Government websites as data: A methodological pipeline with application to the websites of municipalities in the United States

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Abstract

A local government's website is an important source of information about policies and procedures for residents, community stakeholders and scholars. Existing research in public administration, public policy, and political science has relied on manual methods of website content collection and processing, limiting the scale and scope of website content analysis. We develop a methodological pipeline that researchers can follow in order to gather, process, and analyze website content. Our approach, which represents a considerable improvement in scalability, involves downloading the entire contents of a website, extracting the text and discarding redundant information. We provide an R package that can be used to apply our proposed pipeline. We illustrate our methodological pipeline through the collection and analysis of a new and innovative dataset—the websites of over two hundred municipal governments in the United States. We build upon recent research that analyzes how variation in the partisan control of government relates to content made available on the government's website. Using a structural topic model, we find that cities with Democratic mayors provide more information on policy deliberation and crime control, whereas Republicans prioritize basic utilities and services such as water, electricity and fire safety.

PA Letter Requirements:

2-4 pages

no longer than 1500-3000 words

1-3 small display items (figures, tables, or equations)

200-300 word abstract

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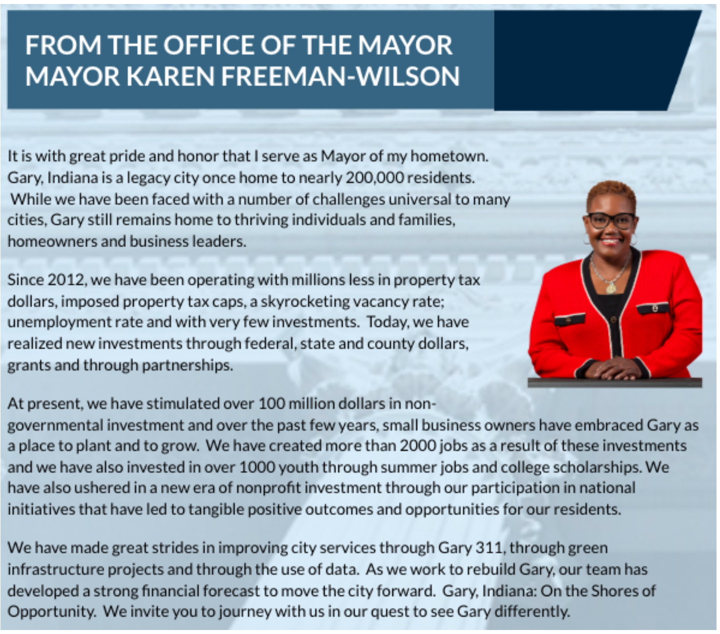
1 Introduction

Local governments convey voluminous information about all aspects of their policymaking, policy implementation, and public deliberation, via their official websites. The vital role of official websites in connecting the government and the governed has motivated a wave of research on the contents of government websites (e.g., Grimmelikhuijsen 2010; Wang et al. 2005; Osman et al. 2014; Eschenfelder et al. 1997). The conventional approach to data collection in projects focused on government websites involves manual content extraction from each website in the dataset. Though accurate, the manual approach to data collection is costly for large-scale analysis. We present a methodological pipeline that can be used to automatically scrape government websites in order to build datasets that can be used for text analysis—describing challenges in data collection and processing, as well as the solutions we adopt. We provide an illustrative application in which we explore the ways in which the textual contents on city government websites in six American states correlate with the partisanship of the city mayor.

2 Mayoral Politics and City Government Website Content

A substantial body of research has found that the partisanship of the mayor affects city governance along multiple dimensions of spending and policy attention (Gerber and Hopkins 2011; de Benedictis-Kessner and Warshaw 2016; Einstein and Glick 2016; Marion and Oliver 2013). Official city websites allow mayors to present their views and policy priorities to the public. In local politics, where campaign funds are low, this lends incumbents a crucial advantage in becoming more well-known among their constituencies (Stanyer 2008). Local government websites are frequently visited by the public (Thomas and Streib 2003). City websites can be used to communicate the stance of a mayor on social or economic programs. Consider the example of the Gary, Indiana homepage, depicted in Figure 1. This screenshot provides a clear example of the utility of a city



FROM THE OFFICE OF THE MAYOR
MAYOR KAREN FREEMAN-WILSON

It is with great pride and honor that I serve as Mayor of my hometown. Gary, Indiana is a legacy city once home to nearly 200,000 residents. While we have been faced with a number of challenges universal to many cities, Gary still remains home to thriving individuals and families, homeowners and business leaders.

Since 2012, we have been operating with millions less in property tax dollars, imposed property tax caps, a skyrocketing vacancy rate; unemployment rate and with very few investments. Today, we have realized new investments through federal, state and county dollars, grants and through partnerships.

At present, we have stimulated over 100 million dollars in non-governmental investment and over the past few years, small business owners have embraced Gary as a place to plant and to grow. We have created more than 2000 jobs as a result of these investments and we have also invested in over 1000 youth through summer jobs and college scholarships. We have also ushered in a new era of nonprofit investment through our participation in national initiatives that have led to tangible positive outcomes and opportunities for our residents.

We have made great strides in improving city services through Gary 311, through green infrastructure projects and through the use of data. As we work to rebuild Gary, our team has developed a strong financial forecast to move the city forward. Gary, Indiana: On the Shores of Opportunity. We invite you to journey with us in our quest to see Gary differently.

Figure 1: Screenshot from the homepage at https://garyin.us/, accessed on 05/22/2019. Image depicts Democratic mayor of Gary, IN, Karen Freeman-Wilson.

website for communicating the mayor's policy priorities and accomplishments.

The existing research that uses scraped websites provides an indication of the theoretical value of empirical analysis of web contents. Research on 'e-governance' evaluates government websites in terms of accessibility, ease-of-use, and function (e.g., Urban 2002; McNutt 2010; Armstrong 2011; Feeney and Brown 2017). As an example, Grimmelikhuijsen and Welch (2012) study local government websites of Dutch municipalities to measure government transparency regarding air quality in the municipalities. The websites of politicians and their parties have also been the object of research (Druckman et al. 2009, 2010; Cryer 2017; Esterling et al. 2011; Esterling and Neblo 2011; Norris 2003; Therriault 2010). For example, Druckman et al. (2010) analyze the issues engaged on websites for candidates in U.S. Congressional elections, and find that candidates strategically engage just a few issues based on the priorities in their districts and the characteristics of their opponents.

3 Data: US Municipal Government Website Text

For data availability reasons, we focus our analysis of municipal websites on six states—Indiana, Louisiana, New York, Washington, California, and Texas. The websites were scraped in March 2018. The selection of states and cities is largely dictated by the presence of partisan mayors and availability of the relevant data. Municipal elections in Indiana and Louisiana are partisan across the board, so our sample is primarily focused on these two states. For Indiana and Louisiana, all cities with a website are included, resulting in a considerably larger sample than for the other four states. New York and Washington do not have nominally partisan elections, but for a subset of cities, partisanship can be determined through contribution data (see appendix for more detail). California and Texas contain a number of large cities whose mayors are sufficiently well-known for their partisanship to be available. Our sample is well-balanced on a number of theoretically important dimensions. One, each of the four Census regions are represented with at least one state. Two, we have a fairly well-balanced sample with respect to the urban/rural cleavage. Furthermore, the sample is politically balanced—we have three blue states, and three red states. The partisan breakdown of city websites is depicted in Table 1. Details on the sources and methods of raw data collection can be found in the Appendix.

State	Democratic	Republican
California	9	6
Indiana	46	54
Louisiana	28	17
New York	36	16
Texas	2	7
Washington	11	2

Table 1: Descriptive statistics on the partisanship of the cities in the corpus.

One of the more subtle aspects of local government is the presence of different types of government structures. Between council-manager governments and mayor-council governments (Morgan and Watson 1992)—either in the weak or strong mayor variant (DeSantis and Renner 2002)—there is variance in where a city's executive authority lies. We do not have access to information about the type of governments across the breadth of our dataset. Given the prominent place that mayors tend to have on their cities' websites, we feel that any bias arising from this nuance should be minor. Gerber and Hopkins (2011), whose theory is somewhat comparable to ours, find that the inclusion of this potential confounder does not affect the results.

4 The Web to Text Pipeline

In this section, we describe our methodological pipeline, with which we take an archive of website files, and output a corpus of formatted plain text documents that are suitable for comparative analysis with text as data methods. Here, we address three methodological challenges. First, though they contain significant amounts of text, websites are not comprised of clean plain text files. Rather, the files available at websites are of multiple types, including HTML, PDF, word processor, plain text, and image files. The first step is aimed at extracting clean plain text from this heterogeneous file base. The second step in our pipeline is to process the text to remove language that is effective at differentiating one website from another but is uninformative regarding policy or political differences between governments. Finally, these tools need to work consistently across all of the websites in our corpus, in spite of the fact that relevant information is stored and structured in different ways.

4.1 Site to Text Conversion

4.1.1 File Type Detection

The format of a file has a major impact on whether and how textual data can be extracted from a document. For the most part, the file type of a document can be correctly determined through the filename ending—its extension. However, there are exceptions to this, which, if ignored, can lead to large amounts of improperly formatted text, arising from incorrectly converted documents, which leads to a general decrease in the amount of usable data. Two issues, in particular, need to be addressed: One, HTML files on city websites frequently do not have an ending but are still perfectly readable if correctly identified as such. Second, some documents contain the incorrect file ending. For example, we found thousands of documents that ended in .html, when they were actually PDFs. To accurately assess their type, we rely on the R package `wand` (Rudis et al. 2016), which is an R interface to the Unix library `libmagic` (Darwin 2008), which determines the type of a file on the basis of its file signature - or “magic number”. This short sequence of bytes at the start (and sometimes end) of files is unique for each file type and therefore allows its correct identification through computer forensics tools such as `libmagic`. Files with incorrect endings are subsequently renamed.

4.1.2 Extracting Text from HTML

The HTML files that websites are comprised of contain a large amount of useful information, but also completely irrelevant text such as menus, navigational elements and other boilerplate. In theory, HTML tags intended to mark text content exist to prevent this problem. In practice, not every web developer adheres to this standard, and even when they do, there is a large degree of variation in the way it is implemented. Parsing any one website is fairly straightforward, but parsing the 283 different websites in our sample in a consistent and comparable manner makes a rule-based approach impossible. The side-by-side screenshots presented in Figure 2 convey the challenges presented by extracting content for text analysis for websites. The textual content that is substantive and unique to the Gary, IN homepage is the Mayor’s message depicted in Figure **??**. Figure 2 presents the complete homepage, along with all of the text that can be naively extracted from the site. The Mayor’s message represents a relatively small fraction of the total text on the

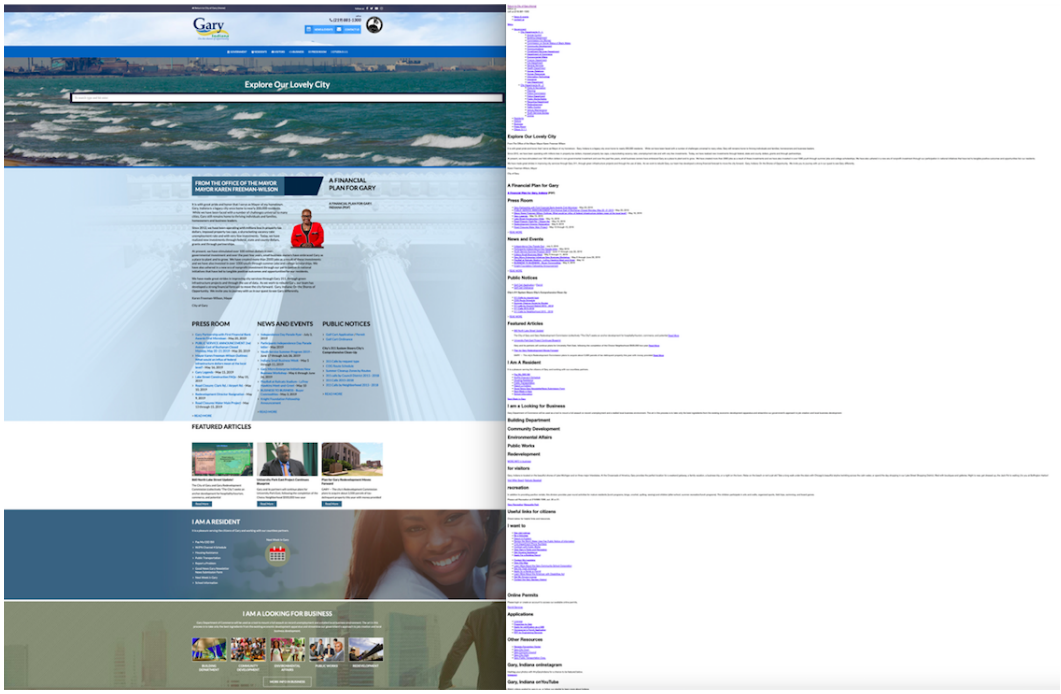
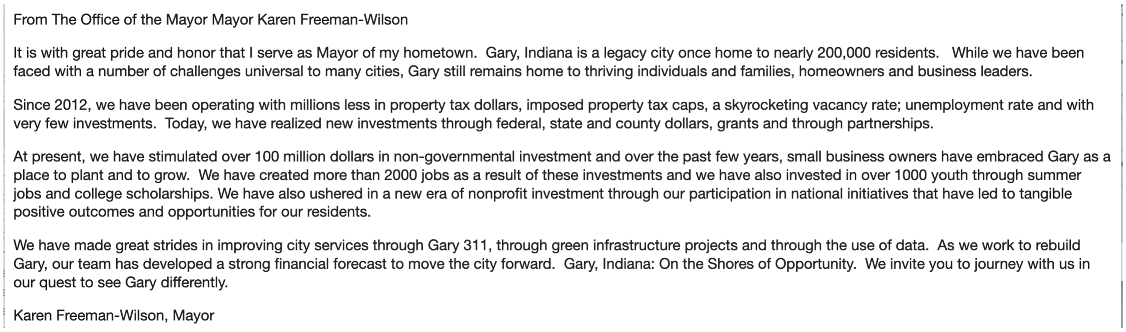


Figure 2: Side-by-side depiction of the entire homepage of https://garyin.us/, accessed on 05/22/2019, and complete/naive extraction of all of the text on the site.

page.

We leverage methods developed in the information retrieval literature to deal with this problem. These boilerplate detection tools are classifiers which rely on both structural features, such as HTML tags, as well as text statistics such as word and sentence length to estimate whether a given portion of an HTML file is useful. We rely on the 'boilerpipe' method described in Kohlschütter et al. (2010), which has been published in a reputable conference, is widely cited, and can easily be implemented through the R package `boilerpipeR`. The complete text extracted from the Gary, IN homepage using boilerpipe is depicted in the screenshot in Figure **??**. We see that only the Mayor's message is extracted, leaving the rest of the text as boilerplate.



From The Office of the Mayor Mayor Karen Freeman-Wilson

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Karen Freeman-Wilson, Mayor

Figure 3: Result of running https://garyin.us/, accessed on 05/22/2019, through the default boilerpipe algorithm at https://boilerpipe-web.appspot.com/.

4.1.3 Extracting Text from PDF, XML, DOC, DOCX and TXT

Other files are read in through the `readtext` R package (Benoit and Obeng 2019), which is a wrapper for a set of parsers.[1,2,3] The breakdown of all files by type is given in Table 2. The most frequent file type besides HTML is PDF, from which we are able to extract a substantial amount of usable text. Files of type XML, DOC, TXT, and DOCX, also occur regularly in our corpus and offer a considerable volume of textual data.

4.2 Preprocessing

Preprocessing is an important part of text-as-data research and choices made therein can have significant effects on the outcomes of an analysis (Denny and Spirling 2018). The challenge in conducting preprocessing for a comparative analysis of websites lies in the considerable variance between websites. Some of it is substantively informative and some of it is completely irrelevant. As an example of the latter, names of city officials and citizen petitioners feature frequently in city documents. The same is true for streets, locations and not least of all, the city itself. Since

[1] `readtext` determines a document's type solely through its ending – so the conversion described above is strictly necessary for the package to work correctly.

[2] We have also experimented with several Unix-based alternatives, but found that they largely led to the same results as `readtext`.

[3] `readtext` also contains an HTML parser, but this tool simply extracts all text and is therefore inferior to boilerpipe.

Filetype	Occurances Before	Occurances After
html	211682	887362
pdf	464842	638802
jpg	0	36958
xml	0	29638
Other	162681	9475
ics	435	8950
png	0	8863
doc	6972	8430
txt	317	6025
	793990	5234
docx	3137	4319
TOTAL	1644056	1644056

Table 2: Number of files per type, before and after detecing them via their magic number. The table shows that a lot of files originally have the wrong type, and that converting them correctly has a large impact on how many of them end up being usable.

individual names recur at a much higher rate within a city than across the entire corpus, this would cause a topic model to cluster its topics by city. Consequently we require a tool which detects the signal in the noise and does so consistently for a discordant set of sources.

To this end, we turn to a common method in natural langauge processing—part-of-speech (POS) tagging and named entity recognition (NER). While not their original purpose, these procedures perform very well in separating the wheat from the chaff. As names convey no substantive information, NER is used to detect and remove them.[4] Furthermore, we select words on the basis of their POS-tags, retaining only nouns (by far the most informative category), verbs, and adjectives. Furthermore, we keep proper nouns that also occur as nouns—this removes names, but retains titles such as “Police Chief” which can appear as proper nouns if they are followed by a name. Finally, we also conduct lemmatization to reduce words to their basic form.[5] POS-tagging, NER

[4] We retain laws, nationalities or religious or political groups (which are politically salient with respect to immigration and identity) as well as works of art (which frequently feature statutes, plans, etc.)

[5] Lemmatization is similar to stemming, but works in a somewhat more sophisticated manner by taking grammar and surrounding words into account to identify the dictionary form of a word. For example, the lemma of the word “lemmatization” would be “lemmatize”, whereas most stemmers would simply chop off the ending, which would yield “lemmatiz”. Thus, lemmatization makes the results more easily comprehensible.

and lemmatization are all implemented through spacyr. This parsing-based approach is very effective in distilling a comparable corpus from a varied set of sources, as the grammatical rules of the English language remain their common denominator. To deal with any leftover issues, we remove words with less than three characters (these are usually artifacts from improperly encoded documents and faulty or impartial optical character recognition), stopwords and non-English words (using the R package Hunspell)[6].

The steps described above are customized to the case of studying text gathered from website files, but we also follow a couple of other steps that are common and advisable in most text analysis projects. First, we remove common uninformative words—stopwords (e.g., and, the, this), words that contain numbers, and words that have fewer than three characters. A final and crucial step is the removal of duplicate documents, which occur very frequently on websites. In addition to their primary purpose, the previous preprocessing steps also help in stripping otherwise identical documents of information that makes them unique – such as names and dates – thus facilitating their deletion.

After all the preprocessing is set and done, our corpus consists of 356,911 documents. In Table 3 we summarize all of the steps we take in gathering and processing our data. The summary includes a brief description of the step, the software packages used, and an indicator of whether the method is implemented in our R package, gov2text.

5 Partisan Language on Municipal Websites

We illustrate the analysis of municipal website content by studying differences in website content based on the party of the mayor. As we reviewed above, the partisanship of the mayor has been found in past research to affect several features of city governance. However, Gerber and

[6] As we are using spacyr with an English parser, non-English words tend to be erroneously categorized as (proper) nouns.

Process	Software dependency	in gov2text
1. Assemble url list.	Selenium	no
2. Collect website files.	wget	no
3. Discard website boilerplate.	boilerpipeR (Annau et al. 2015)	yes
4. Convert non-HTML files to text.	readtext (Benoit and Obeng 2019)	yes
5. Lemmatize text.	spacyr (Benoit and Matsuo 2018)	yes
6. Remove names.	spacyr	yes
7. Retain nouns, verbs, adjectives.	spacyr	yes
8. Stopword/number removal.	quanteda (Benoit et al. 2018)	yes
9. Retain tokens that are English words.	Hunspell (Ooms 2018)	yes
10. Removal of duplicate documents.	gov2text	yes

Table 3: Data collection and processing pipeline. Steps to collect and prepare text for topic modeling.

Hopkins (2011) note that, due to the constraints of state and national policies, municipalities lack discretion in many domains of governance. These constraints do not apply to website contents. City governments have great discretion in composing their websites, modifying website content is low cost relative to other policy changes, and, as reviewed above, city websites provide an effective and often-used means of communication with city residents.

In order to analyze content differences between government websites based on mayoral partisanship, we draw upon a recently-developed class model for text, the structural topic model (STM), developed by Roberts et al. (2014). Building on the conception of "topics" in Latent Dirichlet Allocation, in the STM a topic is a multinomial distribution defined on the word types in the corpus dictionary. The log-odds of the topic probabilities in each document-specific multinomial distribution over topics are drawn from a multivariate normal distribution in which the topic-specific means are determined by a linear regression function that associates document-attributed covariates with topics. For example, in the context of municipal website content, the structural topic model can be used to estimate a regression coefficient that defines the linear relationship between the log-odds of the municipality's population and the log-odds of each topic. For our primary empirical investigation, the STM provides with a tool with which to estimate the relationship between the party of the city’s mayor and the prevalence of each topic we estimate. Further details on our STM specification can be found in the appendix.

5.0.1 Structural topic model results

The results are shown in Table 5. Many of the topics associated with Democrats fit with what we understand to be national party priorities. Topic **52**, on affordable housing, clearly resonates with the Democratic party’s appeal to low-income voters. Similarly, employee rights are represented in topics **10** and **29 [DEBATABLE]**. Democrats also exhibit a strong preference for words related to public finances, such as Topic **58** (’budget’, ’revenue’, ’expenditure’), **topic 45 (’asset’, ’actuarial’, ’liability’, ’financial’)**, **topic 35 (’bond’, ’obligation’, ’proceeds’)** as well as **topic 55 (’taxable’, ’deed’, ’value’)**. We suspect that the association of Democratic mayors with finance-related terms is indicative of a greater willingness to emphasize the city’s efforts to raise and spend money. This finding is consistent with (Einstein and Kogan 2015), who show that Democratic mayors tend to favor greater spending. A second, consistent Democratic focus appears to be law enforcement: The most Democratic topic, **59** (’burglary’, ’robbery’, ’theft’, ’homicide’) depicts Democrats’ complicated relationship with law enforcement **[This used to be about police as well, but now it’s more of a crime topic]**. On the one hand, Democratic partisans have a more negative perception of the police, rating it considerably more negatively on the appropriate use of force and the equal treatment of minorities (Brown 2017). On the other hand, the literature has also shown that cities with a higher Democratic vote share spend more on the police, even after controlling for crime (Einstein and Kogan 2015). Finally, Democrats also focus more on the deliberative process of policymaking, as topics 31 (’agenda’, ’committee’) **[This is now the second-most REPUBLICAN topic 46]**, 34 (‘comment’, ‘draft’, ‘feedback’) **[This is now REPUBLICAN topic 5]**, **1** (‘absent’, ‘preside’, ‘authorized’), and **4** (’audit’, ’procedure’, ’oversight’) attest to. **[Republicans also have topic 16]** This openness regarding the policy process on behalf of cities with Democratic mayors fits with the findings of Grimmelikhuijsen and Welch (2012), which are that left-wing local governments exhibit greater transparency via website content.

City websites with Republican mayors, meanwhile, exhibit a pronounced focus on the essential functions of government. Basic utilities such as energy (Topic **20**), fire protection (Topic **51 [This topic has changed a lot.]**), drinking water (53) **[topic missing]**, and garbage removal (Topic 49) **[topic missing]** are included among those topics that are more prevalent in cities with Democratic mayors. Similarly, protecting citizens from natural disasters is a focus in topics 1 ('storm', 'runoff', 'drainage') **[topic missing]** and **2** ('influenza', 'infection', 'vaccine' **[This is not about Zika anymore, but infectious diseases in general.]**), which may reflect the greater prevalence of Republican mayors in the southeast, a region which is more often affected by hurricanes and tropical diseases.

6 Conclusion

We have developed a methodological pipeline for automatically gathering and preparing government websites for comparative content analysis. We have produced an R package `gov2text`, in which we have implemented and wrapped the core components of our pipeline. This methodology holds the potential to vastly scale up the data collection efforts underpinning the growing body of research that is focused on government website analysis. Through an application to the analysis of municipal websites in six different states, we show how our pipeline is capable of gathering corpora that shed light on the forms and functions of local government. We find that government website contents are associated with the partisanship of the mayor in ways that would be expected based on the parties' national priorities and past research on the effects of mayoral partisanship on city governments.

The biggest limitation in our pipeline, and an open area for future research, is the reliance on `wget` to gather the initial website files. By using `wget`, we miss content that is displayed dynamically on websites using JavaScript. For any one website, it would be possible to customize a routine with Selenium to access dynamic elements, but the process would need to be customized for each website. This would add a costly website-by-website step, whereas `wget` can be applied across websites without website-specific supervision.

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Appendix

Raw data collection methods and sources

We acquired the website URLs from two sources: One, we scraped the URLs of city websites from their respective Wikipedia pages, which we found from lists of cities contained within each state. Two, the General Services Administration (GSA) maintains all '.gov' addresses, and provides a complete list of all such domains to the public.[7] The data from the GSA contains the following variables: (1) domain name, specifically, the all-uppercase version of domain and top-level domain (for example, 'ABERDEENMD.GOV'); (2) the type of government entity to which the domain is registered, such as city, county, federal agency, etc; (3) for federal agencies, the name is specified; (4) the city in which the domain is registered. Naturally, the GSA's list does not contain cities which do not use a '.gov' website (or, in many cases, a city owns a registered '.gov' address, but uses a different one). Furthermore, some of the links are non-functional, and some of the county websites on the list are incorrectly marked as city websites (and vice versa). Since the GSA data is less complete and less reliable than the URLs found on Wikipedia, we mainly rely on the latter and only supplement them with the GSA data if a specific city doesn't have a URL recorded on Wikipedia, or our tests (see below) find it to be non-functional.

Not all of the URLs contained in these archives are functional. To test the URLs' functionality, we use a web driver-controlled browser - a browser that is automatically controlled by a program rather than a human user. We use the Python bindings for the program `Selenium`, which we use to control `Firefox` through the web driver `Geckodriver`. This is advantageous compared to conventional scraping tools such as `Beautiful Soup` or `Rvest` because most websites are designed to be explored by browsers. Modern browsers perform a lot of actions behind the scenes, such as URL resolution and redirection. The use of a web driver-controlled browser is necessary

[7] The dataset is made available at https://github.com/GSA/data/tree/gh-pages/dotgov-domains. This list is updated once per month—we rely on the version released on January 16, 2017.

in our case because a) some city websites simply don't work, but they don't always output an error code correctly (this can fail, for example, if a webmaster simply stops maintaining a site without removing it entirely) which would throw off an automatic scraper, and more often, b) cities sometimes change their websites' URLs, in which case they redirect from the old to the new URL. A web driver-controlled browser, unlike the more rigid conventional scraping tools, will simply follow this redirection. This allows us to subsequently record and use the new URL for the actual website scraping. Consequently, an automated browser allows us to robustly answer the following questions: Is the website actually there? Does it work? If not, is it somewhere else or is it broken? We record this information and construct a list of verified URLs.

To download the websites, we rely on the Unix command line tool `wget`. This program is used to download files from the Internet, and with the use of a recursive option, acts like a web crawler and scraper. This means that `wget` downloads HTML files, parses them and then follows the links contained therein. Then it follows those links and repeats the process until it has constructed a complete tree of the website (note that the program is instructed to stay on the same domain, i.e. it does not follow external links). This way, all the files that make up a website are downloaded. For some cities, whose websites make heavy use of JavaScript to serve content dynamically, such content is not reachable with our methodology and would require additional steps to obtain. For this paper, we ignore such sites and restricted our corpus to cities with at least three successfully downloaded pages.[8]

The partisanship of the mayor of each city is coded in different ways, depending on the state. For Indiana, where elections are nominally partisan, this information is accessible through the state government's website[9]. For Louisiana, we received data on the outcomes of mayoral elections

[8] There is a possibility that this leads to a small bias in selecting against cities with the resources to build more elaborate websites. However, given that our sample is generally more on the wealthy side, this, if anything, should lead to a more balanced sample.

[9] http://www.in.gov/apps/sos/election/general/general2015?page=office&countyID=1&officeID=32&districtID=-1&candidate=

from the Local Elections in America Project (LEAP) (Marschall and Shah 2013). For the other states, where mayoral elections are not nominally partisan (but the partisanship of the mayor is still well-known), we employed different means: For New York and Washington, we searched the state campaign finance websites, and coded the parties of the candidates based on the party committees from which they received donations. For California and Texas, where our data consists of highly populated cities, partisanship information was acquired from Ballotpedia[10]. Finally, we also scraped mayoral partisanship from the cities' Wikipedia pages. When compared to the other data sources above, (and manual searches in case of conflicts) Wikipedia proved to be very reliable and added additional cases to our dataset even for Indiana and Louisiana. Generally speaking, we found data scraped from Wikipedia, aided by manual corrections in case of missing or conflicting data, to be more reliable than data from governmental sources.[11]

Information on other covariates (population and median household income - from the American Community Survey 5-Year Data (2015)) was acquired through the API of the U.S. Census Bureau[12].

Details on STM specification

The structural topic model is implemented in the R package `STM` (Roberts et al. 2018). We use 60 topics—the number recommended by the authors[13] for medium- to large-sized corpora.[14] We use four covariates: First, *party*, to estimate the difference in topic prevalence based on whether mayors are Republican or Democratic. Second, *city population*, which the literature frequently

[10] https://ballotpedia.org/List_of_current_mayors_of_the_top_100_cities_in_the_United_States

[11] In Indiana, the data includes only cities - incorporated municipalities with at least 2,000 inhabitants - as opposed to towns.

[12] https://www.census.gov/data/developers/data-sets.html

[13] For this recommendation, see the documentation for the function `stm()` in version 1.3.0 of the R package `stm` (Roberts et al. 2018).

[14] Since our corpus is at the larger end of that spectrum, we also estimated a model with 120 topics, but found no notable differences.

emphasizes as a determinant of the issues a city faces (see, for example, Guillamón et al. (2013)). Third, we control for wealth by relying on *median income* as a covariate, which we use as a proxy for the tax base in a city. Fourth and finally, we include state dummy variables, which should account for language that is associated with state-specific issues, and general background variables that vary across states.[15]

[15] The “Fightin’ Words” methodology developed by Monroe et al. (2008) could also be used to analyze word-frequency differences between cities based on mayors’ partisanship, but we elected to use the structural topic model since, unlike “Fightin’ Words” , the structural topic model enables us to adjust for several other features through multiple regression.

#	Top Word 1	Top Word 2	Top Word 3	Top Word 4	Top Word 5	Top Word 6	Tokens assigned
49	artist	fun	music	beginner	player	prize	4565
46	chair	subcommittee	speaker	agenda	committee	commission	446
16	motion	second	adjourn	carry	unanimous	chairman	419
47	effluent	inf	eff	infiltration	discharge	sludge	751
21	everybody	think	something	thing	try	want	2609
2	influenza	infection	vaccine	patient	tuberculosis	hepatitis	2980
27	article	subsection	shall	franchisee	paragraph	meaning	658
30	subcontractor	bid	bidder	proposer	subcontract	bidding	512
12	craftsman	architecture	brick	distinctive	revival	storefront	1731
24	mail	fax	application	click	applicant	copy	367
34	playground	recreation	picnic	park	restroom	zoo	546
19	setback	variance	zoning	height	yard	accessory	453
26	mesa	canyon	via	odd	unidentified	paradise	1886
23	bag	recyclable	recyclables	reusable	vegetable	bait	2254
20	customer	renewable	efficiency	energy	saving	conservation	652
31	student	teacher	preschool	academic	kindergarten	youth	855
28	garland	assoc	association	firefighter	duke	xerox	480
50	trench	manhole	ductile	excavation	pipe	grout	1436
32	canceled	dwelling	suite	ave	tad	alteration	491
51	vent	combustible	flammable	egress	ceiling	extinguisher	1160
44	findings	tank	string	carcinogen	lust	sic	255
17	portfolio	micron	maturity	treasury	yield	investment	538
48	contributor	filer	officeholder	political	rouge	payee	293
5	draft	comment	review	revision	clarify	process	356
37	endorsed	endorse	rescue	assistant	analyst	technician	355
9	trust	revocable	planned	mfr	apportionment	exhibit	361
8	imp	assessor	taxpayer	petition	preliminary	determination	91
40	amt	invoice	acct	exp	unencumbered	encumbrance	116
57	councilman	introduced	alderman	whereas	resolved	councilwoman	615
11	obesity	sugary	epidemic	drink	calorie	sensible	96
15	credit	docket	app	post	download	month	61
3	wetland	specie	species	vernal	ecological	riparian	2293
29	margin	error	disability	speak	employed	language	180
43	medicare	payroll	blanket	contractual	undistributed	dept	322
42	incumbent	prep	batch	qualifier	analytical	examination	1091
55	taxable	deed	res	homestead	value	book	87
22	allocation	subtotal	admin	cost	yon	allocate	190
25	mitigation	impact	significant	adverse	environmental	measure	217
56	savings	neighborhood	village	excise	ltd	matrix	131
33	thence	east	south	corner	west	avenue	340
7	fugitive	bio	emission	coal	unmitigated	exhaust	773
18	perm	queue	delay	peak	adj	flt	187
54	license	licensee	citation	tow	fee	taxicab	710
6	race	householder	islander	census	occupied	female	160
60	bicycle	bike	pedestrian	route	sidewalk	bicyclist	561
14	accomplishment	grantee	narrative	outcome	grant	recipient	255
53	applied	col	dist	occupancy	monoxide	valuation	128
4	audit	auditor	procedure	timely	implemented	oversight	472
35	redemption	bond	increment	obligation	proceeds	lease	339
39	downtown	mixed	retail	waterfront	orient	density	419
10	grievance	deductible	coinsurance	dependent	employee	copay	583
38	para	persona	horas	bud	contracted	ante	1334
36	respondent	compare	figure	trend	appendix	satisfied	696
45	governmental	asset	actuarial	liability	financial	statement	235
41	complainant	allegation	defendant	offender	commander	complaint	1695
52	homeless	homelessness	affordable	supportive	housing	affordability	394
58	budget	revenue	adopted	balance	transfer	expenditure	176
13	initiative	outreach	strategy	leadership	engagement	focus	502
1	absent	preside	authorize	ordained	int	tag	377
59	burglary	robbery	theft	homicide	murder	gunshot	945

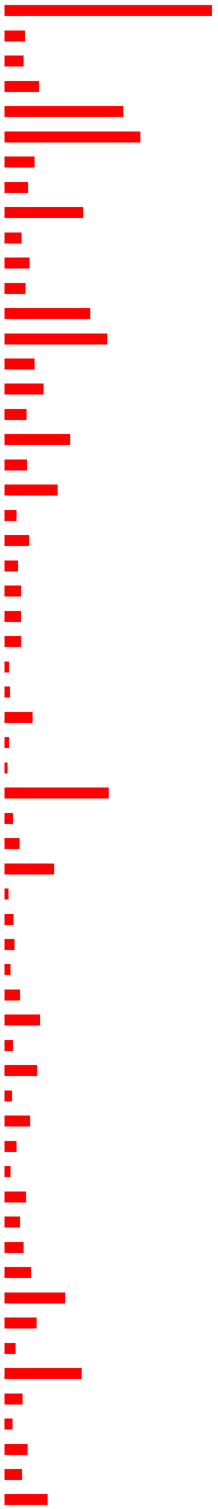

Table 4: Top words from a structural topic model with 60 topics and FREX scoring. Colors depict partisanship based on coefficient size. White cells are non-significant topics.

#	Top Word 1	Top Word 2	Top Word 3	Top Word 4	Top Word 5	Top Word 6	Tokens assigned
43	fun	player	dream	celebration	favorite	blog	3460
5	please	email	contact	copy	mail	click	201
42	breastfeed	vaccine	infection	symptom	asthma	mosquito	2497
17	alarm	disaster	fire	rescue	preparedness	evacuation	989
53	drinking	wastewater	water	pipeline	pump	disinfection	461
50	buffalo	news	honor	warren	announce	lovely	1106
52	reappoints	digest	cat	leg	legislator	sander	997
33	really	think	something	thing	somebody	anybody	1873
44	shall	herein	forth	deem	thereof	pursuant	405
8	invoice	card	amt	filer	debit	officeholder	527
26	fee	charge	billing	per	meter	monthly	233
2	yon	borough	comm	gen	sou	spec	709
49	bin	recycling	garbage	recyclables	recyclable	bag	1791
7	energy	garland	renewable	solar	electricity	climate	742
23	bid	proposer	bidder	contractor	subcontractor	contract	447
57	duct	conduit	bolt	splice	valve	fitting	1373
13	server	wireless	software	telecommunication	subscriber	desktop	1092
54	motion	adjourn	second	unanimously	ayes	carry	474
1	storm	runoff	infiltration	discharge	drainage	drain	516
38	youth	student	parent	teacher	immigrant	literacy	714
35	artist	rouge	baton	art	artwork	exhibition	1632
59	sampling	sample	analytical	concentration	hydrocarbon	toxicity	1241
3	portfolio	yield	jun	maturity	investment	rating	544
45	premise	licensee	violation	license	permit	inspection	509
9	para	persona	ante	horas	junta	largo	1469
60	exhaust	fugitive	aircraft	airport	aviation	diesel	731
30	fort	thence	blvd	worth	ave	west	681
58	councilor	auburn	plain	ward	beech	glen	480
51	whereas	councilman	alderman	ordain	hereby	resolution	420
16	recreation	park	golf	playground	picnic	zoo	682
36	retiree	retirement	actuarial	deductible	dental	pension	470
27	exam	incumbent	supervise	supervision	examination	knowledge	687
56	historic	landmark	revival	archaeological	century	historian	2587
12	parking	hotel	garage	space	retail	square	321
41	tax	exemption	abatement	real	estate	property	310
4	facade	awning	porch	roof	balcony	exterior	1108
28	census	population	respondent	figure	percent	margin	541
18	prune	tree	deer	forestry	shrub	bulrush	2522
15	complainant	defendant	allegation	complaint	allege	discrimination	1384
20	noise	mitigation	impact	adverse	significant	vibration	325
14	yes	agency	federal	recipient	compliance	entity	205
46	variance	setback	plat	zoning	yard	fence	289
29	learn	neighborhood	graffito	event	resident	online	196
25	cannabis	marijuana	senate	dispensary	ballot	cultivation	1188
22	priority	strategic	ongoing	goal	implementation	implement	141
6	project	improvement	phase	replacement	upgrade	capital	174
11	shoreline	beach	marina	coastal	waterfront	salmon	1069
24	attract	economy	workforce	innovation	sector	economic	748
47	employee	overtime	sick	wage	grievance	bargaining	511
39	tab	accessibility	mode	var	alt	false	259
10	density	village	urban	us	mixed	corridor	358
37	audit	auditor	internal	procedure	accountability	oversight	420
21	housing	affordable	homeless	homelessness	affordability	landlord	318
34	comment	draft	feedback	stakeholder	suggest	discussion	289
19	debt	bond	governmental	obligation	financial	accounting	251
40	bicycle	bike	lane	crosswalk	pedestrian	bicyclist	574
32	budget	revenue	expenditure	appropriation	fund	million	242
48	absent	aye	khan	nay	berry	voting	528
31	chair	agenda	commission	speaker	chairperson	committee	314
55	robbery	homicide	arrest	sergeant	suspect	burglary	1395

Table 5: OLD: Top words from a structural topic model with 60 topics and FREX scoring. Colors depict partisanship based on coefficient size. White cells are non-significant topics.

#	Top Word 1	Top Word 2	Top Word 3	Top Word 4	Top Word 5	Top Word 6	Tokens assigned
96	subcommittee	agenda	forum	speaker	item	adjournment	217
49	prize	celebration	ceremony	parade	follower	favorite	2043
102	motion	second	adjourn	unanimous	carry	whiting	207
73	legislator	player	football	leg	town	stadium	695
95	online	email	website	browser	contact	server	351
70	election	ballot	lobbyist	voter	candidate	campaign	407
74	tentative	conditional	approval	grading	attachment	deviation	177
79	snow	remember	plow	lock	scam	sure	888
28	craftsman	revival	historic	gabled	bungalow	historical	882
114	park	playground	recreation	picnic	mesa	trail	235
11	tuberculosis	infection	hepatitis	overdose	influenza	vaccine	1515
21	think	something	want	thing	talk	everybody	1155
86	sewer	sanitary	water	pipeline	drinking	wastewater	176
59	fort	worth	plot	tad	falls	demo	192
20	subsection	licensee	article	chapter	sec	shall	214
47	inf	micron	effluent	eff	sludge	isomer	591
62	bid	buyer	seller	bidder	price	quote	357
48	contributor	instruction	filer	political	officeholder	payee	79
104	provisions	subcontractor	surety	rev	bidder	supplementary	232
27	breach	franchisee	hereunder	agreement	remedy	agree	213
112	youth	camp	teach	teen	lesson	yoga	722
23	dog	rabies	euthanasia	euthanized	pet	spay	1710
35	trust	revocable	mfr	apportionment	living	assn	285
116	emergency	preparedness	null	dispatch	rescue	fire	340
80	energy	efficiency	customer	saving	rebate	renewable	382
113	proud	leadership	honor	pleased	grateful	passion	1168
18	garland	invoice	assoc	check	firefighter	association	152
81	page	last	sub	update	prime	award	17
2	mosquito	insecticide	spray	bait	repellent	pesticide	997
120	project	improvement	funding	justification	completion	acquisition	47
105	thence	plat	easement	annexation	pud	westerly	255
118	comment	concern	suggest	clarify	suggestion	dear	307
34	library	campus	doe	branch	center	arena	208
40	portfolio	treasury	investment	maturity	yield	liquidity	250
115	masonry	plaster	joist	stud	sheathing	ceiling	875
53	department	authority	dpt	correction	citywide	transit	109
3	vend	utensil	meat	fat	cheese	salad	1325
8	assessor	taxpayer	determination	informal	petition	notification	39
58	recycling	bag	garbage	recycle	recyclable	recyclables	318
87	sign	billboard	pole	speeding	illuminate	banner	472
31	student	elementary	school	college	graduate	academic	233
32	dwelling	alteration	plumbing	plumb	canceled	mechanical	143
51	combustible	vent	piping	conductor	duct	flammable	517
91	app	credit	download	post	issued	agent	57
66	wetland	vernal	riparian	habitat	specie	species	1040
44	findings	string	tank	carcinogen	qty	lust	128
42	contamination	spill	remediation	groundwater	asbestos	hazardous	343
99	prep	batch	qualifier	analytical	surrogate	sample	313
84	airport	facility	aviation	maintenance	operation	aircraft	150
19	accessory	height	dwell	frontage	setback	subsection	218
6	householder	poverty	disability	married	husband	universe	93
98	obesity	sugary	epidemic	soda	sensible	drink	65
33	avenue	street	west	east	boulevard	south	98
10	deductible	copay	prescription	coinsurance	outpatient	inpatient	488
50	ductile	trench	pipe	manhole	coupling	compaction	705
17	margin	error	occupied	race	occupy	islander	79
5	earthquake	flood	floodplain	flooding	landslide	fault	723
76	variance	setback	yard	exception	fence	front	94
16	business	marijuana	cannabis	manufacturing	industry	collective	319
108	fugitive	bio	exhaust	unmitigated	noise	receptor	262

Table 6: Top words from a structural topic model with 120 topics (first 60 topics displayed here) and FREX scoring. Colors depict partisanship based on coefficient size. White cells are non-significant topics.

#	Top Word 1	Top Word 2	Top Word 3	Top Word 4	Top Word 5	Top Word 6	Tokens assigned
29	labor	worker	force	unemployed	earnings	civilian	80
111	discharge	pollutant	inspection	inspect	pollution	inspector	109
68	contractual	parts	duke	outside	postage	receipts	274
77	curb	pavement	sidewalk	ramp	gutter	asphalt	390
65	draft	update	process	review	staff	progress	67
24	landlord	tenant	renewal	rent	lease	expired	255
106	consultant	proposer	procurement	contract	firm	subcontractor	179
43	blanket	medicare	payroll	premium	undistributed	refund	107
103	urban	mixed	density	redevelopment	development	industrial	115
89	taxable	res	deed	value	homestead	star	41
83	building	demolition	story	demolish	floor	build	82
119	cost	estimate	estimated	initial	costs	change	52
109	respondent	satisfied	dissatisfied	survey	satisfaction	disagree	403
64	must	signature	copy	application	applicant	submission	139
26	tax	deduction	amt	assessed	bill	abatement	171
78	yes	worksheet	text	pic	font	button	476
7	greenhouse	emission	coal	climate	ozone	dioxide	334
54	parking	tow	taxi	vehicle	shuttle	passenger	236
41	assistant	analyst	technician	aide	specialist	asst	119
22	allocation	val	cove	acct	glen	subtotal	79
63	fee	charge	license	reservation	surcharge	refundable	143
117	delay	perm	queue	peak	flt	detector	113
4	datum	database	copyright	accuracy	data	compile	193
45	audit	auditor	auditing	internal	implemented	procedure	222
100	mitigation	impact	significant	adverse	significance	unavoidable	136
88	gender	discrimination	transgender	immigrant	immigration	religion	859
9	district	zoning	maker	vacancy	speaker	planner	45
12	artist	artwork	art	arts	mural	sculpture	1055
94	contracted	encumbrance	unencumbered	exp	expend	bud	71
110	rouge	parish	baton	thereto	sewerage	adjudicate	464
46	commissioner	chair	commission	committee	briefing	advisory	187
85	sch	min	tin	hump	carpool	qua	390
15	complainant	allegation	allege	complaint	doc	misconduct	963
30	incumbent	examination	supervision	knowledge	exam	ability	410
107	savings	ltd	village	neighborhood	excise	costs	81
72	imp	burglary	theft	testify	petitioner	mischief	116
60	bike	bicycle	bicyclist	pedestrian	route	mobility	336
82	accomplishment	narrative	grantee	outcome	objective	mod	101
36	decline	trend	recession	average	rate	percentage	265
52	homeless	homelessness	supportive	consolidated	transitional	counseling	193
1	alderman	resolved	whereas	resolution	authorizing	authorize	245
92	concept	design	realm	visual	character	conceptual	433
71	bond	obligation	proceeds	redemption	debt	series	174
67	dist	applied	col	occupancy	valuation	monoxide	62
25	scenario	figure	appendix	assume	assumption	model	162
38	horas	persona	para	yon	sou	ante	1350
14	federal	agency	entity	recipient	grant	eligible	90
56	waterfront	shoreline	marina	beach	port	boat	844
61	revenue	balance	expenditure	reserve	forecast	budget	101
75	governmental	asset	liability	assets	statement	pension	142
37	endorse	endorsed	budget	proposed	adopted	adopt	111
69	tree	planned	circumference	gross	density	infill	211
90	councilman	introduced	ordain	ordinance	digest	yea	244
97	actuarial	grievance	employee	retirement	bargaining	actuary	250
39	affordable	housing	affordability	homeowner	income	bedroom	150
55	ave	combo	blossom	pearl	cir	olive	1091
13	strategy	goal	strategic	stakeholder	focus	initiative	162
57	absent	int	preside	ordained	tag	numbers	194
101	violent	gang	firearm	offender	crime	patrol	511
93	shooting	suspect	pronounce	gunshot	flee	shoot	730

Table 7: Top words from a structural topic model with 120 topics (second 60 topics displayed here) and FREX scoring. Colors depict partisanship based on coefficient size. White cells are non-significant topics.

#	Top Word 1	Top Word 2	Top Word 3	Top Word 4	Top Word 5	Top Word 6	Tokens assigned
115	garland	celebration	blog	dream	sorry	copyright	994
52	dog	legislator	spay	neuter	animal	microchip	761
44	copy	record	mail	request	notice	notify	120
98	neighborhood	community	resident	safe	life	quality	95
88	war	professor	sister	bachelor	daughter	soldier	2516
43	camp	yoga	camper	fun	librarian	library	1080
42	infection	tuberculosis	breastfeed	hepatitis	vaccine	condom	1608
72	drinking	water	contaminant	reservoir	pipeline	irrigation	216
84	say	ask	explain	reply	horn	advise	454
18	player	coach	game	umpire	ball	shirt	1595
61	unanimously	motion	prince	adjourn	carry	ken	192
63	mosquito	spray	rodent	pesticide	repellent	pest	851
81	effluent	sludge	lbs	mercury	wastewater	gal	540
60	shall	deem	forth	unless	except	thereof	119
69	ethic	candidate	lobbyist	filer	political	officeholder	355
33	think	really	something	thing	just	go	826
119	firefighter	fire	chief	police	captain	patrol	248
37	physician	nursing	medical	nurse	outpatient	medicaid	352
5	home	homeowner	alarm	detector	monoxide	header	209
23	proposer	bidder	subcontractor	bid	contractor	subcontract	239
116	councilor	alderman	councilwoman	alderwoman	quill	councilors	268
15	trademark	borough	new	immigration	immigrant	pour	274
67	discrimination	disability	gender	religion	accommodation	origin	373
117	asthma	overdose	obesity	hospitalization	diabetes	prevalence	659
94	duct	valve	sprinkler	combustible	splice	conductor	778
58	event	firework	parade	press	holiday	troy	335
70	whereas	hereby	resolve	duly	authorize	therefore	202
30	disaster	emergency	preparedness	evacuation	dispatch	homeland	365
38	student	parent	school	teacher	academic	youth	354
93	city	fort	worth	manager	hall	charter	16
75	online	click	plain	website	download	learn	165
3	value	market	productivity	customize	yrs	index	126
49	recycling	recycle	garbage	waste	trash	landfill	408
111	franchisee	indemnify	arise	harmless	breach	party	307
17	snow	plow	tornado	flood	pothole	crew	552
89	vend	food	meat	utensil	calorie	vending	1174
45	application	applicant	certificate	must	license	permit	151
85	runoff	sanitary	infiltration	storm	drainage	drain	241
106	equipment	boiler	fleet	crane	mechanic	fuel	539
8	invoice	payment	card	credit	account	cash	187
13	class	test	adobe	embed	reader	acrobat	312
108	cigarette	senate	tobacco	consumer	smoking	ban	542
25	coal	hazard	hazardous	toxic	radiation	substance	288
86	groundwater	sample	asbestos	analytical	remediation	remedial	345
1	golf	exhibit	lessee	course	lessor	lease	401
9	para	persona	ante	horas	junta	sin	635
24	phone	name	page	address	glen	cove	158
7	energy	renewable	solar	electricity	climate	efficiency	399
66	plat	thence	easement	pud	tract	subdivision	230
57	dwell	unit	remodel	condominium	dwelling	residential	167
95	roof	masonry	porch	exterior	would	brick	611
26	fee	charge	per	cost	plus	rate	102
51	chapter	code	violation	subsection	article	sec	151
59	zoning	conditional	zone	cannabis	overlay	district	241
101	height	foot	square	feet	setback	frontage	124
96	house	cemetery	burial	butler	funeral	barber	472
65	ballot	vista	ranch	canyon	silicon	voter	518
120	bend	fir	hometown	twelfth	exceptional	rodeo	271
36	aviation	airport	airline	runway	aircraft	hangar	429
34	plan	planning	comprehensive	master	review	amendment	42

Table 8: OLD: Top words from a structural topic model with 120 topics (first 60 topics displayed here) and FREX scoring. Colors depict partisanship based on coefficient size. White cells are non-significant topics.

#	Top Word 1	Top Word 2	Top Word 3	Top Word 4	Top Word 5	Top Word 6	Tokens assigned
82	com	mar	spec	jun	est	comm	1388
22	server	software	wireless	technology	desktop	broadband	430
80	artist	art	artwork	exhibition	artistic	sculpture	1099
113	trench	thickness	compaction	concrete	slab	excavation	766
87	respondent	survey	census	racial	demographic	score	427
83	homeless	homelessness	supportive	client	transitional	encampment	229
20	noise	fugitive	receptor	exhaust	vibration	emission	376
35	landlord	tenant	owner	property	rent	lien	205
105	beach	orange	arena	rainier	ocean	resort	457
2	yon	bay	gen	sou	coliseum	estuary	385
6	redevelopment	land	developer	parcel	development	area	70
104	riparian	wetland	habitat	marsh	floodplain	grassland	968
41	tax	exemption	taxable	deduction	levy	taxpayer	172
68	economy	workforce	economic	sector	industry	innovation	332
28	figure	table	scenario	margin	analysis	appendix	207
110	bond	maturity	debt	issuer	redemption	obligation	232
102	sidewalk	curb	pole	crosswalk	ramp	sign	237
118	project	phase	construction	completion	improvement	complete	45
78	parking	tow	vehicle	garage	car	motor	210
71	actuarial	retiree	retirement	pension	deductible	unfunded	239
91	prune	tree	forestry	deer	shrub	planting	1240
114	incumbent	exam	supervision	supervise	examination	ability	432
16	park	recreation	playground	zoo	trail	picnic	290
53	waterfront	boat	shoreline	maritime	dock	barge	800
76	felony	violent	offender	gang	theft	inmate	783
4	courtyard	realm	design	facade	proponent	articulation	608
100	division	manage	staffing	oversee	management	analyst	100
97	mitigation	impact	adverse	significant	alternative	propose	132
11	historic	landmark	revival	archaeological	preservation	historical	876
77	million	fiscal	forecast	revenue	quarter	billion	138
74	board	chairperson	secretary	member	appoint	executive	118
47	allegation	complainant	misconduct	bias	complaint	allege	580
92	sick	employee	wage	overtime	grievance	bargaining	260
10	ave	avenue	south	east	west	blvd	189
112	grant	loan	funding	program	recipient	federal	85
56	downtown	mall	midtown	uptown	hotel	shopping	414
14	yes	agency	successor	oversight	attachment	describe	125
40	bicycle	bike	transit	bicyclist	lane	bus	315
62	affordable	housing	affordability	income	household	moderate	188
99	memorandum	resolution	council	legislation	entitle	commission	173
19	governmental	accounting	asset	statement	financial	net	156
103	permission	ayes	correspondence	bid	smith	demolition	203
107	appropriated	dollars	thousand	ongoing	matrix	justification	117
12	approach	difficult	achieve	challenge	critical	often	257
46	variance	fence	setback	exception	yard	applicant	136
90	audit	auditor	procedure	internal	auditing	documentation	226
64	density	urban	corridor	village	orient	transit	165
21	goal	strategy	outreach	priority	strategic	implementation	105
73	parish	rouge	baton	hogan	councilman	thereto	482
29	comment	draft	discussion	feedback	discuss	presentation	168
32	budget	expenditure	appropriation	fund	endorse	balance	129
54	aye	absent	khan	nay	berry	voting	344
39	mode	accessibility	tab	focus	else	alt	117
109	auburn	buffalo	ward	brown	announce	casino	177
50	news	warren	lovely	release	leader	proud	498
79	digest	proposal	sander	reappoints	metropolitan	gray	236
27	bankruptcy	plaintiff	creditor	trial	court	supreme	810
31	agenda	speaker	item	committee	chair	divided	146
48	consolidated	contingency	reinvestment	inc	contract	authorize	134
55	suspect	shoot	fatal	homicide	stopper	pronounce	512

Table 9: OLD: Top words from a structural topic model with 120 topics (second 60 topics displayed here) and FREX scoring. Colors depict partisanship based on coefficient size. White cells are non-significant topics.