AI Governance: Analyzing City-Level Artificial Intelligence Policies in the United States

URP 535 (Introduction to Urban Informatics)
Eman Mozaffar, Arjun Suri, Estella Zhang Qiming

1. Introduction and Motivation

Cities are beginning to grapple with the introduction and prevalence of Artificial Intelligence (AI) in governance, the workforce, and the daily lives of citizens. Technological advancements such as AI continue to shape how society functions, and in turn how cities manage both day-to-day and long-term operations. Our analysis of Artificial Intelligence (AI) policies and documentation serves to take a look at preliminary trends in the policymaking space at the municipal level.

Recently, the conception of Generative AI (GenAI) has propelled to the forefront of general consciousness. Products such as OpenAI's ChatGPT and Google's Gemini have been released to the public, and several critical applications and tools have been developed and deployed for many everyday purposes. Although many of the prospects of these new technologies are novel and exciting, they also bring forth a series of ethical questions and regulatory concerns.

By examining what governments have done so far to reckon with AI's meteoric rise, we wish to understand the in-flight initiatives, general guidelines, policies, and standards that are setting the stage for how AI will be used and regulated in American cities. Specifically, we want to examine the sentiments of the documents, the nature of the contents, and commonalities and differences between what we analyze, in order to further the discussion on the relationship between emerging technologies and governance.

2. Research Questions and Methodology

Our primary objective is to explore existing local policy and governance documentation to provide guidance on the usage and regulation of artificial intelligence tools and technologies. With the ultimate goal of identifying themes, trends and areas for improvement within the United States policy sphere, we sought to answer the following research questions:

1. Which cities in the United States have created AI-specific policies and plans?
2. What are the most commonly identified attitudes toward AI and overarching themes explored within the documents?
3. Are there any emerging trends in the data and observations we gathered that reveal the direction of municipal AI governance?

To answer these research questions, our process began with the collection of AI policies and plans (where applicable) from different U.S. cities. After using the MetroLab Network Resource Library as a starting point, we found other aggregate online sources that led us to government websites for cities and counties that hosted their AI policies, standards, or strategic documents. We were able to locate 14 local U.S. city documents in total for this review, in addition to several directives and executive orders from cities that were planning to create and publish policies in the near future.

While compiling these documents, we also completed a literature review of research and articles relevant to AI governance, which aided us in understanding the processes surrounding policy creation and governance, and allowing us to determine which policy-specific metrics we wanted to collect for our analysis.

We then focused on compiling a dataset of important metrics related to the contents of each collected policy. In order to do so, we closely read and synthesized each document and noted different attributes related to the document's scope and focus, technologies mentioned, content and language, and the various stakeholders and target audiences involved.

Our final product consists of a detailed text analysis report detailing our findings from our policy analysis. Using the dataset containing our metrics and observations, we created both spatial maps and non-spatial graphics, and discussed the implications of these findings. Although the concept of creating AI policies and task forces is a relatively new municipal undertaking in the U.S., we were able to determine the average level of detail and interesting commonalities among the documents, along with possible trends that may potentially be found in other local municipalities as AI and its practical applications continue to impact cities and their future strategies.

3. Literature Review

3.1. Introduction to Artificial Intelligence (AI)

Artificial Intelligence (AI) encompasses computerized systems designed to emulate human-like intelligence. These systems are characterized by their ability to learn, solve problems, and achieve goals under uncertain and varying conditions with different degrees of autonomy (Harris, 2023, pp. 1). AI is a multifaceted field with various methodologies and applications, such as natural language processing, robotics, and facial recognition. The development of AI systems aims to create machines that can perform tasks that typically require human intelligence.

Generative AI (GenAI) represents a significant advancement in the AI domain, particularly in developing models and applications capable of generating content. ChatGPT, developed by OpenAI, is a prime example of a GenAI application. It is powered by a large language model (LLM), trained on extensive data collections, primarily sourced from public internet sites. LLMs like ChatGPT can generate text-based responses that closely mimic human-like qualities when prompted by a user (Harris, 2023, pp. 1).

GenAI models are designed to replicate the style and appearance of the data they are trained on. They exhibit a phenomenon known as "capability overhang," where AI systems possess latent abilities that remain undiscovered or untested by researchers. The inception of transformer architecture in 2017 and subsequent enhancements in generative pre-trained transformer (GPT) models since 2019 have propelled the evolution of GenAI. The public availability of these tools since 2022 has further facilitated their widespread adoption (Harris, 2023, pp. 1).

3.2. Legislation Overview

As the prevalence of AI technologies has increased, so has the regulatory discourse. According to the AI Index analysis, the number of laws containing "artificial intelligence" passed in 127 countries rose from one in 2016 to 37 in 2022. In addition, an examination of parliamentary records in 81 countries revealed a nearly 6.5-fold increase in mentions of AI in legislative proceedings since 2016 (Maslej et al., 2023, pp. 266).

In the United States, there have been proposed legislations such as the Algorithmic Accountability Act of 2022, aimed at mandating impact assessments of automated decision systems, including those utilizing machine learning and AI, by the Federal Trade Commission (Harris, 2023, pp. 10).

At the federal level, several laws that address AI or contain provisions related to AI have been passed in recent legislative sessions. One of the most significant pieces of legislation is the National Artificial Intelligence Initiative Act of 2020, part of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021. Additionally, various federal agencies, such as the General Services Administration, the Office of Management and Budget, and the Office of Personnel Management, have been legally mandated to engage in efforts to facilitate the adoption of AI throughout the federal government (Harris, 2023, pp. 7).

At the state level, Figure 1 illustrates the number of legislative acts passed from 2016 to 2022 in certain states. Maryland tops the chart with seven bills, followed by California, Massachusetts, and Washington (Maslej et al., 2023, pp. 272-273).

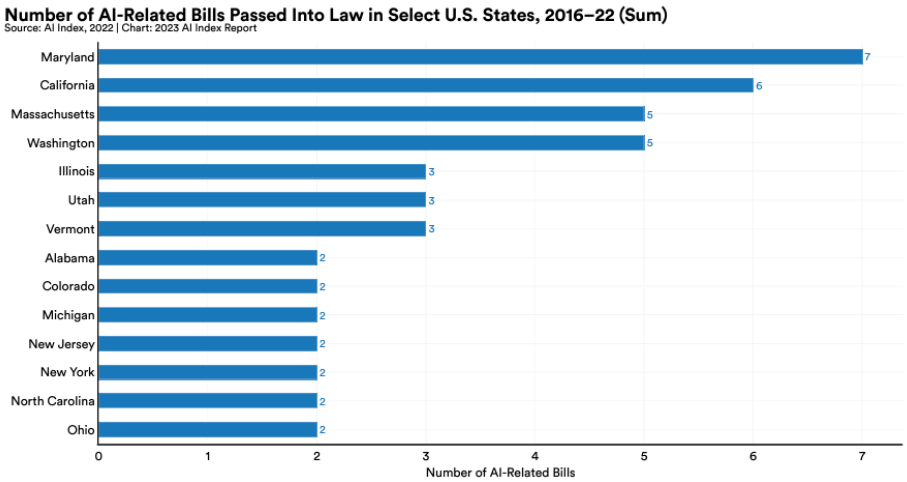

Figure 1. Number of Legislative Acts passed from 2016 to 2022 in certain States in the U.S. (Maslej et al., 2023, pp. 273)

Public, business, and political interest in AI is growing, especially in light of recent developments and use of GenAI models. According to respondents from a variety of businesses, seniority levels, and geographic locations, generative AI tools are already being used extensively (McKinsey & Company, 2023, pp. 3). The potential of these technologies are growing, but so are calls for congressional action and awareness of potential risks (Harris, 2023, pp. 12).

However, there has still been little research into AI policies and sentiments across city levels in the US. This is extremely important, as it can provide insights into the varying approaches and sentiments faced by cities of different sizes and contexts.

Additionally, comprehensive research on AI policies at the city level can contribute to a broader understanding of the overall landscape of AI governance in the US, highlighting trends, best practices, and areas needing improvement. This knowledge can then be used to inform the development of more cohesive and coordinated national AI policies that align with the needs at both country and city levels.

3.3.3 MetroLab Guidelines

We used the aforementioned MetroLab guidelines on data management at a city level as a foundational understanding to which we could then compare each individual city's policies. While not completely specific to AI, many of the concepts presented in the MetroLab documentation were consistent with the ideas mentioned throughout the policies we read, such as how to safely store, use, and manage big data, and societal implications of using technology in governance. The guidelines outlined by MetroLab for data management in smart cities aim to ensure ethical data practice by setting firm internal structure and prioritizing community engagement and safety. The guidelines emphasize the importance of transparency and accountability, consistent with themes found in the assessed policies. MetroLab further referenced norms set by ‘The Platform Urbanism Data Sharing,’ which provide greater insight

into data sharing ethics through minimizing data collection, specifying data granularity, ensuring transparency, and oversight.

Regarding good data management norms, the guidelines stress the necessity of internal structure to regulate data safeguarding throughout its lifecycle (*Figure X. Data Lifecycle and Management Flowchart (MetroLab, 2024, pp. 11)*). This involves transitioning from individual data teams to a centralized authority to standardize data management procedures and eliminate discrepancies between small departments. Additionally, processes such as right-sizing and the use of data catalogs are highlighted as means to ensure consistency and efficiency in data management practices.

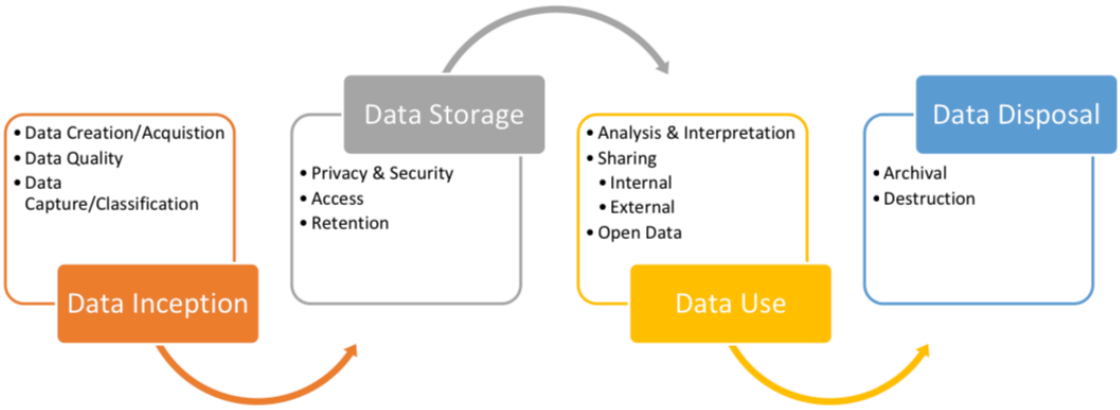

Figure 2. Data Lifecycle and Management Flowchart (MetroLab, 2024, pp. 11)

Roles and responsibilities within the data management structure are clearly defined, with positions such as Chief Data Officer, Chief Information Officer, Open Data Program Manager, and Unit Data Stewards each playing crucial roles in overseeing data management, sharing agreements, data uploads, and adherence to legal and regulatory procedures.

While every policy did not achieve this level of structural thoroughness, using the MetroLab guidelines as a standardized template allowed us to conduct policy analysis with a background of what an ideal policy could look like, and which details to include.

We also referenced chapter three of Sarah Williams's *Data Action,* which allowed us to understand the drawbacks to big data usage, and use a standard for terminology and concepts observed in the individual cities' policies to quantify the hesitant point of view about big data. A large contrast to MetroLab's encouraging fundamentals, Williams's section titled 'The Hubris of Using Data for a Social Good' explains failed use cases of public data for public good, sharing both a warning and a lesson in data ethics. Williams does so through a public health case study from 2009, where she explains the downfall of big data usage without the inclusion of political science and policy experts.

The prominent example Williams analyzes is Google Flu Trends (GFT), a model developed by Google to monitor and predict flu outbreaks using data analytics of searches from their own platform. Initially, GFT showed signs of early success, as a result of its revelation of basic trends, but over time the project effectiveness continued to decrease. GFT suffered from algorithmic failures as a result of overestimations in cases by not accounting for changes in flu strains and social patterns, which Google users may not have included in their searches. The failure of GFT underscores the importance of collaboration with data scientists and policy experts in analyzing big data effectively.

This concept echoes the sentiment of the ‘Data Action’ method advocated by MetroLab, which emphasizes the inclusion of policy experts in data-related endeavors to ensure informed policy formulation. Williams' warning served as a crucial definition for our skeptical lens in reading policies. Furthermore, when looking at the policies through this lens, we understood the importance of diverse stakeholder involvement in formulating safe AI usage, specifically for data storage and use.This encouraged us to use stakeholders mentioned as a key metric.

4. Data Sources and Metrics

The AI policy analysis dataset used in this report was generated by our team after gathering relevant documentation and compiling metrics based on our review. The review of 14 documents yielded information related to the relevant location, whether the policy was written for generative AI or AI in general, and whether the policy was concerned with the application or review of technology, or both.

We also collected metrics on different technologies and innovation strategies mentioned, the level of detail, keywords within the document, sentiment analysis, stakeholders involved, and whether this document applies to government employees or citizens and corporate entities at large. This dataset was converted into CSV format and used in RStudio to create maps and visualizations to better understand the breakdown of the policies that were assessed.

The complete AI policy analysis data table contains details on the scope and focus, level of integration, content and language analysis, stakeholder information, and links to the documents analyzed. In particular, this analysis contains keywords that we noted were important to each policy, along with a summary of what the purpose of each document contains. It is also important to note that documents reviewed contained a combination of policies, standards, guidelines, and plans, all of which serve different purposes.

The few cities with plans are those that possess more manpower and resources to consider AI as a policy concern, although AI’s increased ubiquity will likely cause this number to rise in the future. A majority of the cities with documents analyzed (Atlanta, Austin, Baltimore, Boise, Boston, Chicago, Lebanon, NH, New York City, San Francisco, San Jose, Santa Cruz County, Seattle, Tempe, and Washington, D.C.) are relatively large municipalities in population and influence.

All documents were publicly available on their respective websites, and were found based upon using MetroLab's portal as a beginning point. It is important to note that the brevity of this dataset is due to AI's relative novelty. Many other cities and states have declared the need for the creation of documentation and standards surrounding AI, and may be in the process of creating task forces and documentation. At the time of this study's completion, this existing dataset is a representative collection of U.S. documentation, but this is subject to change significantly in the near future.

5. Analysis

To analyze the collected information, we produced a series of charts, maps, and visualizations to identify how the policies and documents vary, any emerging trends, and what content drives the design of municipal policies across the United States. Later on, we also provide our interpretations of these visualizations, and additional context that can help us predict how cities that plan to harness the power of AI will create and implement governance strategies in the future.

5.1. Non-Spatial Techniques

Figure 3. Word cloud of all collected policy documentation

Word clouds provide a straightforward illustration of which phrases occur with the highest frequency within a series of texts. After gathering the documents we could locate, we parsed the documentation to create a corpus, and removed all stopwords (commonly occurring words, such as "a", "and", or "the"). The *wordcloud* package in RStudio will create an image that displays more frequent words in the largest size.

From above, we can identify “AI” , “city”, “generative”, “use”, “data”, and “public” as some of the most notable words in the corpus. “ChatGPT” is the most commonly occurring specific technology, while concepts like “responsible”, “guidance”, “action”, “support”, “potential”, and “privacy” are also common. This indicates that these documents are relatively serious, forward-thinking yet cautious, and concerned with safety and responsibility, which is in alignment with our extended text analysis of existing documents.

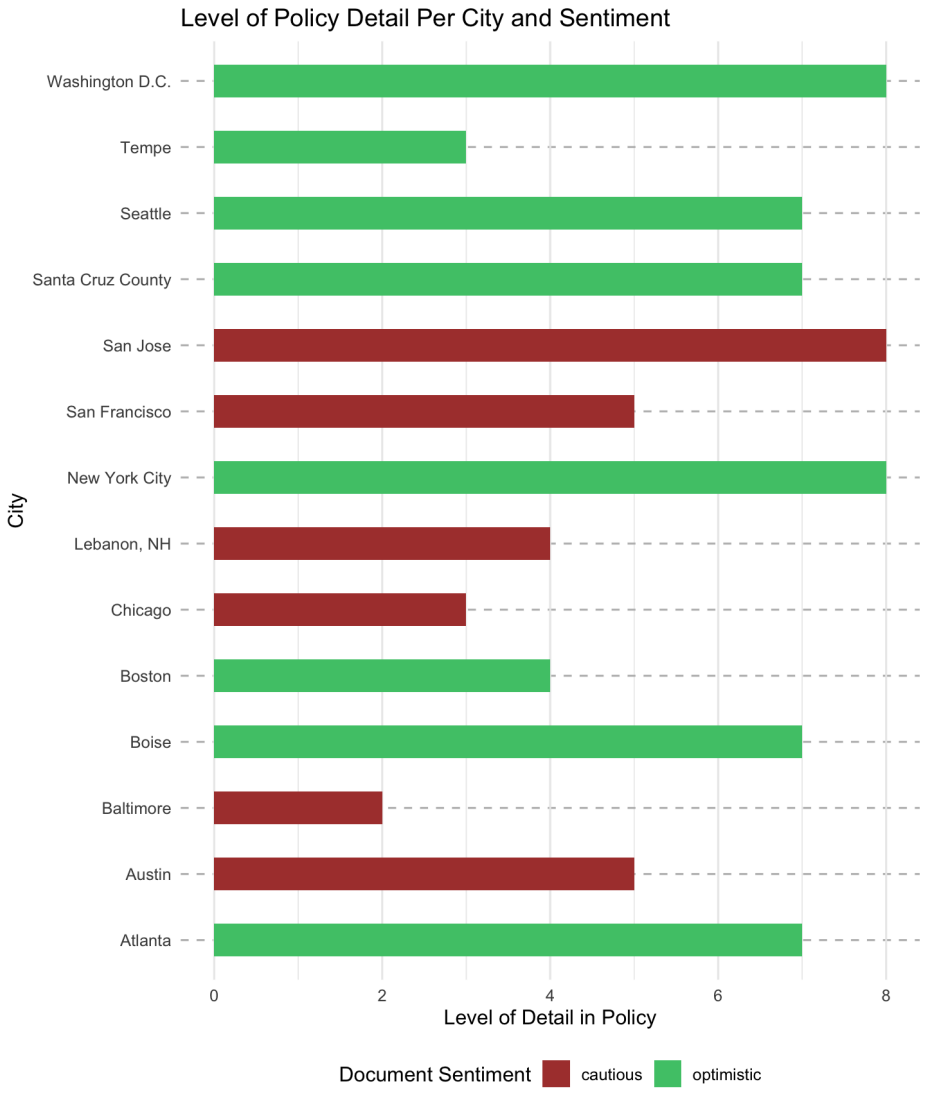

Figure 4. Level of detail of policy and document sentiment per city

Figure 4 provides a comprehensive look at all documents at a glance, delving into the specificity of their language. Less detailed documents were typically plans or announcements, giving a foreshadowing of what may be to come. Detailed policies explored the application of AI concepts, interaction with stakeholders, and more specific technologies mentioned. The graph

displays the level of detail in the policies on the X axis, as well as a colored bar to show the sentiment of the document.

The graph reveals that holistically, the optimistic policies were more detailed than the cautious policies, which would make sense, as cities that are more comfortable with AI may have a larger incentive to create detailed policies that thoroughly explain its uses and guidelines. No policies felt fully comprehensive, as they all mentioned actively monitoring the space to improve and build upon the specifics as time passes and AI usage continues to evolve.

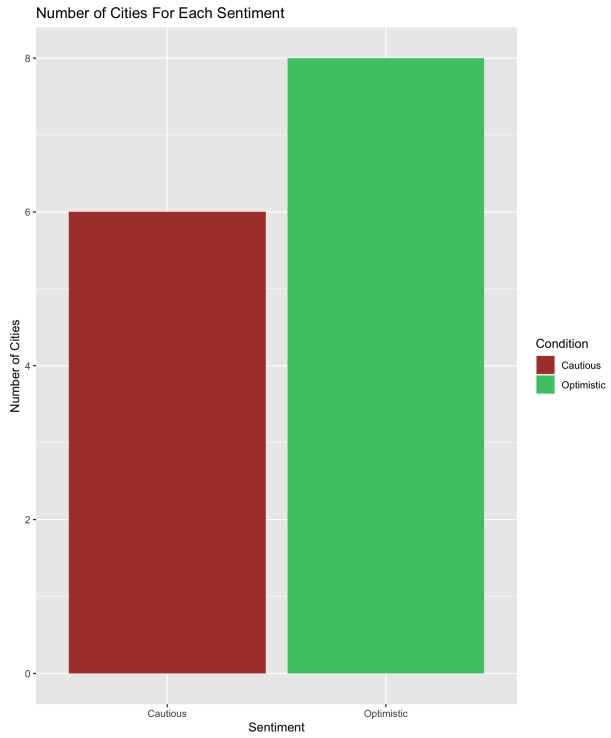

Figure 4b. Count plot of document sentiment

When analyzing the breakdown of optimistic and cautious document sentiments, this graph demonstrates that optimistic views were somewhat more frequent. When understanding document sentiment, we identified keywords describing AI — the documents with a greater mention of ideas relating to data security, bias regulation, and limitations received a cautious grade, whereas documents with an innovative focus received an optimistic grade. Looking at the split between the two, optimistic documents were more frequent. This result is consistent with our assumptions, as cities that are taking the initiative to craft AI policy currently are ahead of the curve in regards to their stance on AI, and are more likely to see the innovative use capabilities.

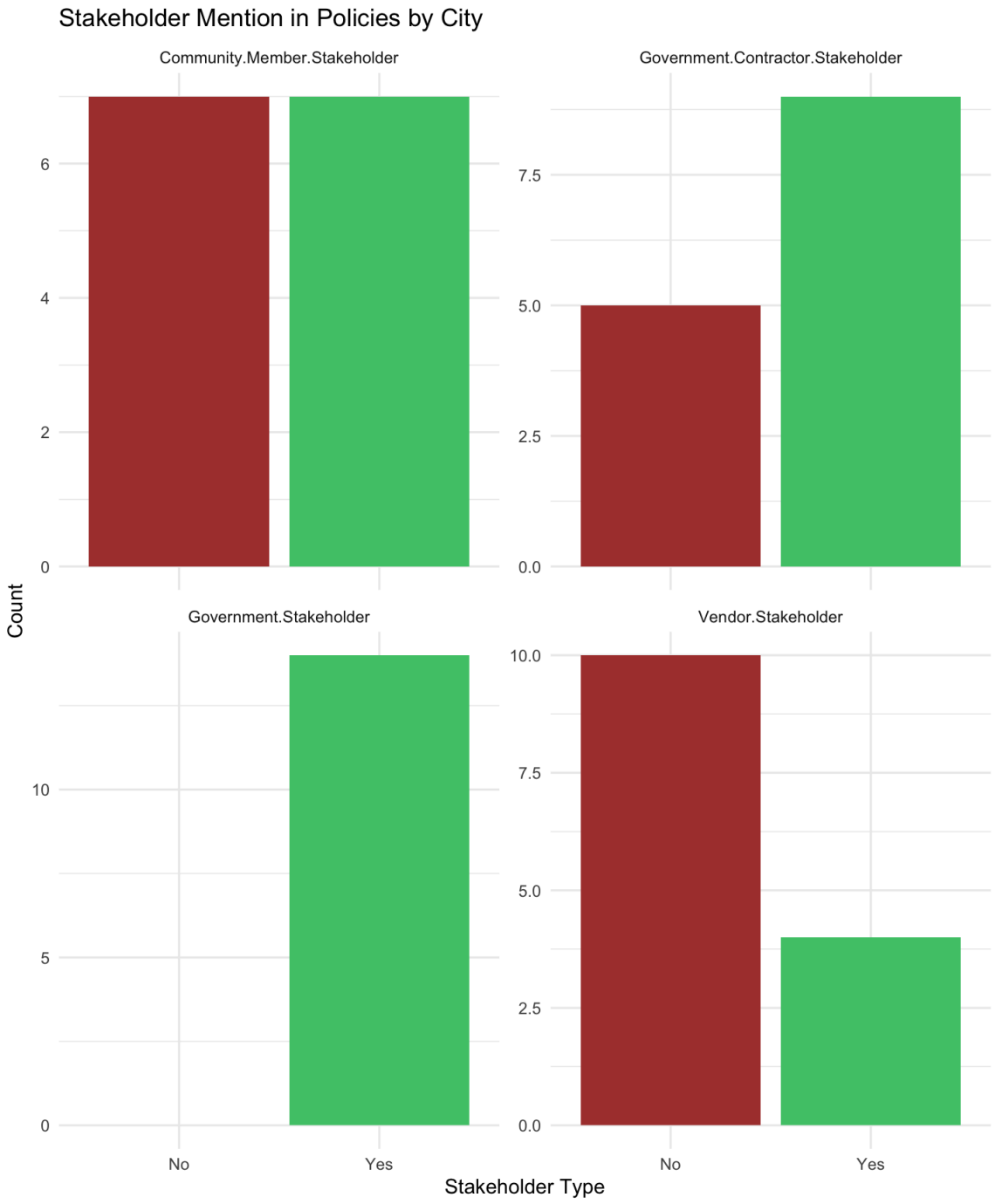

Figure 5. Stakeholder counts visualized

Figure 5 demonstrates the diverse stakeholders mentioned throughout the different policy documents. In our review, we decided on four crucial stakeholders: government employees, government vendors, contractors, and community members. We chose these four stakeholders as they represent a diverse group of people AI policy could affect.

The graph reveals interesting trends, as government employees are stakeholders in each of the policies we read, yet individual vendors are mentioned in very few. The overall trend of these policies seems to be remaining within the bubble of local government, and as the stakeholders become more independent, the proportion of policies that mention them decreases. After government employees, the next largest category was government contractors, followed by community members, and independent vendors. It is possible that in the near future, we may see regulations and guidelines that extend beyond the government workforce, but the documents we were able to compile almost exclusively prioritize government-specific AI usage.

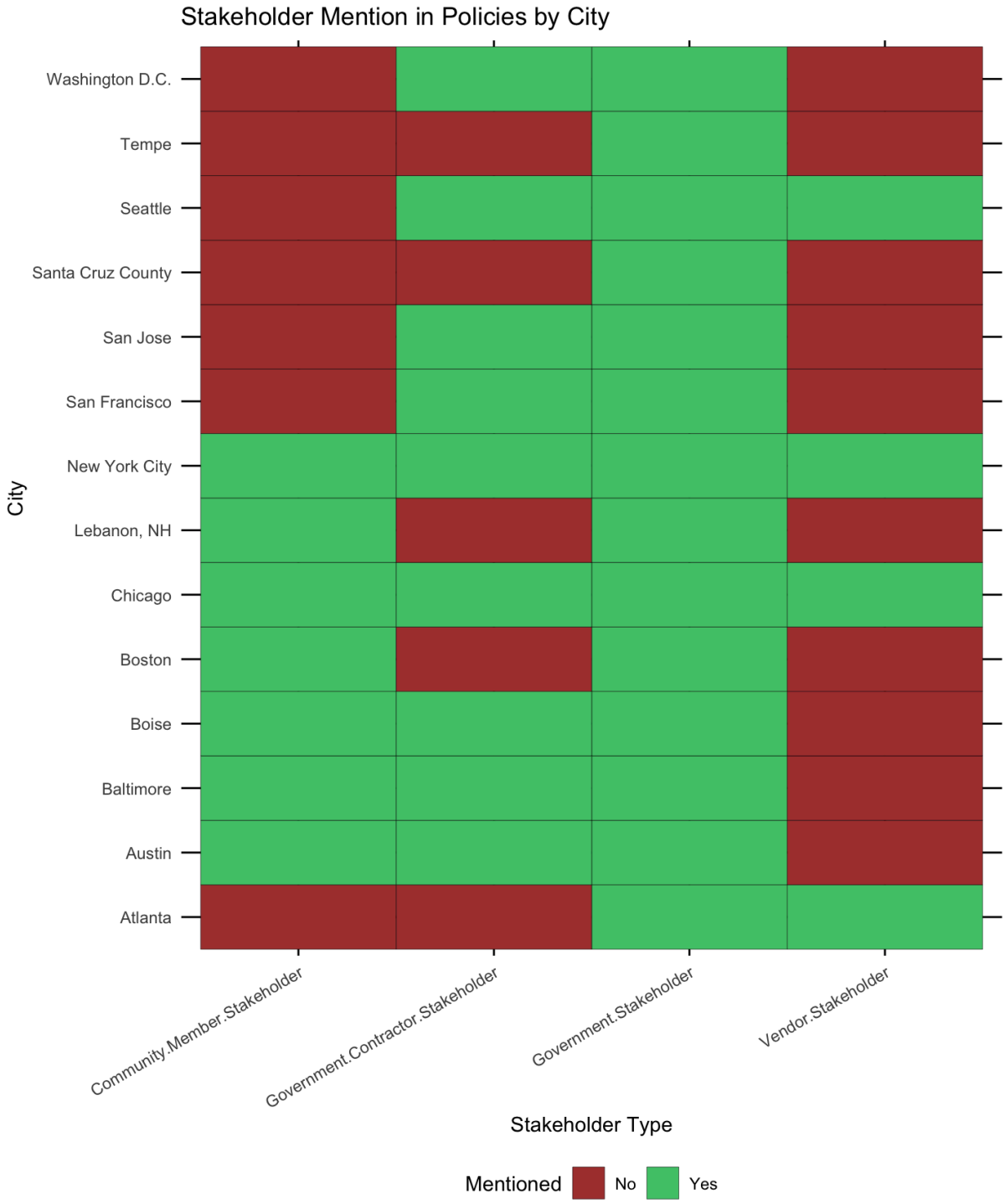

Figure 6. Stakeholder mentioned in each cities heatmap

This heatmap is a visualization to identify which cities mentioned which stakeholders in their policies. This reveals that cities that had mentioned more than just government employees as stakeholders were also the most typical cities to include multiple other stakeholders.

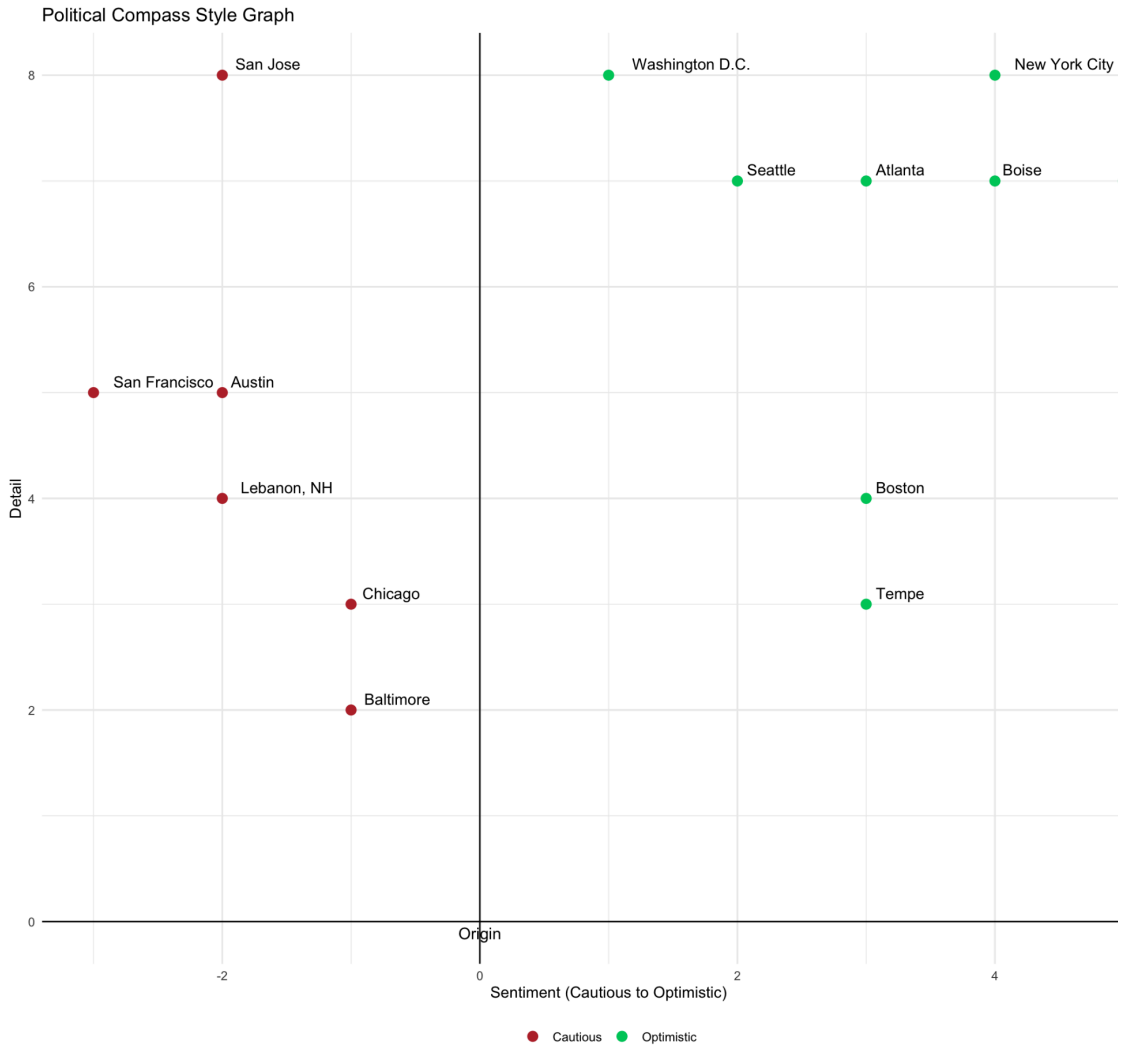

Figure 7. 'Political Compass' style grid of the 14 cities arranged by detail and sentiment

Figure 7 shows another version of the sentiment data, and maps this data against the level of detail in each policy, showing where each city stands relative to one another. There is a clear trend observed in the cities themselves — the three cities with the most detailed documents (New York, Washington D.C., and San Jose) are cities with immense resources that may have contributed to their ability to craft detailed policy documentation.

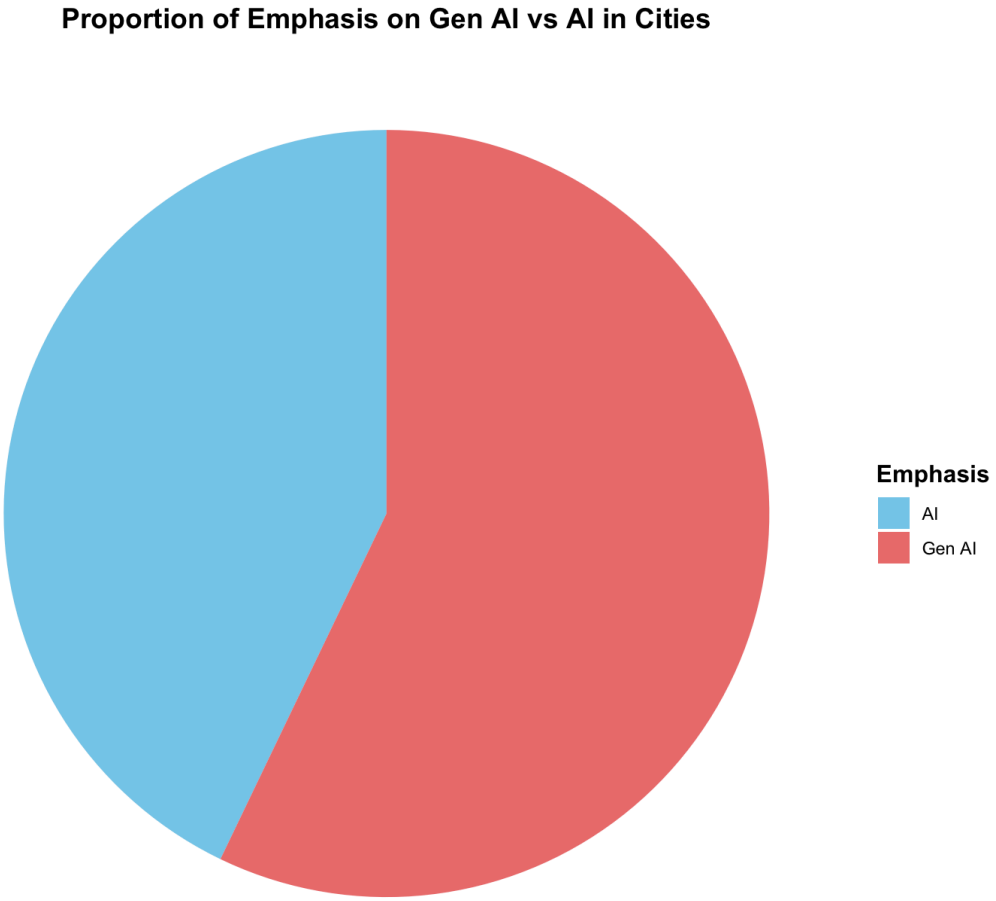

Figure 8. Breakdown of policies with a Gen AI vs AI focus

The next metric we reviewed was comparing the cities that had an emphasis on GenAI and those that looked toward a higher-level application of AI. The results displayed a larger proportion of policies emphasizing GenAI over other AI applications. This may be a reflection of how GenAI is a current trend within and outside of technological spheres, and has communicated itself as one of the most applicable forms of technology for government employees. AI itself has various outlets which would be extremely difficult to regulate in its entirety, especially given how many of the documents were less detailed than anticipated. Because of this, the focus of these policies lies especially on GenAI policies. It appears that these policies are microcosms of what AI policy could look like in the coming years as our understanding of the technology evolves.

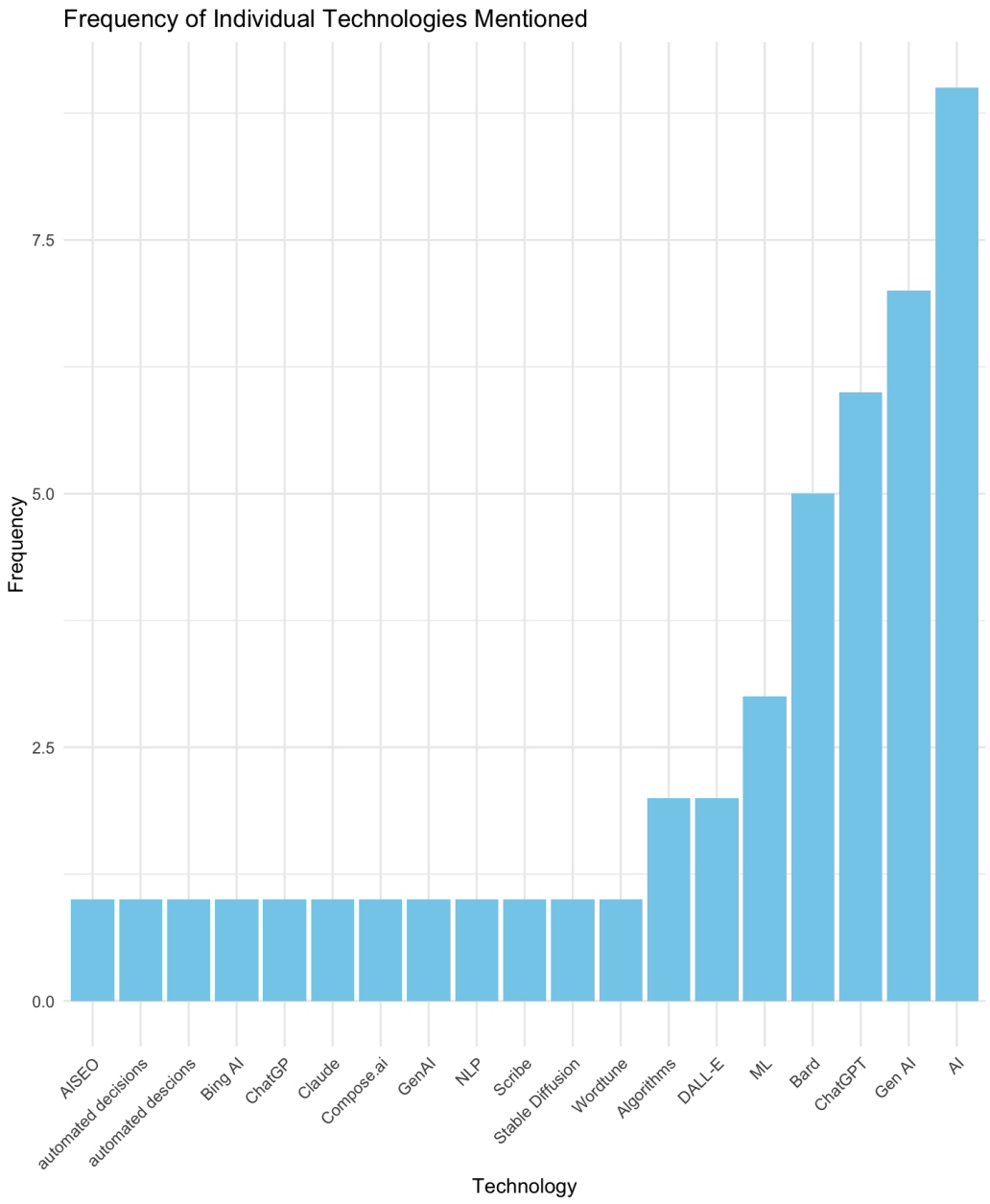

Figure 9. Specific technologies mentioned

AI and GenAI were the most highly mentioned specific technological concepts, and ChatGPT was the most mentioned specific tool, which is unsurprising given its significant role in popularizing GenAI as a concept to workers typically not as immersed within new technologies. Other notable mentions include machine learning, Bard (now Gemini), and DALL-E, both of which have come under fire for not accounting for biases and producing historically inaccurate results.

5.2. Spatial Techniques

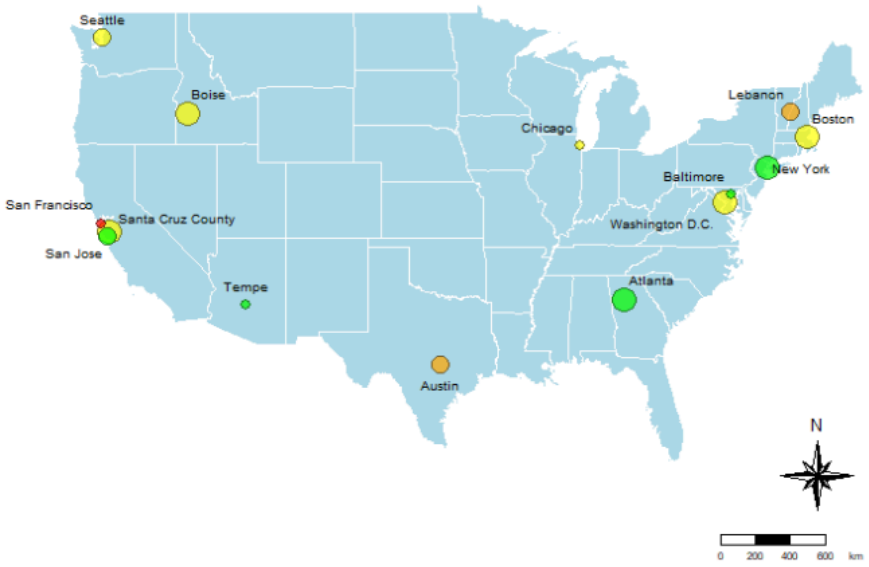

Figure 10. Spatial Map (Static Version)

The heatmaps (Interactive Version: https://rpubs.com/estellaz/AIPoliciesUS) provide a visual representation of the current status of AI and/or GenAI policies across 14 cities. Each city is represented by a circle, the size of which indicating the level of detail within their documentation—the larger the circle, the more detailed the policy.

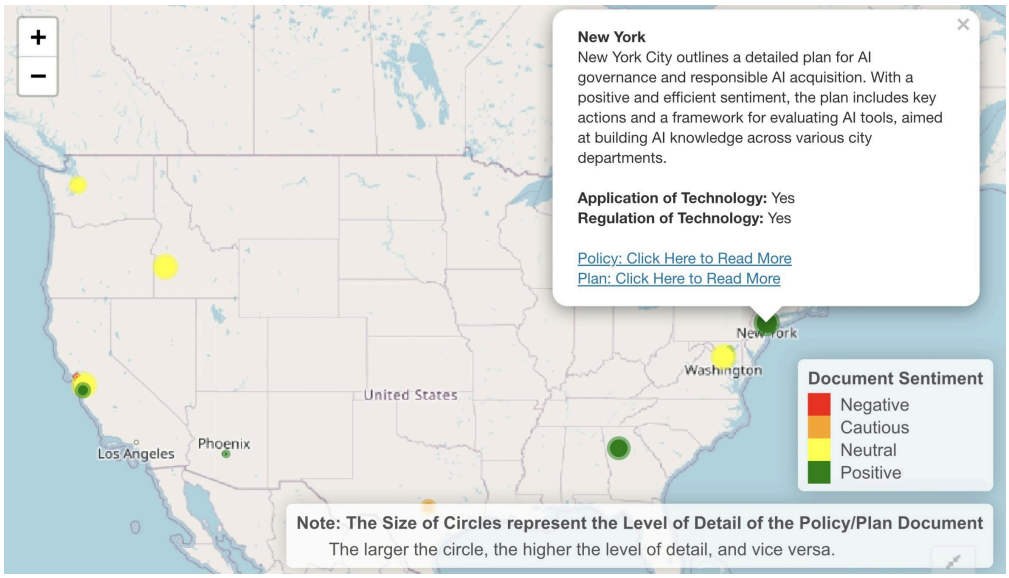

Figure 11. Spatial Map with a Pop Up Displayed

The color of the circles also differ depending on the city's prevailing sentiments toward AI policies, categorized into negative, cautious, neutral, or positive sentiments based on the color

coding of the circles. Additionally, the pop-up provides information on whether each city's documentation is concerned with the application or regulation of AI technologies.

6. Discussion

The state of AI policy is still in relative infancy, with few cities having dedicated task forces and implementation plans, and for this reason, we expect many changes in the impending future. Work is being done at the state and local levels, but policies generally lack detail compared to technical documentation from other domains that has been put into practice. Insights from technical experts may be needed to further develop these policies, and it was noted that many cities have issued executive orders and guidelines instead of formal documentation, highlighting the importance of flexibility and more rapid development in this evolving field.

These observations are in alignment with expectations, as AI has become a general topic of discussion relatively recently. It typically will take municipalities time to understand the shifting landscape of AI, what the true capabilities and limitations are, the projections of how it will continue to evolve, and which issues are the most pressing prior to making sweeping decisions about how it should be regulated.

Spatially, AI policy has garnered significant interest in select regions across the United States, primarily along the East and West Coasts, as well as in a few more populated central areas (Chicago), which is again in alignment with how changes tend to occur and spread nationwide. These regions have seen a growing focus on developing guidelines, regulations, and frameworks to govern the use of AI in governance. However, AI policy is still limited in its outreach, with formalized policies only available in a select number of cities across the US. We expect to see a sea change as GenAI's capabilities become increasingly integrated and adopted on a national scale — innovation and culture hubs such as New York and San Francisco will typically spearhead the implementation of tech-forward policies, and other cities will follow later on.

Many challenges are posed when attempting to govern AI, including the regulation of digital products on a local scale, especially regarding cross-border data transfers. These policies and plans also universally struggle with not being specific enough on many issue areas and proposed initiatives, which will potentially make it difficult for cities to actually implement the intended milestones listed on roadmaps in a timely manner.

Furthermore, although being risk-averse can be an asset, it is important to acknowledge the cautious optimism of the documents analyzed. Many of these documents (and all policies in particular) are focused on security and potential risks of GenAI. Policies often mention specific technologies by name, indicating a potential need for adaptable regulations as technology evolves. It is impossible to "future-proof" a policy, but having more general guidelines for a wider range of technologies and having a consolidated resource library for all tech-focused policies in

an easy-to-access, human-readable format may be helpful for governance purposes, and for general public knowledge as well.

Many cities have expressed intentions to create more detailed documentation and increase governance in the future, though implementation remains a challenge. We expect to see more “growing pains” within this space in the next few years, and a general sense of confusion as technologies become replaced in a more rapid fashion than they are adopted. Understanding what MetroLab’s “GenAI for Local Governments” task force is working toward can provide valuable insights for future policy creation and governance approaches, potentially offering a model for effective implementation in cities that are interested in applying AI in governance, without experiencing excessive confusion or inefficiency.

7. References

Harris, L. A. (2023). Artificial Intelligence: Overview, Recent Advances, and Considerations for the 118th Congress (R47644). Congressional Research Service. https://crsreports.congress.gov/product/pdf/R/R47644

Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Perrault, R. (2023). *The AI Index 2023 Annual Report.* AI Index Steering Committee, Institute for Human-Centered AI, Stanford University.

“Model Data Governance Policy & Practice Guide.” MetroLab Network, 3 Aug. 2023, metrolabnetwork.org/datagovernance-guide/.

McKinsey & Company. (2023). The state of AI in 2023: Generative AI's breakout year. QuantumBlack AI by McKinsey.

Williams, Sarah. Data Action Using Data for Public Good. MIT PRESS, 2022.