

Political Analysis of the Artificial Intelligence Act

A generative AI - based approach

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Links

Access to poster, data sets, codes, references and graphics folder :

https://drive.google.com/drive/folders/1Zj8RCpKArxxGNQ-PIdWvkxUZklw7QK09?usp=share_link



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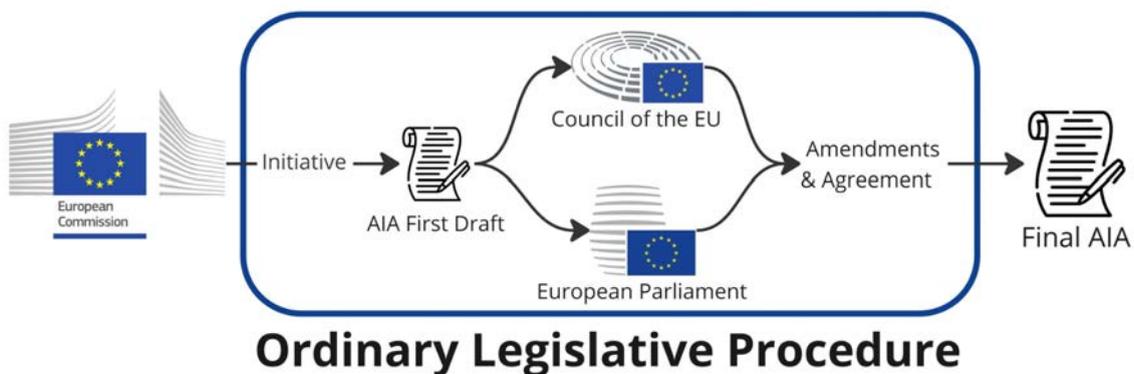
Summary of Key Findings

The project focused on a political analysis of the European Union's Artificial Intelligence Act using generative AI methodologies. Key findings include the identification of the significant role of the European Commission and Council in shaping the AI Act, with their proposals showing a high alignment with the final adopted text. The Parliament's amendments emphasized citizen protection, transparency, and ethical considerations. The analysis also highlighted the varied influence of political entities and specialized committees on the legislative process, underscoring the importance of diverse insights in drafting legislation.

1. Introduction

Before the media arrival of artificial intelligence with the release of the Chat GPT generative program at the end of 2022, the AI Act was already under development through the legislative process of the European Union.

The European institutions are based on three major governance bodies: the European Commission, the Council of the European Union, and the European Parliament. The European Commission is the executive body of the EU, consisting of a Commission President and commissioners who propose European laws and ensure their implementation. The AI Act was initiated by the European Commission in April 2021. The Council of the European Union consists of Ministers from the member states of the European Union, and this institution proposed its version of the text in December 2022. Lastly, the European Parliament represents EU citizens through Members of the European Parliament elected for five years in each member country and proposed its 3,312 amendments in June 2023 after numerous debates between parliamentary groups (Group of the European People's Party (Christian Democrats), Group of the Progressive Alliance of Socialists and Democrats in the European Parliament, Renew Europe Group, Group of the Greens/European Free Alliance, European Conservatives and Reformists Group, Identity and Democracy Group, The Left in the European Parliament - GUE/NGL) and the work of various committees (Transport and Tourism Committee, Legal Affairs Committee, Industry, Research and Energy Committee, Culture and Education Committee, etc.).



The AI Act is a regulation in the context of European law, meaning it is a text that will be applied as is throughout the territory of the European Union, whereas a directive is more flexible, applying differentially through laws voted on in various national parliaments. Its modifications during the legislative process described above highlight the power dynamics within European democracy and its actors.

2. Initial Data Sets

To study the AI Act, which aims to introduce a common legal framework and manage risks related to artificial intelligence (AI), classifying them based on the type of application (minimal, limited, high, or unacceptable risk). We had to obtain various texts proposed by different stakeholders.

We then collected the various documents on the UE officials website in PDF formats. Our reference file is the text adopted by the Parliament on June 14, 2023 amendments on the proposal for a regulation of the European Parliament and of the Council on laying down harmonized rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD)).

There are also proposals from other stakeholders such as committees and political groups :

Committees:

- Transport and Tourism Committee
- Legal Affairs Committee
- Industry, Research and Energy Committee
- Culture and Education Committee
- Committee on the Environment, Public Health and Food Safety
- Committee on the Internal Market and Consumer Protection & Committee on Civil Liberties, Justice and Home Affairs

Political groups:

- EPP : European People Party
- Greens/EFA : Green/European Free Alliance
- Renew : Renew Europe
- S&D : Group of the Progressive Alliance of Socialists and Democrats in the European Parliament
- GUE/NGL : The Left Group in the European Parliament

- ID : Identity and Democracy Group
- ECR : European Conservatives and Reformists Group

Once all the different texts were concatenated, we had a PDF document of 2551 pages. It was from this document that we extracted the various pieces of information to build our database, upon which we based our analysis.

3. Research Questions

After dissecting the text from the parliament enriched by its amendments, and highlighting the contribution of each political group and committee to the text proposed by the commission, it seemed interesting to question the political orientation of the text adopted by the parliament. This question leads to a second one, focused on the method to follow in order to be able to compare the influences among themselves and understand the underlying political stakes.

The investigation into how to combine these two inseparable questions led to the exploration of utilizing prompt engineering and large language model technology to analyze and interrogate the text, raising further questions: What is the political leaning of the text adopted by the Parliament? How to make sense of the different versions presented by the political groups? How to handle the 3,312 amendments proposed by various political groups and specialized committees? These are some of the questions we have endeavored to answer in this mixed methods approach (quantitative and qualitative), using statistical computations to identify key changes and trends. From these statistical findings, we generate specific questions. These are then explored qualitatively through a specialized chatbot, designed to analyze and interpret the nuances of the legislation's various iterations. By integrating cutting-edge AI models such as Retrieval Augmented Generation (RAG) and GPT-4, the investigation offers a thorough and detailed sociopolitical analysis.

Hypothesis : By its nature and orientation, it is anticipated that the original text proposed by the Commission will likely be market and competition-oriented, with a strong emphasis on fostering innovation. This inclination stems from the Commission's historical role in driving the European single market and its focus on technological advancements to bolster the EU's global competitiveness. Conversely, the Parliament is expected to introduce amendments that lean towards risk prevention and offer a more protective stance for citizens. This prediction aligns with the Parliament's track record of prioritizing individual rights, privacy, and ethical considerations in technology regulation. The Parliament's amendments could tighten regulations, demand greater

transparency, and enforce stronger oversight to align AI deployment with social and ethical norms, thus preventing societal harm.

4. Methodology

Parsing : To analyze the comprehensive AI Act legislation, GPT-4 was utilized to efficiently parse the extensive 2,551-page document into manageable, coherent sections, enhancing the readability and interpretability of the intricate legislative text. This initial segmentation was further refined using Python, which facilitated the cleaning and systematic organization of the data. This dual approach ensured a structured and accessible format for in-depth analysis, enabling a thorough examination of the legislative nuances and amendments proposed by various European Parliament committees and political groups.

Descriptive statistics : We employed descriptive statistics to track the AI Act's journey through the various EU institutions. This step provides a clear view of the legislative process and its progression in order to conduct an examination of how amendments were distributed among different political entities, shedding light on the dynamic evolution of the legislation and identifying the pivotal influencers shaping its final form.

Topic Modeling Analysis : We leveraged topic modeling techniques to understand legal nuances and pinpoint the critical issues of the AI Act that sparked debate in order to ascertain which actors were most involved in the European trilogue. This analytical approach enabled us to discern the core themes and contentious points within the legislation, facilitating a deeper understanding of the discussions that shaped the European trilogue.

Similarity scores and contrast analysis : We used ChatGPT API and Cortex manager to analyze all of the proposals for each article, comparing their similarities and differences to the final adopted text.

Creation of the bot :

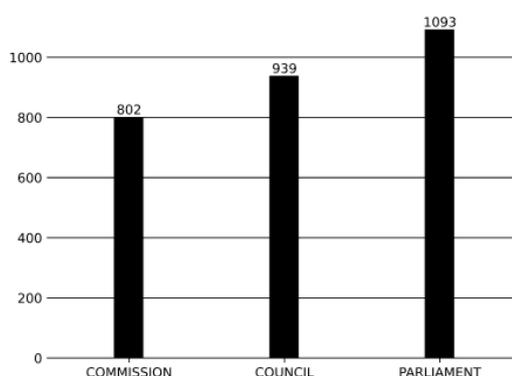
1) **Embeddings** : We then converted the text segments from the AI Act legislation into embeddings, which are high-dimensional numerical representations that encapsulate the semantic essence of words and phrases. This allowed our model to grasp complex legal concepts and relationships within the text, enhancing their ability to process and interpret the legislative information accurately.

2) **Document retrieval and matching** : In order to reduce the hallucinations of our model and to create a concise and relevant text output by synthesizing the retrieved data, we used RAG (Retriever-Augmented Generation). Rag is a method that first retrieves relevant information from a vast database in response to a query, and then uses a generator, usually a large language mode. In RAG, the model therefore integrates a retrieval step within its decision-making process. This is usually done by querying a reference corpus or knowledge base with text embeddings. By doing so, it explicitly defines and scrutinizes the information leveraged to produce an output, thus making it easier to elucidate the evidence utilized by an LLM in its decision-making processes. This approach ensures that the generated content is both informative and contextually accurate.

5. Findings

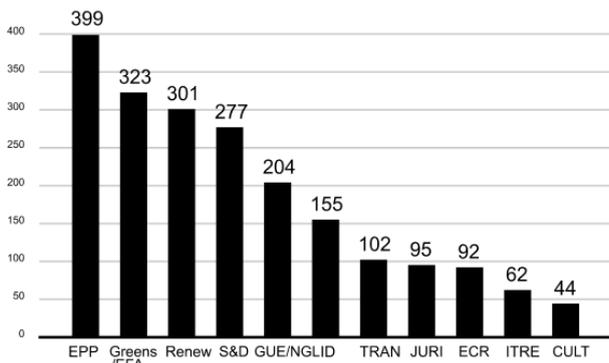
Our findings encompass the enumeration of AI Act article proposals from EU institutions, the tally of amendments from parliamentary actors including political groups and committees, and the distribution of text amendments across various topics of the AI Act by different actors. Additionally, we conduct a contrast keyword analysis and calculate similarity scores of the recital proposals in relation to the adopted text, providing a comprehensive political analysis of the legislation. These results enable us to better understand the political dynamics within the legislative process of regulating artificial intelligence in Europe. Here's a detailed presentation of our finds :

1. Number of AI Act article proposals by EU institutions



The commission provided the first proposal of AI Act, then the council made another proposition before parliamentary debates. We can see here the size of the law increased as we went along this process, showing how democracy actually works.

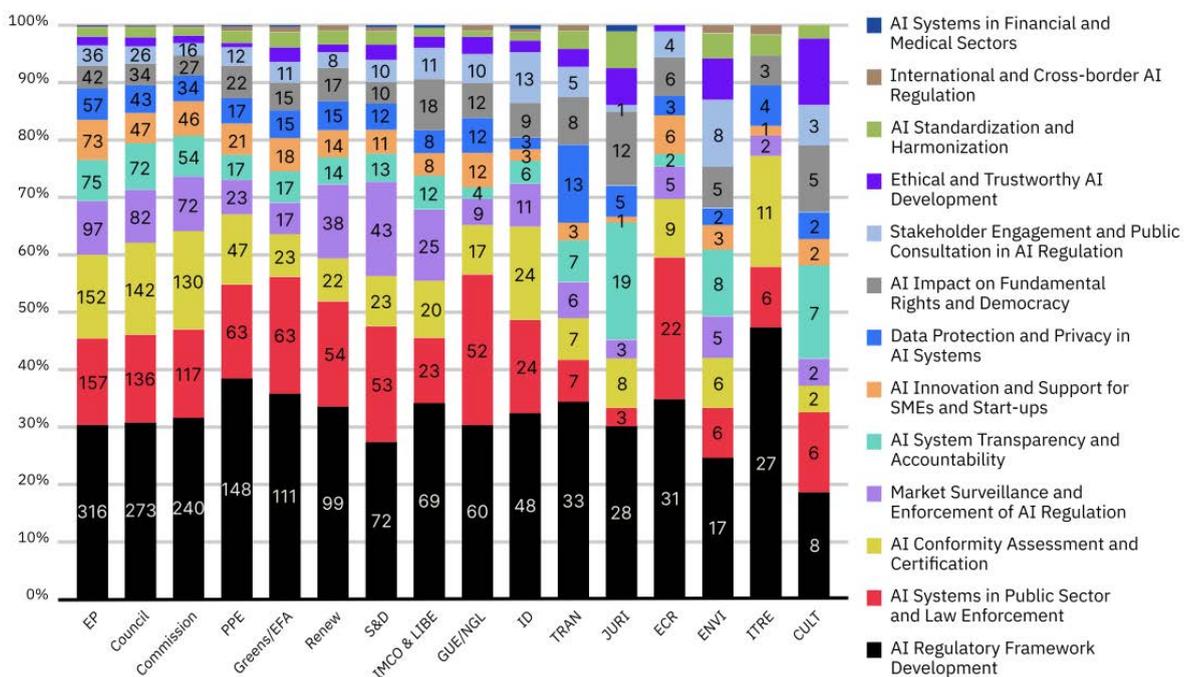
2. Number of Amendments by parliaments actors (political groups and committees)



EPP: European People's Party
 Greens/EFA: Green/European Free Alliance
 Renew: Renew Europe
 S&D: Group of the Progressive Alliance of Socialists and Democrats in the European Parliament
 GUE/NGL: The Left Group in the Eu Parliament
 ID: Identity and Democracy Group
 ECR: Euro Conservatives and Reformists Group
 TRAN: Transport and Tourism Committee
 JUR: Legal Affairs Committee
 ITRE: Industry, Research and Energy Committee
 CULT: Culture and Education Committee

The European People Party is the most represented group in the European Parliament so they also propose more amendments. Political groups make more suggestions than committees : they are the heart of parliamentary debate.

3. Stacked Bar Chart : Proportion of text amendments proposed by each actor (committees and political bodies) according to the different topics of the IA Act.

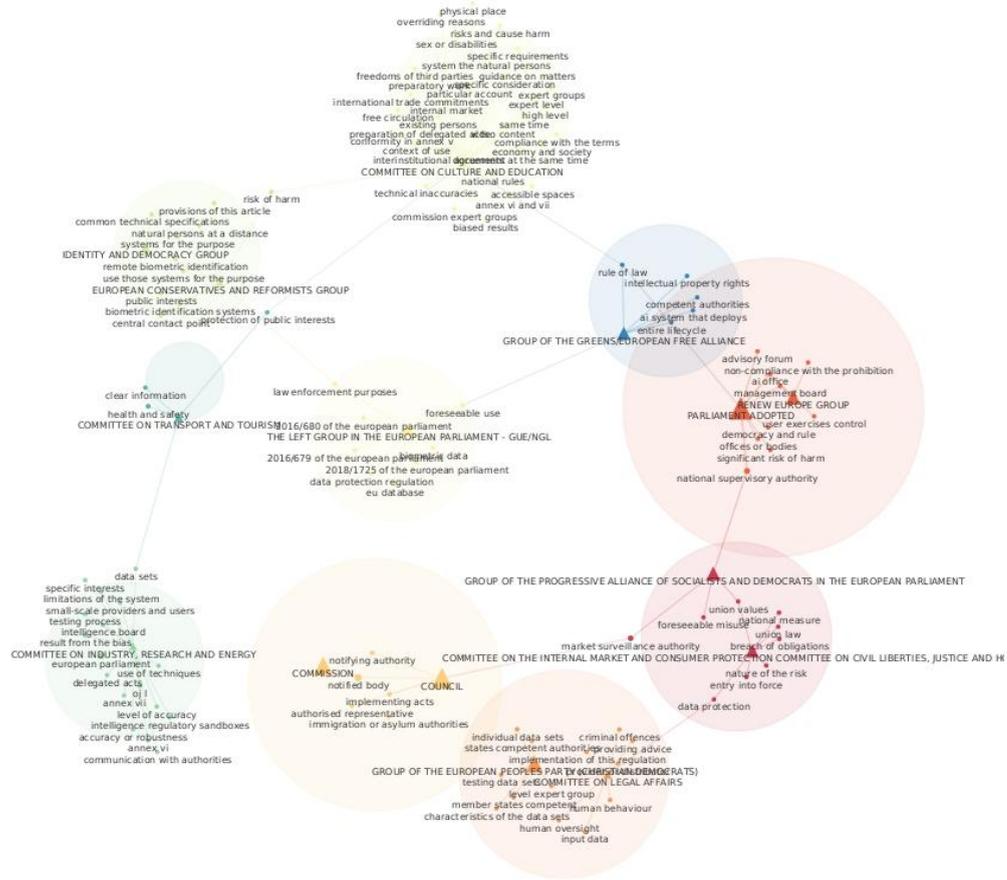


In this graph is a stacked bar chart, we can observe the contributions of each actor to the IA Act. Different colors indicate the various topics addressed, with the size of each bar reflecting the volume of contributed texts on each topic.

Here are some observations:

- **Major Contributors:** The entities that have contributed the most texts overall are the 'EP' (European Parliament) and 'Council'. Their bars are the tallest, indicating a higher volume of contributions compared to other entities.
 - **Topic Distribution:** The topics with the most contributions across almost all entities are 'AI Systems in Financial and Medical Sectors' (black), 'International and Cross-border AI Regulation' (dark gray), and 'AI Standardization and Harmonization' (red). This suggests these topics are of high priority or interest among most entities.
 - **Entity-Specific Interests:** Some entities have a significant proportion of their contributions focused on specific topics. For example, 'CULT' seems to have a particular interest in 'AI Systems in Public Sector and Law Enforcement' (green), which is a larger proportion compared to other entities.
 - **Lesser Focused Topics:** Topics like 'Ethical and Trustworthy AI Development' (blue) and 'AI Conformity Assessment and Certification' (orange) have relatively fewer contributions across the board, which might be counter-intuitive given the current global emphasis on AI ethics and reliability.
 - **Balanced Contributions:** The 'ITRE' entity shows a relatively balanced distribution of contributions across different topics, indicating a more holistic approach to the AI Act.
 - **Counter-Intuitive Findings:** Despite the global emphasis on data protection and privacy, the contributions specific to 'Data Protection and Privacy in AI Systems' (yellow) are not the most dominant category in this chart. Similarly, 'AI System Transparency and Accountability' (light blue) has a surprisingly low representation, even though these are critical issues in AI governance.
 - **Diverse Interests:** Entities like 'Renew', 'S&D', and 'ECR' show a diverse interest across topics, indicating engagement with a broad range of issues.
- It's important to note that the volume of contributions doesn't necessarily reflect the influence or importance of each topic within the final AI Act; it only indicates the number of texts submitted by each entity on each topic. The decision-making impact of these contributions would depend on the legislative process and negotiations that follow.

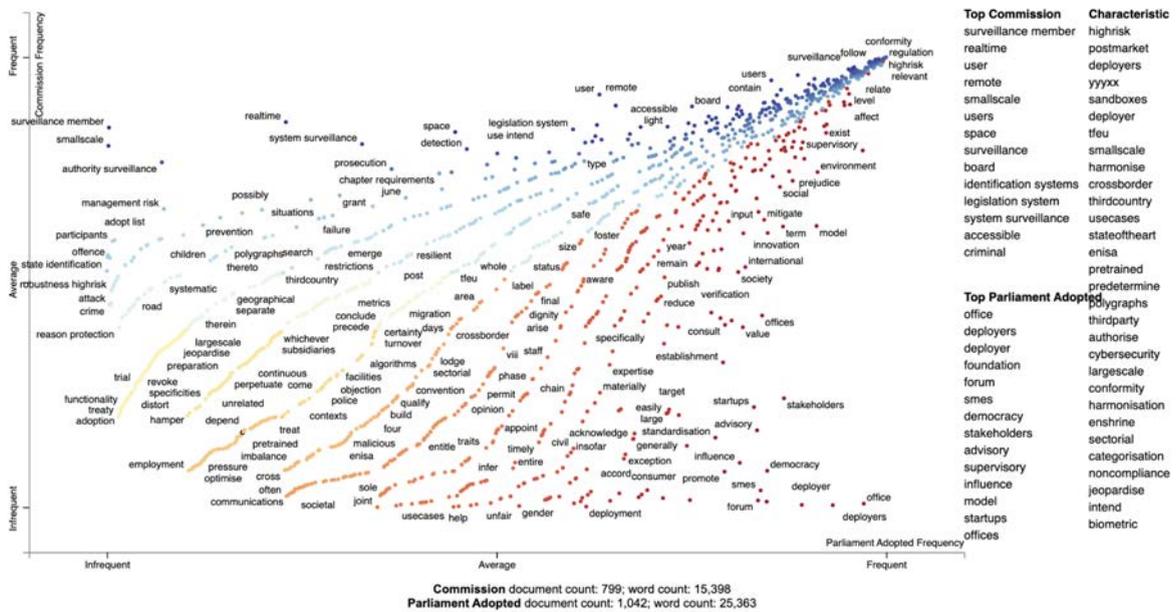
4. Textual Analysis



Using the Cortext Manager tools, we performed textual analysis on the AI regulation corpus. Initially, we extracted the most frequently used terms to create a word network and observed which actors share the most common words. On this network, we can observe that the text versions of the Commission and the Council are closely related, while the one adopted by the Parliament seems to predominantly share a common vocabulary with the Renew Europe Group vocabulary, and to a lesser extent with the Group of the Greens/European Free Alliance.

Furthermore, the network reveals a certain proximity between the Group of the Progressive Alliance of Socialists and Democrats in the European Parliament and the Committee on the Internal Market and Consumer Protection. We can see the same between the European People Party (Christian Democrats) and the Legal Affairs Committee, as well as between the European Conservatives and Reformists Group and Identity and Democracy Group.

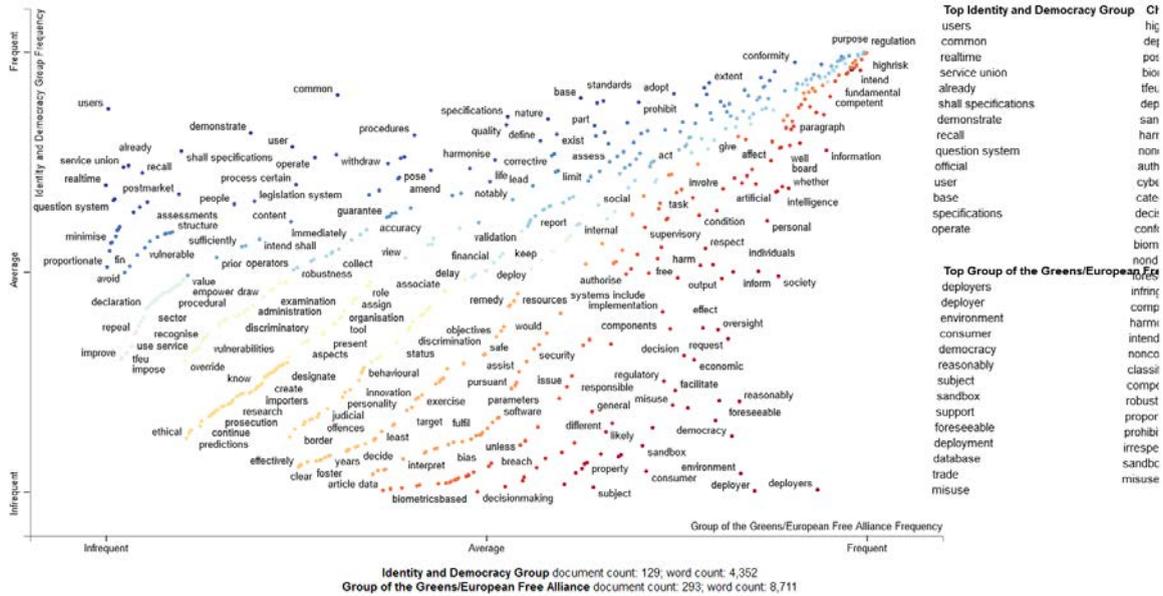
Once this was done, we decided to delve more into the differences between the text version proposed by the Commission and the one adopted by the Parliament. With Cortext Manager, we conducted a contrast analysis, shifting our focus from previously identified expressions to individual words.



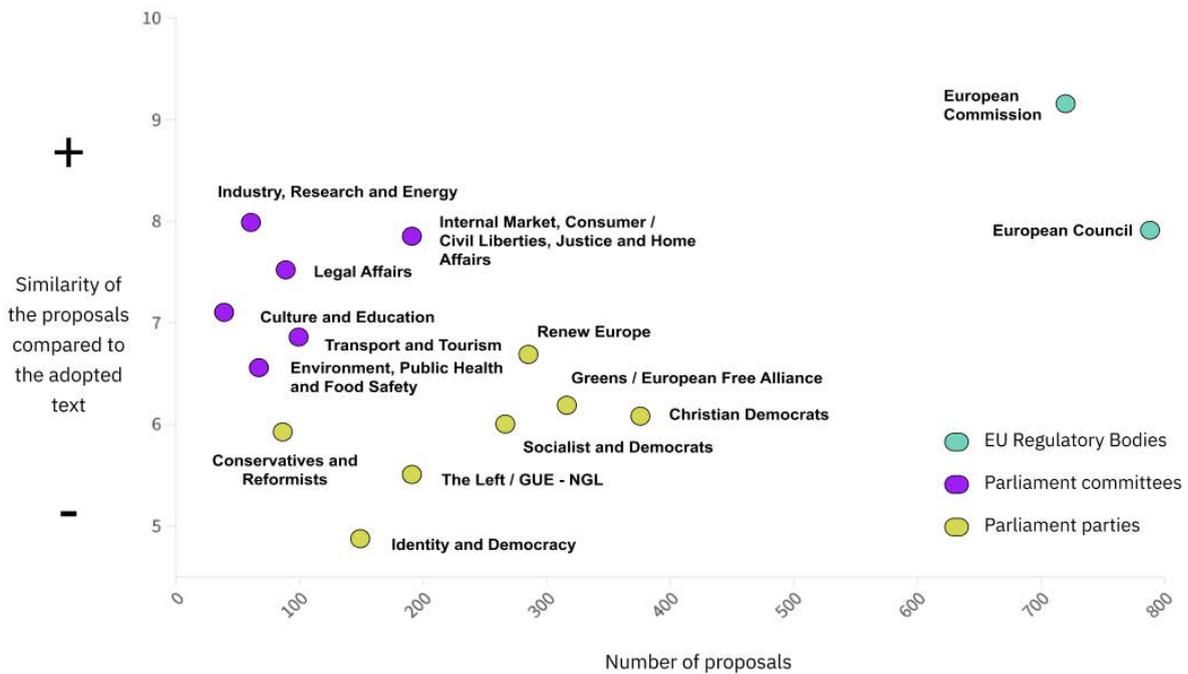
The resulting chart illustrates the frequency of keywords used by the Parliament on the vertical axis and the Commission on the horizontal axis. This allows us to discern the contrasts in word usage between the Parliament and the Commission. We observe a significant number of common words between the two institutions, as well as numerous extremes, providing insight into how different discourses are constructed.

For instance, in the European Parliament's discourse, key words appear to emphasize the importance of institutional structure ("offices," "foundation," "forum") and various actors ("stakeholders," "democracy," "startups," "SMEs") in the governance of AI. On the European Commission's side, keywords highlight controversies surrounding the use of AI ("system surveillance," "risk management"), with a focus on "user" safety.

This same technique could be applied to compare words used by different political groups or committees in the exact same way, enabling us to highlight specific word choices or main themes conveyed by each actor. For example, here, you have a contrast analysis between "Identity and Democracy Group" and "Group of the Greens/European Free Alliance".



5. Similarity Scores of the recital proposals in relation to the adopted text



The European Commission and European Council stand out in the scatter plot, taking positions in the upper right, reflecting their role in submitting a large volume of proposals, approximately 700 to 800, which also showcase a high similarity to the adopted text with scores close to 10, indicating a considerable influence over the final legislative outcomes. In contrast, the Parliament Committees, although submitting fewer proposals, less than 100 in number, achieve high similarity scores above 8, implying an effective proposal drafting that aligns closely with the adopted text,

potentially owing to specialized expertise or a strategic focus on pivotal legislative issues.

Political parties show a diverse range of influences, with their proposals variably spread across the mid-range of the plot, suggesting a moderate number of proposals, between 100 and 300, and similarity scores from 5 to 7, indicating different degrees of alignment with the final text. It's particularly interesting to observe the political extremes, including "The Left / GUE - NGL" and "Identity and Democracy," which, despite a moderate proposal count, find themselves with the lowest similarity scores near 5, possibly signifying a misalignment with the legislative consensus or a tendency towards more radical proposals that are less likely to be reflected in the final text.

Other political groups such as "Renew Europe," "Greens / European Free Alliance," "Socialist and Democrats," and "Christian Democrats" appear to hold a moderate influence, with a fair number of proposals and similarity scores that are neither low nor high. Surprisingly, the Parliament Committees' high effectiveness comes despite their fewer proposals, challenging the notion that greater input equals more influence, while the limited impact of the political extremes might seem unexpected given their often strong public presence.

In conclusion, the plot illustrates that the European Commission and Council are the most influential in shaping proposals that mirror the adopted text, while specialized committees demonstrate a focused and efficacious approach in their contributions. Political parties exhibit a spectrum of influence, with centrists and moderates apparently aligning more with the adopted text than those on the political fringes.

Overall, the plot provides valuable insights into the dynamics of legislative influence within the context of AI regulation in Europe. It highlights the crucial roles played by key institutions and committees, as well as the varying degrees of influence exerted by different political factions.

6. Discussion

Our research highlights the evolving nature of the legislation, showing the increase in law size through democratic processes.

- The analysis reveals the European People's Party's significant contribution to amendments, demonstrating the centrality of political groups in debates. A detailed examination of contributions by different actors to various AI Act topics indicates priority areas such as AI systems in financial and medical sectors, and international regulation. The contrast in volume and focus of contributions across entities suggests differing priorities and strategies in influencing the legislation.
- The findings conclude that while the European Commission and Council are influential in shaping proposals, specialized committees exhibit effective drafting, aligning closely with the final text. This analysis provides insight into the legislative process, emphasizing the importance of political dynamics and specialized knowledge in shaping AI regulation.

However, the research does not explicitly mention a critical perspective directly aimed at the research findings themselves.

- We highlight that despite the global emphasis on data protection, privacy, and AI system transparency, these topics did not dominate the contributions to the AI Act. This could be a point of critique, questioning whether the legislative focus adequately addresses public and expert concerns about AI ethics and accountability.
- Plus, the analysis reveals the significant influence of the European Commission and Council in shaping proposals, with specialized committees also demonstrating focused and efficacious contributions. Critics might argue about the balance of power and influence among different EU bodies and question whether the legislative process allows for a sufficiently broad range of perspectives, especially from minority groups or external stakeholders.
- Then, the findings note that the volume of contributions does not necessarily reflect the influence or importance of each topic within the final AI Act. This raises questions about the legislative process's transparency and the mechanisms through which certain contributions gain precedence over others.

- Finally, the diverse range of influences from political groups, especially those at the political extremes with lower similarity scores, could be a point of criticism. It may reflect a legislative environment where consensus is challenging to achieve or where radical proposals are sidelined, potentially limiting the scope of debate and the inclusivity of the legislative process.

Our research highlights the evolving nature of legislation, showing the increase in law size through democratic processes. It analyzes the evolution of AI legislation in Europe, emphasizing political contribution and shortcomings in addressed topics, such as data protection and ethics. It raises concerns about the transparency and inclusivity of the legislative process, particularly regarding the balance of power among EU institutions and the influence of diverse political groups.

7. Conclusion

The development and refinement of the AI Act within the European Union is a testament to the dynamic and collaborative nature of its legislative process. The involvement of various political groups and specialized committees, as evidenced by the numerous amendments, highlights the commitment to a democratic and inclusive approach in shaping crucial legislation.

The AI Act's development exemplifies the EU's effort to balance technological innovation with ethical standards, aiming for AI advancements to align with societal values. This study employs a mixed-methods approach, merging statistical analysis with qualitative interpretation, to navigate the complexities of legislative texts. This methodology reveals political nuances and legislative shifts, highlighting the significance of integrating quantitative data with in-depth analysis. Our investigation into the AI Act's legislative journey within the EU reveals key insights into the interplay between political forces, institutional roles, and the thematic priorities shaping AI regulation.

Firstly, the analysis delineates the significant role of the European Commission and the Council in steering the content and orientation of the AI Act. Their proposals, characterized by a market-oriented and innovation-driven approach, have shown a high degree of alignment with the final adopted text. This alignment underscores their pivotal position in shaping the regulatory framework, reflecting a broader ambition to maintain the EU's competitive edge on the global stage while ensuring a balanced approach to risk management and innovation promotion.

Secondly, the Parliament's amendments, as anticipated, veered towards enhancing protections for citizens, emphasizing risk prevention, transparency, and ethical considerations. This shift illustrates the Parliament's commitment to safeguarding individual rights and societal values in the face of technological advancements. The diverse contributions from various political groups and specialized committees, despite their varying degrees of influence, highlight the democratic vibrancy and complexity of the EU's legislative process. The substantial number of amendments proposed—3,312 in total—demonstrates an engaged and responsive legislative body that seeks to refine and adapt the regulatory framework to address emerging challenges and stakeholder concerns effectively.

The findings highlight the varied influence of political entities in the European Parliament on the AI Act, with the European People's Party playing a significant role due to its size, alongside impactful contributions from smaller groups and specialized committees. These contributions, driven by expertise and strategic focus, significantly shaped the final legislation, underscoring the value of diverse insights in legislative drafting. The research also points to evolving priorities in AI regulation, emphasizing critical sectors and the need for a harmonized approach to manage innovation's risks and benefits. Moreover, the study notes a mismatch between the volume of contributions and their impact on the legislation, prompting questions about the decision-making processes and the need for a more transparent, inclusive legislative procedure. Finally, it calls for ongoing attention to the AI Act's adaptability in response to rapid technological changes, highlighting the EU's effort to balance innovation with ethical considerations and fundamental rights in its regulatory approach.

In conclusion, our investigation into the legislative evolution of the AI Act within the European Union reveals a multifaceted narrative of political engagement, institutional influence, and thematic prioritization. It reflects the EU's concerted effort to navigate the complexities of AI regulation, balancing the imperatives of innovation and competition with the need for ethical oversight and citizen protection. As the AI Act moves towards implementation, the insights gleaned from this analysis will be invaluable in guiding future regulatory endeavors and ensuring that the EU remains at the forefront of ethical, effective, and inclusive governance in the age of artificial intelligence.

The EIFFEL framework's analysis of the EU's AI Act showcases the complex legislative process, emphasizing democratic engagement and ethical considerations in technology policy. This approach marks a leap in legal analytics, enhancing transparency and setting a precedent for nuanced AI regulation discussions. It suggests further

exploration into AI governance through additional research, including policy analyses and academic studies, to understand the practical and ethical dimensions of AI fully. This comprehensive view is crucial for informed policymaking and effective stakeholder participation in the evolving landscape of AI technology.

8. References

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