CPB.

¹¹ <https://english.kiesraad.nl/>

¹² <https://www.cpb.nl/en/charted-choices-2025-2028>

Overview of all 'sitting' Political Parties			
VVD	D66	PVV	CDA
GL-PvdA	SP	FvD	PvD
ChristenUnie	Volt	Ja21	SGP
Denk	50Plus	OPNL	BBB
Bij1	Piratenpartij	Splinter	BVNL

Table 1: All parties based on the results of the dutch elections of 2017, 2021 and 2023.

Overview of all topics (query words)			
Immigration	Economics	Climate	Agriculture
Taxes	Healthcare	Rural areas	Public transport
Defence	Education	Housing	Religion
European Union	Income	Sentences	

Table 2: All topics based on the election manifestos summaries and voting guide.

3.3 Data analysis

This research focusses on Network Analysis which is performed using the Python programming language (latest stable version 3.12.0) following the Jupyter ¹³ notebook standard to which combines code, documentation, data, and visualizations. Besides the Mastodon.py API wrapper to access the Mastodon data the notebooks use NetworkX ¹⁴ to perform Network Analysis. This library allows for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks and has built-in functions for common analysis measurements and displaying graphs. To display data plot distributions, and creating visualizations a combination of Matplotlib ¹⁵ and Seaborn ¹⁶ are used.

4 Results

The results section is divided into three subsections eachs corresponding to the individual research questions as described in the *introduction* section. The first (R1) research question related to activity of political parties on the platform, the second (R2) relates to topics from election manifestos and voting guides and the third (R3) is a network analysis of instances and servers of political parties on the network. Each with accompanying descriptions of the methods performed and graphs to further understand the data and the result of the analysis.

Before describing the individual research questions what's interesting to note related to the the general increase of activity in terms of the dutch elections

¹³ <https://jupyter.org/>

¹⁴ <https://networkx.org/>

¹⁵ <https://matplotlib.org/>

¹⁶ <https://seaborn.pydata.org/>

on the whole Mastodon platform is that if a query is performed on all toots related to dutch elections (includes terms such as 'dutch elections', 'verkiezingen', 'tweedekamer', 'tweede kamer') and plot them based on year we get the result as shown in figure 3. This results in a total of 18.230 toots which included election related terms of which around 16.000 are in the last two years. A clear spike in activity is seen in the most recent election year, 2023, as opposed to previous elections, 2017 and 2021, which show almost no activity on general election query words.

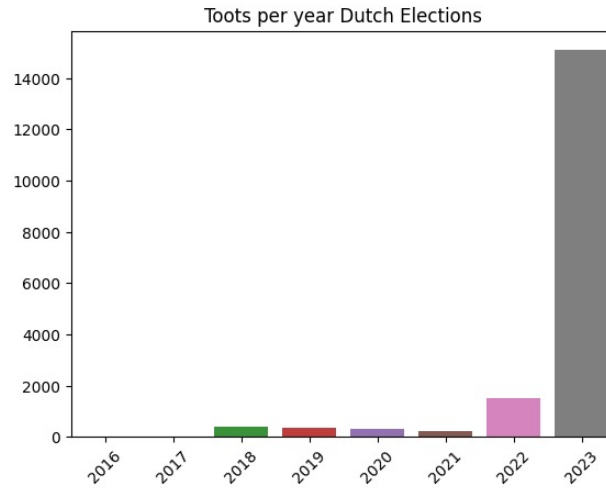


Fig. 1: Bar chart of query words related to dutch elections

4.1 Activity of Political Parties (R1)

Finding M1: *Out of all parties x parties are present on Mastodon and have instances.*

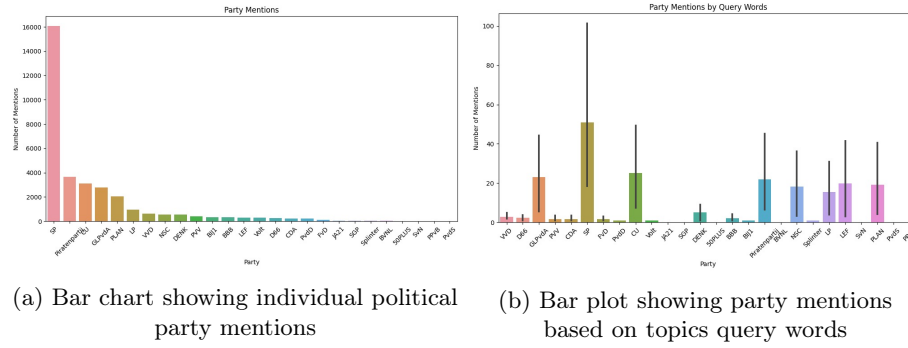


Fig. 2: Graphs visualizing party activity based on party name mentions and query words based on topics

4.2 Election-related topics and query words (R2)



Fig. 3: Party mentions related to topics

Finding M2: Out of all parties x parties are present on Mastodon and have instances.

4.3 Network Analysis of Parties instances and servers (R3)

Finding M3: Out of all parties x parties are present on Mastodon and have instances.

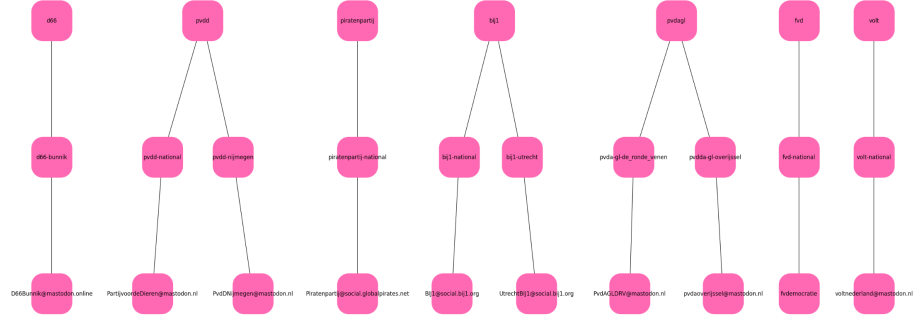


Fig. 4: Overview of parties and corresponding sub instances

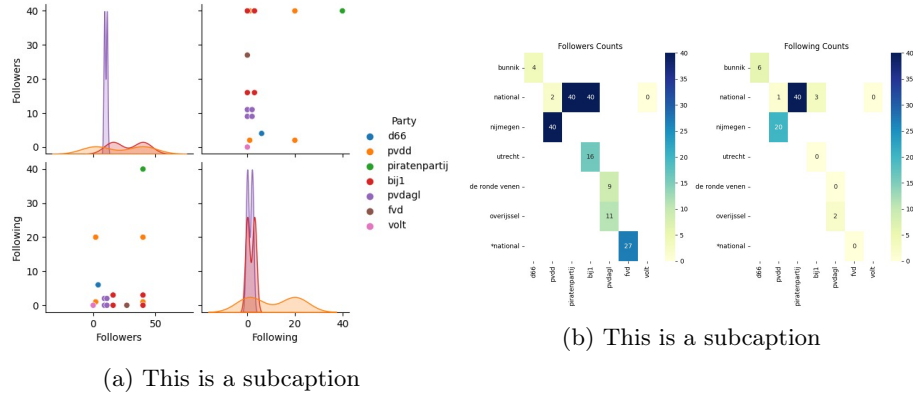


Fig. 5: Graphs visualizing parties and follower counts

5 Discussion

Privacy & ethical considerations

6 Future work

Each of the parties is placed on a political spectrum (left, lean left, center, lean right, right). Quote a source. There is probably an 'official' list for this. Based on what they voted (maybe stemmentracker)? If they are left-wing, right-wing. How many zetels etc. this could be part of our weighting. We now say each party is equal in our graphs. But some parties are 'larger' in terms of ledennummers etc.

List of topics could probably be larger. We now manually made a list of topics based on summaries and manually scanning through table of content of manifestos. This could be automated in future work by having NLP scan table of contents from election manifestos, 'moties' or determine the topic using classification based on voting guides (stemwijzers).

The network analysis focusses on political parties but most party have one 'fractievoorzitter'. To further analyse the network we could also switch to individual user accounts of the fractievoorzitter's of the kamer and see based on who they follow or their follower account what other politicians of the party have accounts on Mastodon.

The topics displayed in the voting guides are the topics parties mostly disagree on and are picked based on a larger list of topics. That doesn't necessarily mean these topics are the most popular topics in society. For future research we would like to cross-reference topics from the voting guides with topics discussed on social networks to see if topics that gain traction on social networking sites align with topics from the stemwijzer.

7 Conclusion

With this work, we invite researchers, journalists and practitioners alike to further investigate Mastodon in relation to the Dutch House of Representatives elections or explore any other new and upcoming Social Networking Site using similar methodology.

8 Acknowledgements

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9 Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. The author(s) has no affiliation with any of the companies and organizations mentioned in this article and this work has not been supported by any funding agency, private organization, or political party.

10 Appendix

In the spirit of open research in order to support reproducibility and enable future work in this problem space the datasets and Python notebooks in this work are publicly available on GitHub using the MIT License. Under the *dandevri* username (one of the authors) we have several a code repository with several subfolders:

1. **Notebooks:** Source Code for the Python Jupyter Notebooks for data scraping and processing. <https://github.com/dandevri/vu-social-web-data/notebooks>
2. **Datasets:** The processed and transformed datasets used in the notebooks. <https://github.com/dandevri/vu-social-web-data/datasets>

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