

Artificial Intelligence in Healthcare: an Overview of European Online News

2024



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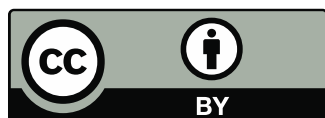
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Table of contents

Key Findings	1
Introduction	2
1. Overview of reporting on artificial intelligence in healthcare	3
2. Online mainstream news about “digital ageism in healthcare”	9
Appendix	10
Annex I – Methodology.....	12
Annex II - About the authors.....	14

Key Findings

The purpose of this document is to illustrate, using text mining techniques, the main topics related to artificial intelligence (AI) and healthcare, with additional information on digital ageism. We intend to provide an overview of the most important news titles and reporting trends related to this topic. The sources of our analysis include a selected source of online mainstream media outlets in the 27 Member States.

This report summarises the findings of the analysis on data collected from 1 January 2023 till 6 March 2024.

Key findings:

- Compared to the topic “AI & science” explored in a previous edition of this report series, “AI in healthcare” appears less frequently in European online media.
- There is an overall lack of leading news about “AI in healthcare”, as the topic is not politicised: news come mainly from the private sector. Innovation conducted in private firms or research centres (from diagnosis to drug development) are often mentioned.
- Hence, the AI revolution and innovation is in the focus of news items and its vitalising impact on the tech and healthcare sector. In this context, news have a rather positive tone. Nevertheless, risks and concerns are also commonly raised.
- “Digital ageism” in healthcare is recognised by scientists and the WHO, but it is almost completely missing from mainstream media reporting, which suggests that this concept is unknown to most citizens.

Introduction

Following two other reports on Artificial Intelligence in this series of joint publication of the European Science-Media Hub (ESMH) and the JRC Text Mining and Analysis Competence Centre (TMA-CC), in this report we focus on the use of artificial intelligence in healthcare, with additional information on the question of age bias in healthcare applications, i.e. digital ageism.

Artificial intelligence made revolutionary advancement in the field of science and technology, and the need for regulating AI received great attention in Europe. The European AI Act, a landmark law, was recently adopted by the European Parliament (13 March 2024) after a provisional agreement reached by the Parliament and Council in December 2023.¹ The act establishes obligations for high risk AI systems, including those that could have an adverse impact to health. Among the obligations of the AI Act, the reliability and accuracy of systems supporting human decisions and diagnostics is highlighted.² It is envisaged that high-risk AI systems should be adopted via delegated acts and that the rapid pace of technological development, as well as the potential changes in the use of AI systems should be considered as well. Furthermore, the act outlines the importance of the protection of the fundamental rights which also include non-discrimination and gender equality.

The analysis was performed on European mainstream online articles published between 1 January 2023 and 6 March 2024, covering the period leading up to the agreement reached among EU legislators. To identify the most relevant topics, we applied an automated topic-clustering algorithm that unveils the main events and narratives appearing in media. Data was collected by Europe Media Monitor (EMM) on a selection the most important EU27 online media sources, including 581 media outlets from all Member States.³

For a more specific description of the methodology and applied technology, please refer to the Annexes.

¹ <https://www.europarl.europa.eu/news/en/press-room/20231206IPR15699/artificial-intelligence-act-deal-on-comprehensive-rules-for-trustworthy-ai>

² https://www.europarl.europa.eu/doceo/document/TA-9-2024-03-13-TOC_EN.html

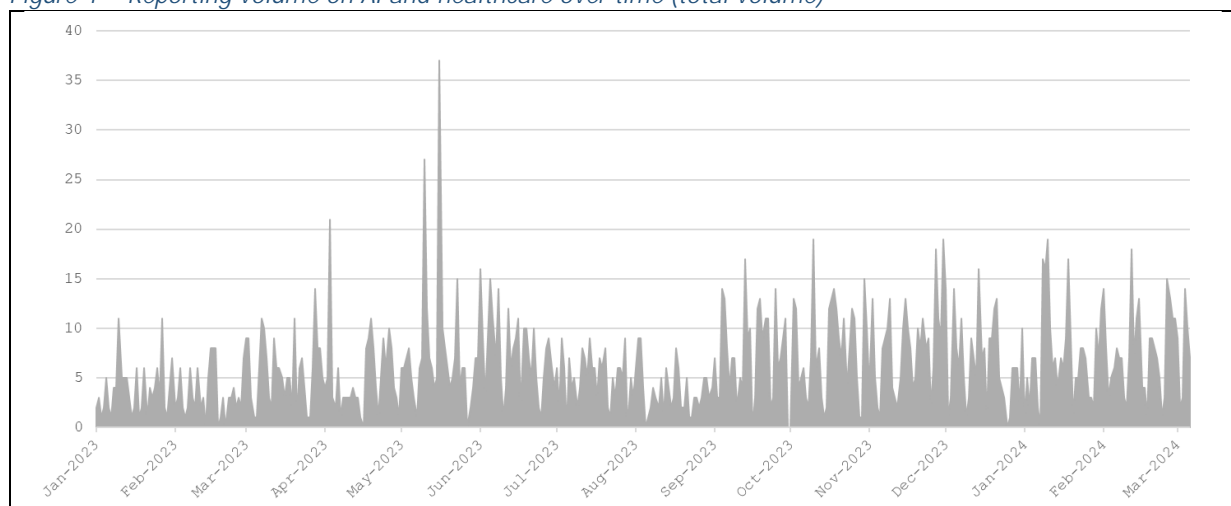
³ The number of sources was weighted based on the countries' population.

1. Overview of reporting on artificial intelligence in healthcare

In this chapter, we provide an overview of media reporting about AI in the context of healthcare.

First, we display the evolution of the reporting volume in [Figure 1](#). The full dataset contains more than 2 600 articles which discuss AI and healthcare from different perspectives. It presents the total number of articles published per day containing the keywords “*artificial intelligence*” (in the title or article’s text) and “*health*” or “*healthcare*” (in the title or in the first sentences of the article).⁴ **Box 1** The figure shows daily reporting peaks not exceeding 40 articles per day, suggesting that reporting about the topic in mainstream media is relatively low (the main news will be explained later in this chapter). This topic accounts for 5.5 articles of a million of mainstream articles published in the same period (i.e. 0.00055%). For comparison, “AI and science” were mentioned in 656,592 news items of a million of mainstream articles from 1 January 2023 till 10 February 2024 (i.e. 0.066%)⁵ while Climate Change News account for 1.2% from 15 October 2022 till 30 November 2023.⁶

Figure 1 – Reporting volume on AI and healthcare over time (total volume)



Source: EMM “EE24campaign” index. Period: 2023-01-01 to 2024-03-06. Daily aggregated data.

Second, to explore the main topics covered by the media, we applied an automated clustering algorithm on the titles of the articles. The main topics are displayed as keywords on [Figure 2](#). The keyword list unveils a large share of the articles included in our dataset focus on AI revolution and innovation medicine, which appears a cross-cutting issue in several news groups.⁷

The five biggest clusters represent 66.8% of all articles and they focus on different aspects of the transformation of medicine and healthcare along the AI evolution. To have a quick overview of the content included in the top 5 groups, we applied artificial intelligence to generate an automated summary of the items. Additionally, we applied algorithms to unveil the predominant sentiment, the most recurrent persons, framings and source countries for each cluster (see

⁴ See [Box 1 – Query on AI & healthcare](#) in Appendix.

⁵ See Zsuzsanna Pásztor, Theresa Reitis-Münstermann, Generative Artificial Intelligence for Science Communication: an Overview of European Online News, European Commission/European Parliament, 2024, JRC138266.

⁶ See Theresa Reitis-Münstermann, Zsuzsanna Pásztor, Monitoring Climate Change and COP28 in European Online News Media, European Commission/European Parliament, 2024, JRC137382.

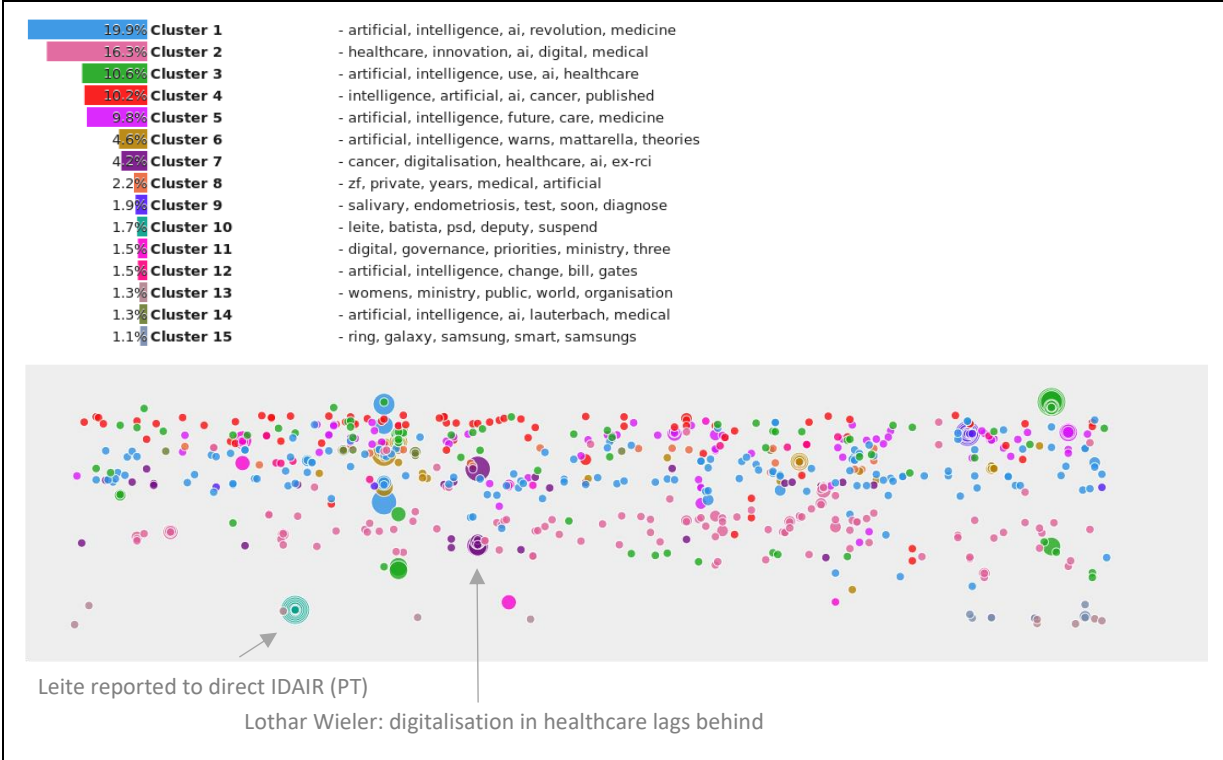
⁷ Other models of GenAI seem to be less represented in media, such as Gemini, DialoGPT, BlenderBot or Grok.

Figure 3 for the output, see Annex II for the methodology). Based on this information, we detected both similarities and differences between these clusters and in comparison to other aspects of AI news.

Top 5 topic clusters

Figure 2 shows that most items in the clusters are spread along the timeline, suggesting a lack of strong, leading news items (that would be shown on the graph by numerous bubbles very close to each other, or bubbles forming concentric circles suggesting news items taken from other sources with an almost identical title). An example for this would be news about Ricardo Baptista Leite (ex-member of the Portuguese Parliament) who suspended his activity as deputy to direct IDAIR, an international organisation that promotes research in Artificial Intelligence and digitalisation for health (cluster 10), or Lothar Wieler, ex-president of the Robert Koch Institute (RKI), expressing his view that digitalisation in healthcare is lagging behind (cluster 7). This lack of significant leading news in the biggest clusters may signal that the issue is not picked up by main political forces.

Figure 2 – Main clusters of “AI and healthcare” articles (Clustered: 1,305, Total: 2,662).



Source: EMM “EE24campaign” index. Period: 2023-01-01 to 2024-03-06.

Note: The chart is populated based on a horizontal timeline. The colours of the bubbles represent the cluster. The size of the cluster has no meaning, it is purely a graphical solution. Vertical distance from other items represents semantic similarity. Clustering was performed on headlines. Headlines not similar to any of the groups are not considered in the distribution across topics. “Similarity, includes also the similar length of titles and mentions of names.

Cluster 1 stands out with its high score on positivity, as it contains several articles dealing with the potential benefits of the AI revolution in healthcare. For examples, titles suggesting that AI “heals”, “will boost health”, “alleviates pressure on healthcare”, gives “support to the diagnosis of diseases”, “helps to monitor mental health”, “protects health” and “is revolutionising the future of global healthcare”, add on the positive angle.

Cluster 2 is the second most positive cluster, as it incorporates news from the health & tech industry and the main private companies of this sector, which witnesses a surge of AI innovation. In addition to innovation, it outlines the positive economic impact of AI on the healthcare sector, also in terms of savings. Titles of articles in this group frequently contain references to specific companies, e.g. “*Healtech: health and technology for a better quality of life*”, “*Google medical chatbot passes medical exam*”, “*digital healthcare is the buzzword for 2024*”, etc.

Cluster 3 draws attention on health organisations including WHO, warning of potential risks and biased information caused by AI use. The share of negative articles in this cluster is the highest.

Cluster 4 focusses on the specific fields of applications of AI in the medical and pharmaceutical industry regarding diagnosis, treatment and research. Similar to cluster 2, private companies collaborating with research centres on different innovations are often mentioned, and attention is also paid to the growing medical equipment market and the pharmaceutical industry.

Cluster 5 does not seem to differ significantly from the previously described groups, but the angle of the articles taken here appears to look more into future developments, e.g. “*medicine of the future*”, “*quantum, the key to the future*”.

Regarding the potential fields of applications, on the first place, cancer appears on the key word list (also in cluster 7), as it is argued that AI can help to contribute to prevention by making more accurate diagnosis of rare diseases and cancer. Furthermore, glaucoma screening, improved medical imaging, digital physiotherapy, improved patient care, dermatological diagnoses, orthodontics, salivary tests for endometriosis, AI-led development of new drugs and antibiotics, the prediction of anxiety disorders, monitoring patients with chronic obstructive pulmonary disease, streamlining prescription processes, and enhancing the effectiveness of in vitro fertilisations or even brain surgery emerged, just to mention a few.

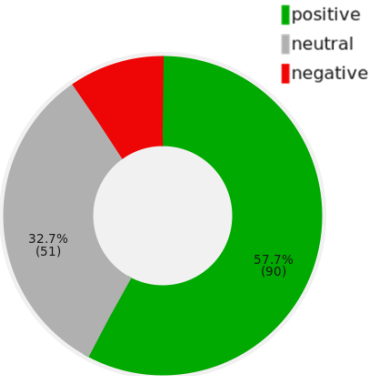

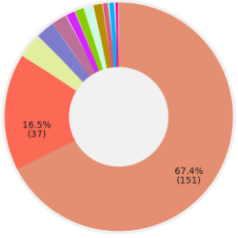
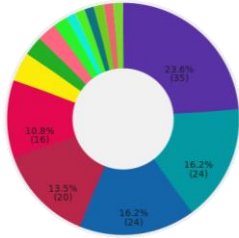
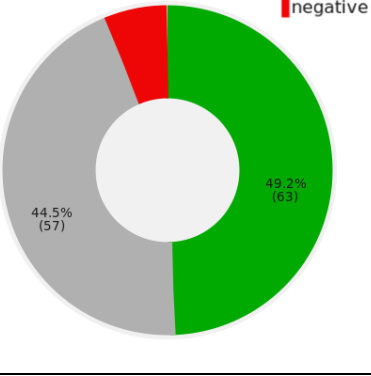
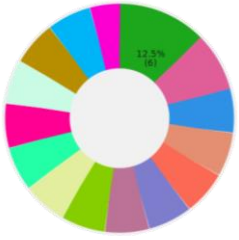
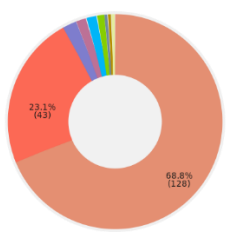
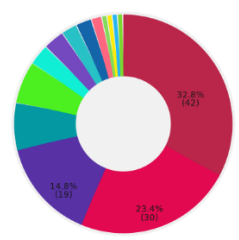
Nonetheless, concerns have been raised about data privacy, the potential for health inequalities, and the need for robust ethical frameworks to guide the development and deployment of AI in healthcare.

Framing of AI news

Compared to the analysis conducted in a recent report on *AI in the context of science and journalism*⁸, the topic of “*healthcare and AI*” explored in the present report score high on safety. In contrast, we found high scores on the policy and political framing aspects for AI news focussed on science and journalism (as tech giants, scientists and political actors outlined great attention on the need of regulatory measures were outlined). It is also in line with the recently approved European AI Act, which highlights the health sector for potential high-risk AI applications (see Introduction). The safety angle is however accompanied with a relatively high score of positive news which suggest a more positive than negative overall issue framing. Regarding the content, the summaries produced by AI unveil that risk and benefits are discussed along each top 5 clusters.

⁸ See Figure 5 in the following report: Zsuzsanna Pásztor, Theresa Reitis-Münstermann, *Monitoring Generative Artificial Intelligence and Science in European Online News Media*, European Commission/European Parliament, 2024, JRC138266.

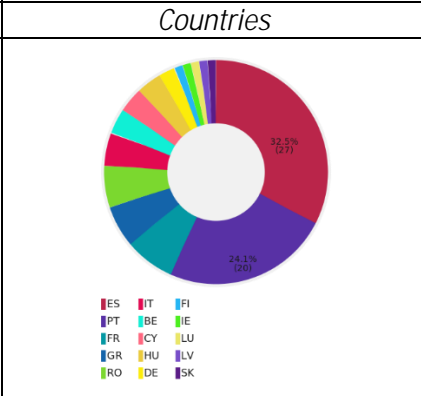
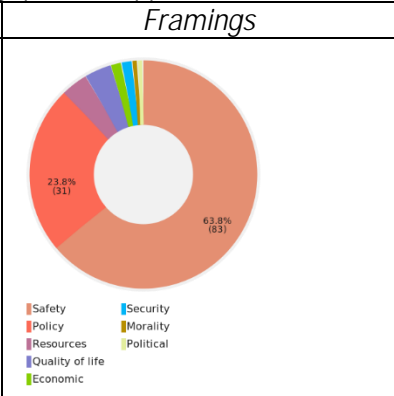
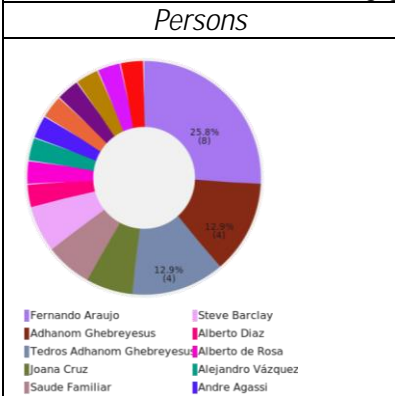
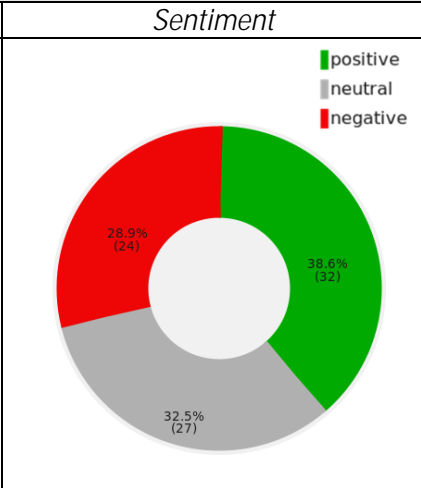
Figure 3 – Top 5 clusters including an automated summary, sentiment data, the most recurrent persons, framings and source countries

Revolution or Risk? (Cluster 1)		
<p><i>Summary</i></p> <p>Artificial intelligence is revolutionising healthcare, with applications ranging from cancer diagnosis to mental health monitoring. AI is being used to develop new antibiotics, improve medical imaging, and support personalised treatment plans. The technology is also being harnessed to enhance disease prevention and public health initiatives. However, concerns have been raised about data privacy, the potential for health inequalities, and the need for robust ethical frameworks to guide the development and deployment of AI in healthcare.</p>		<p><i>Sentiment</i></p>  <p>positive neutral negative</p>
<p><i>Persons</i></p>  <ul style="list-style-type: none"> Adena Friedman Brian Comiskey Luis Paulo Paulo Reis Pedro Pinto Joaquim Brigas Liliana Ferreira Paula Brito Tiago Marques Amparo Navarro 	<p><i>Framings</i></p>  <ul style="list-style-type: none"> Safety Policy Political Quality of life Resources Crime Economic Legality Morality Public opinion Security Fairness 	<p><i>Countries</i></p>  <ul style="list-style-type: none"> PT DE IE FR AT LT GR CY MT ES SI PL IT BE RO
Innovations and Savings Ahead (Cluster 2)		
<p><i>Summary</i></p> <p>The healthcare industry is witnessing a surge in AI-driven innovations, with companies like Huawei, Fujifilm, and Microsoft collaborating to leverage AI in healthcare ecosystems. AI is being used in various applications, including cancer diagnosis, glaucoma screening, and digital physiotherapy. Healthcare providers are also adopting AI technologies to improve patient care and outcomes. Additionally, there is a growing focus on digital health and biomedical innovation, with universities and research centres offering degrees in these fields. The use of AI in healthcare is expected to save billions of dollars and improve the overall quality of care.</p>		<p><i>Sentiment</i></p>  <p>positive neutral negative</p>
<p><i>Persons</i></p>  <ul style="list-style-type: none"> Saúde Digital Elisa Tarazona Alberto Granados Clifford Harris Costa Pereira Generalitat Valenciana Giovanni Sabatini Health Hub Joan Ribo 	<p><i>Framings</i></p>  <ul style="list-style-type: none"> Safety Policy Quality of life Resources Security Economic External regulation Morality Political 	<p><i>Countries</i></p>  <ul style="list-style-type: none"> ES BE CZ IT SE DE PT BG FI FR GR RO IE CY

Caution, Risks, and Potential Benefits (Cluster 3)

Summary

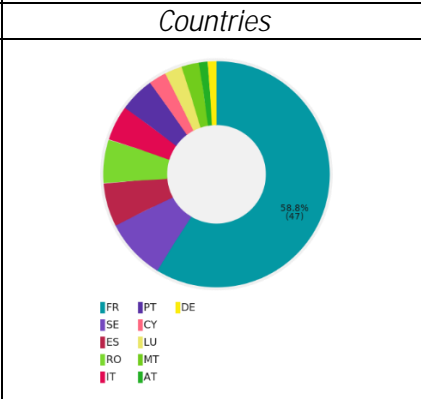
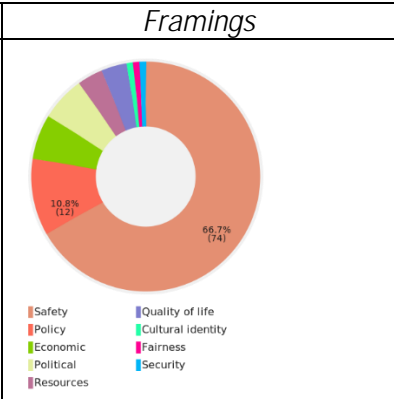
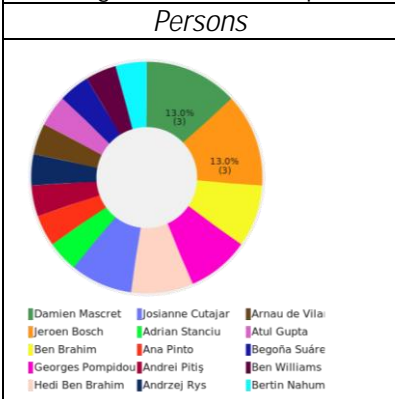
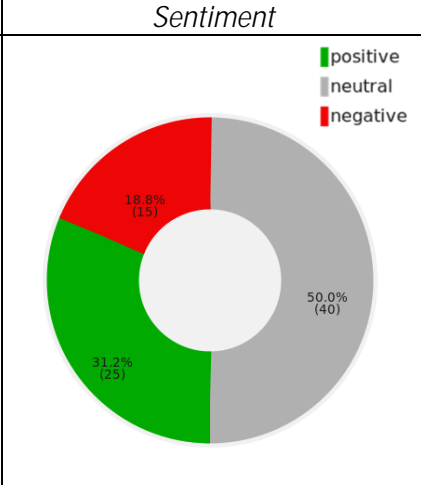
The World Health Organization and other health organisations are calling for caution in the use of artificial intelligence in healthcare. They warn of potential risks and biased information caused by AI use. Despite these concerns, many health services are implementing AI for faster and more accurate diagnoses, such as dermatological diagnoses. AI is also being used in various ways to improve healthcare, including monitoring exercise in patients with chronic obstructive pulmonary disease, streamlining prescription processes, and enhancing the effectiveness of in vitro fertilisations. However, there are also calls for responsible use of AI in health and addressing gaps in AI applications.



Revolutionising Diagnosis, Treatment, and Research (Cluster 4)

Summary

The latest advancements in healthcare technology are revolutionising the medical field, with artificial intelligence (AI) playing a significant role in diagnosis, treatment, and research. From salivary tests for endometriosis to AI-driven cancer diagnostic devices, the potential for AI to improve patient outcomes is immense. Additionally, AI is being used to develop new drugs, predict the onset of anxiety disorders, and even enhance critical care data sets. The medical equipment market is growing, and the pharmaceutical industry is recruiting for nearly 10 000 positions. As AI continues to evolve, it is expected to have a profound impact on healthcare, transforming the way we diagnose, treat, and prevent diseases.

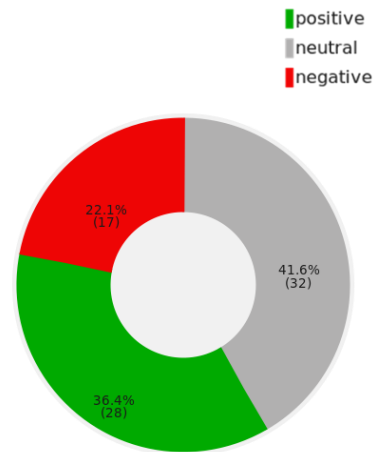


A Revolution of Medical Care (Cluster 5)

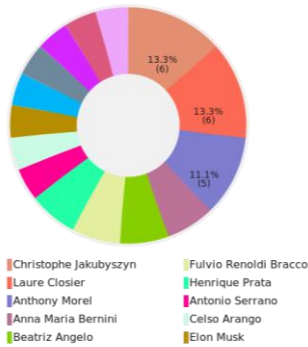
Summary

The healthcare industry is rapidly adopting artificial intelligence (AI) to improve diagnostics, treatment, and patient care. AI is being used in various applications such as cancer prediction, personalised care, and even brain surgery. Startups and researchers are leveraging AI to revolutionise healthcare, from mental health to orthodontics. However, concerns about data privacy and the need for more ethical and safe AI in healthcare applications are also emerging.

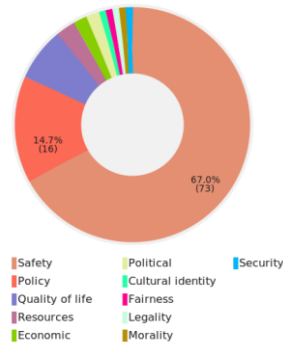
Sentiment



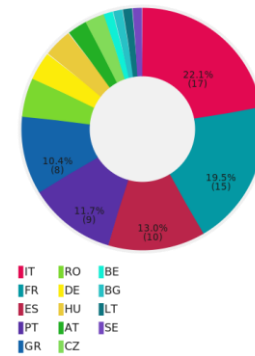
Persons



Framings



Countries



Source: EMM "EE24campaign" index. Period: 2023-01-01 to 2024-03-06. Clustered data.

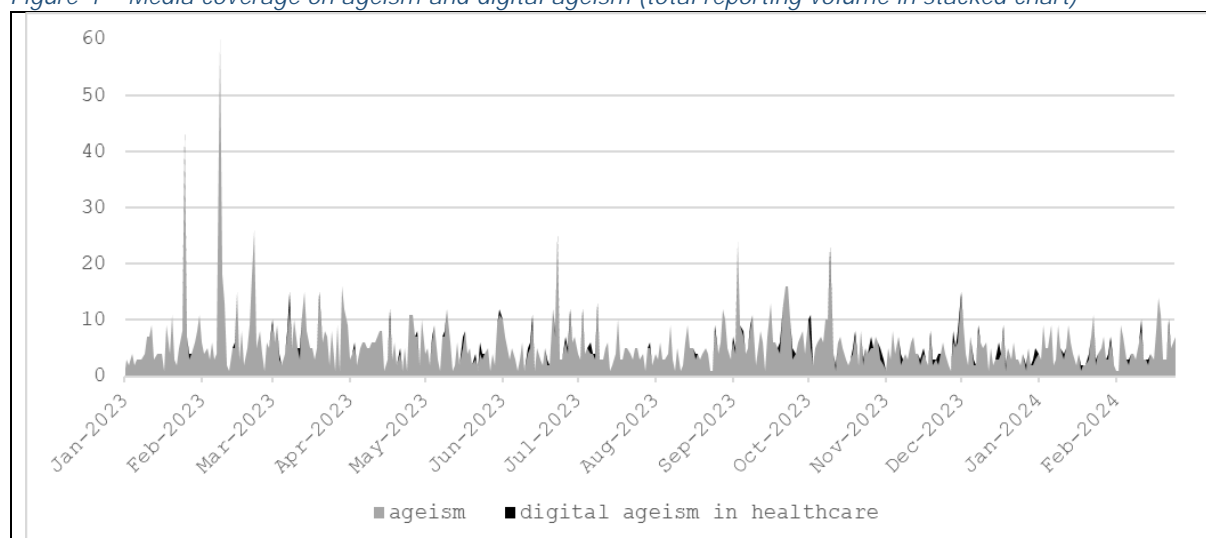
2. Online mainstream news about “digital ageism in healthcare”

In this chapter, we provide an overview of media reporting about age bias in healthcare applications, i.e. digital ageism.

The use of AI devices in healthcare is growing rapidly, and its potential is immense, although as scientists point out, these devices are not exempt from bias which introduces not only safety issues, but also ethical and legal concerns. In other words, AI applications can exacerbate discrimination on the basis of age and gender.⁹

The bias incorporated in AI is a well-known issue for scientists who develop the algorithms, and also the WHO issued a policy brief on “Ageism in Artificial Intelligence for Health”. Nonetheless, the coverage of “digital ageism in healthcare”¹⁰ (an aspect recognised within the regulatory framework of the EU Medical Device Regulation¹¹ and the new AI Act) receives very low in European mainstream online media (see Figure 4 in black). It reaches its maximum daily reporting peak with six articles (6 October 2023). These results suggest that “digital ageism” is an unknown concept for most EU citizens. It is noteworthy that direct mentions of “ageism” in general are not frequent in European online mainstream media (see Figure 4 in grey).¹²

Figure 4 – Media coverage on ageism and digital ageism (total reporting volume in stacked chart)



Source: EMM “EE24campaign” index. Period: 2023-01-01 to 2024-03-06. Daily aggregated data.

⁹ See e.g. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10709664/> ; <https://www.nature.com/articles/s41599-023-01999-y>

¹⁰ See Box 3 – Query on AI & healthcare & ageism in Appendix.

¹¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R0745>

¹² See Box 2 – Query on ageism in Appendix. For more details, please refer to Kajander, N., et al., Shifting perspectives: addressing ageism in media narratives, European Commission, 2024, JRC138090.

Appendix

Box 1 – Query on AI & healthcare

+ (title: ("artificial intelligence" OR "искуствен интелект" OR "umělá inteligence" OR "kunstig intelligens" OR "künstliche Intelligenz" OR "τεχνητή νοημοσύνη" OR "inteligencia artificial" OR "tehisintellekt" OR "tekoäly" OR "intelligence artificielle" OR "intleacht shaorga" OR "umjetna inteligencija" OR "mesterséges intelligencia" OR "intelligenza artificiale" OR "dirbtinis intelektas" OR "mākslīgais intelekts" OR "intelligenza artifizjali" OR "kunstmatige intelligentie" OR "sztuczna inteligencja" OR "inteligência artificial" OR "intelligența artificială" OR "umelá inteligencia" OR "umetna inteligenca" OR "artificiell intelligens"))

text: ("artificial intelligence" OR "искуствен интелект" OR "umělá inteligence" OR "kunstig intelligens" OR "künstliche Intelligenz" OR "τεχνητή νοημοσύνη" OR "inteligencia artificial" OR "tehisintellekt" OR "tekoäly" OR "intelligence artificielle" OR "intleacht shaorga" OR "umjetna inteligencija" OR "mesterséges intelligencia" OR "intelligenza artificiale" OR "dirbtinis intelektas" OR "mākslīgais intelekts" OR "intelligenza artifizjali" OR "kunstmatige intelligentie" OR "sztuczna inteligencja" OR "inteligência artificial" OR "intelligența artificială" OR "umelá inteligencia" OR "umetna inteligenca" OR "artificiell intelligens"))

+ (title: ("health" OR "healthcare" OR "zdraví" OR "zdravotní péče" OR "sundhed" OR "sundhedspleje" OR "υγεία" OR "υγειονομική περίθαλψη" OR "terveys" OR "terveydenhuolto" OR "santé" OR "soins de santé" OR "zdravlje" OR "zdravstvo" OR "egészség" OR "egészségügy" OR "salute" OR "assistenza sanitaria" OR "sveikata" OR "sveikatos priežiūra" OR "is-saħħa" OR "kura tas-saħħa" OR "gezondheid" OR "gezondheidszorg" OR "zdrowie" OR "opieka zdrowotna" OR "saúde" OR "cuidados de saúde" OR "sănătate" OR "asistență medicală" OR "zdravie" OR "zdravotná starostlivosť" OR "zdravje" OR "hälsa" OR "sjukvård" OR "Gesundheit" OR "Gesundheitswesen" OR "Gesundheitssystem" OR "salud" OR "asistencia sanitaria" OR "sláinte" OR "cúram sláinte" OR "veselība" OR "veselības aprūpe" OR "здравеопазване" OR "tervis" OR "tervishoid"))

description: ("health" OR "healthcare" OR "zdraví" OR "zdravotní péče" OR "sundhed" OR "sundhedspleje" OR "υγεία" OR "υγειονομική περίθαλψη" OR "terveys" OR "terveydenhuolto" OR "santé" OR "soins de santé" OR "zdravlje" OR "zdravstvo" OR "egészség" OR "egészségügy" OR "salute" OR "assistenza sanitaria" OR "sveikata" OR "sveikatos priežiūra" OR "is-saħħa" OR "kura tas-saħħa" OR "gezondheid" OR "gezondheidszorg" OR "zdrowie" OR "opieka zdrowotna" OR "saúde" OR "cuidados de saúde" OR "sănătate" OR "asistență medicală" OR "zdravie" OR "zdravotná starostlivosť" OR "zdravje" OR "hälsa" OR "sjukvård" OR "Gesundheit" OR "Gesundheitswesen" OR "Gesundheitssystem" OR "salud" OR "asistencia sanitaria" OR "sláinte" OR "cúram sláinte" OR "veselība" OR "veselības aprūpe" OR "здравеопазване" OR "tervis" OR "tervishoid"))

Box 2 – Query on ageism

+ (title: ("ageism" OR "ageismi" OR "vyravimas" OR "възрастова дискриминация" OR "възрастовата дискриминация" OR "ейджизъм" OR "ageismus" OR "alderdom" OR "Ageismus" OR "el Ageism" OR "L'âgisme" OR "ageizam" OR "Altersdiskriminierung" OR "ageizmus" OR "ageismo" OR "l-etaizmu" OR "ageizm" OR "Ageism" OR "ageizem" OR "ηλικιωτισμός" OR "aoiseachas" OR "Ageisms" OR "vanus" OR "Ageisme" OR "age discrimination" OR "diskriminace na základě věku" OR "forskelsbehandling på grund af alder" OR "Altersdiskriminierung" OR "διακρίσεις λόγω ηλικίας" OR "discriminación por edad" OR "vanuseline diskrimineerimine" OR "ikäsyrjäntä" OR "discrimination fondée sur l'âge" OR "idirdhealú aoise" OR "diskriminacija na temelju dobi" OR "életkoron alapuló hátrányos megkülönböztetés" OR "discriminazione in base all'età" OR "diskriminacija dėl amžiaus" OR "diskriminācija vecuma dēļ" OR "diskriminazzjoni bbažata fuq l-età" OR "leeftijdsdiscriminatie" OR "dyskryminacja ze względu na wiek" OR "discriminação em razão da idade" OR "discriminarea pe motive de vârstă" OR "diskriminácia na základe veku" OR "diskriminacija na podlagi starosti" OR "äldersdiskriminering"))

text: ("ageism" OR "ageismi" OR "vyravimas" OR "възрастова дискриминация" OR "възрастовата дискриминация" OR "ейджизъм" OR "ageismus" OR "alderdom" OR "Ageismus" OR "el Ageism" OR "L'âgisme" OR "ageizam" OR "Altersdiskriminierung" OR "ageizmus" OR "ageismo" OR "l-etaizmu" OR "ageizm" OR "Ageism" OR "ageizem" OR "ηλικιωτισμός" OR "aoiseachas" OR "Ageisms" OR "vanus" OR "Ageisme" OR "age discrimination" OR "diskriminace na základě věku" OR "forskelsbehandling på grund af alder" OR "Altersdiskriminierung" OR "διακρίσεις λόγω ηλικίας" OR "discriminación por edad" OR "vanuseline diskrimineerimine" OR "ikäsyrjäntä" OR "discrimination fondée sur l'âge" OR "idirdhealú aoise" OR "diskriminacija na temelju dobi" OR "életkoron alapuló hátrányos megkülönböztetés" OR "discriminazione in base all'età" OR "diskriminacija dėl amžiaus" OR "diskriminācija vecuma dēļ" OR "diskriminazzjoni bbažata fuq l-età" OR "leeftijdsdiscriminatie" OR "dyskryminacja ze względu na wiek" OR "discriminação em razão da idade" OR "discriminarea pe motive de vârstă" OR "diskriminácia na základe veku" OR "diskriminacija na podlagi starosti" OR "äldersdiskriminering"))

Box 3 – Query on AI & healthcare & ageism

+ (title: ("artificial intelligence" OR "искуствен интелект" OR "umělá inteligence" OR "kunstig intelligens" OR "künstliche Intelligenz" OR "τεχνητή νοημοσύνη" OR "inteligencia artificial" OR "tehisintellekt" OR "tekoäly" OR "intelligence artificielle" OR "intleacht shaorga" OR "umjetna inteligencija" OR "mesterséges intelligencia" OR "intelligenza artificiale" OR "dirbtinis intelektas" OR "mākslīgais intelekts" OR "intelligenza artifičjali" OR "kunstmatige intelligentie" OR "sztuczna inteligencja" OR "inteligência artificial" OR "inteligența artificială" OR "umelá inteligencia" OR "umetna inteligenca" OR "artificiell intelligens"))

text: ("artificial intelligence" OR "искуствен интелект" OR "umělá inteligence" OR "kunstig intelligens" OR "künstliche Intelligenz" OR "τεχνητή νοημοσύνη" OR "inteligencia artificial" OR "tehisintellekt" OR "tekoäly" OR "intelligence artificielle" OR "intleacht shaorga" OR "umjetna inteligencija" OR "mesterséges intelligencia" OR "intelligenza artificiale" OR "dirbtinis intelektas" OR "mākslīgais intelekts" OR "intelligenza artifičjali" OR "kunstmatige intelligentie" OR "sztuczna inteligencja" OR "inteligência artificial" OR "inteligența artificială" OR "umelá inteligencia" OR "umetna inteligenca" OR "artificiell intelligens"))

+ (title: ("health" OR "healthcare" OR "zdraví" OR "zdravotní péče" OR "sundhed" OR "sundhedspleje" OR "υγεία" OR "υγειονομική περίθαλψη" OR "terveys" OR "terveydenhuolto" OR "santé" OR "soins de santé" OR "zdravlje" OR "zdravstvo" OR "egészség" OR "egészségügy" OR "salute" OR "assistenza sanitaria" OR "sveikata" OR "sveikatos priežiūra" OR "is-saħħa" OR "kura tas-saħħa" OR "gezondheid" OR "gezondheidszorg" OR "zdrowie" OR "opieka zdrowotna" OR "saúde" OR "cuidados de saúde" OR "sānātate" OR "asistență medicală" OR "zdravie" OR "zdravotná starostlivosť" OR "zdravje" OR "hälsa" OR "sjukvård" OR "Gesundheit" OR "Gesundheitswesen" OR "Gesundheitssystem" OR "salud" OR "asistencia sanitaria" OR "sláinte" OR "cúram sláinte" OR "veselība" OR "veselības aprūpe" OR "здравеопазване" OR "tervis" OR "tervishoid"))

description: ("health" OR "healthcare" OR "zdraví" OR "zdravotní péče" OR "sundhed" OR "sundhedspleje" OR "υγεία" OR "υγειονομική περίθαλψη" OR "terveys" OR "terveydenhuolto" OR "santé" OR "soins de santé" OR "zdravlje" OR "zdravstvo" OR "egészség" OR "egészségügy" OR "salute" OR "assistenza sanitaria" OR "sveikata" OR "sveikatos priežiūra" OR "is-saħħa" OR "kura tas-saħħa" OR "gezondheid" OR "gezondheidszorg" OR "zdrowie" OR "opieka zdrowotna" OR "saúde" OR "cuidados de saúde" OR "sānātate" OR "asistență medicală" OR "zdravie" OR "zdravotná starostlivosť" OR "zdravje" OR "hälsa" OR "sjukvård" OR "Gesundheit" OR "Gesundheitswesen" OR "Gesundheitssystem" OR "salud" OR "asistencia sanitaria" OR "sláinte" OR "cúram sláinte" OR "veselība" OR "veselības aprūpe" OR "здравеопазване" OR "tervis" OR "tervishoid"))

+ (title: ("bias" OR "discrimination" OR "προκατάληψη" OR "διακρίσεις" OR "syryjintä" OR "biais" OR "claontacht" OR "idirdhealú" OR "vooringenomenheid" OR "discriminatie" OR "uprzedenia" OR "dyskryminacja" OR "viés" OR "discriminação" OR "pristranskosti" OR "diskriminacija" OR "sesgo" OR "discriminación" OR "pristranost" OR "diskriminacija" OR "elfogultság" OR "diszkrimináció" OR "novirzes" OR "diskriminācija" OR "pārtinire" OR "discriminare" OR "zaujatost" OR "diskriminace" OR "forskelsbehandling" OR "kallutatus" OR "diskrimineerimine" OR "pregiudizi" OR "discriminazione" OR "Bias" OR "Diskriminierung" OR "partiskhet" OR "biais" OR "diskriminering" OR "пристрастност" OR "дискриминация" OR "šališkumas" OR "diskriminacija" OR "prejudizzju" OR "diskriminazzjoni" OR "ageism" OR "ageismi" OR "vyravimas" OR "възрастова дискриминация" OR "възрастовата дискриминация" OR "ейджизъм" OR "ageismus" OR "alderdom" OR "Ageismus" OR "el Ageism" OR "L'âgisme" OR "ageizam" OR "Altersdiskriminierung" OR "ageizmus" OR "ageismo" OR "l-etaizmu" OR "ageizm" OR "Ageism" OR "ageizem" OR "ηλικιωτισμός" OR "aioseachas" OR "Ageisms" OR "vanus" OR "Ageisme" OR "age discrimination" OR "diskriminace na základě věku" OR "forskelsbehandling på grund af alder" OR "Altersdiskriminierung" OR "διακρίσεις λόγω ηλικίας" OR "discriminación por edad" OR "vanuseline diskrimineerimine" OR "ikäsyrjintä" OR "discrimination fondée sur l'âge" OR "idirdhealú aoise" OR "diskriminacija na temelju dobi" OR "életkoron alapuló hátrányos megkülönböztetés" OR "discriminazione in base all'età" OR "diskriminacija dėl amžiaus" OR "diskriminācija vecuma dēļ" OR "diskriminazzjoni bbažata fuq l-età" OR "leeftijdscriminatie" OR "dyskryminacja ze względu na wiek" OR "discriminação em razão da idade" OR "discriminarea pe motive de vârstă" OR "diskriminácia na základe veku" OR "diskriminacija na podlagi starosti" OR "äldersdiskriminering"))

text: ("bias" OR "discrimination" OR "προκατάληψη" OR "διακρίσεις" OR "syryjintä" OR "biais" OR "claontacht" OR "idirdhealú" OR "vooringenomenheid" OR "discriminatie" OR "uprzedenia" OR "dyskryminacja" OR "viés" OR "discriminação" OR "pristranskosti" OR "diskriminacija" OR "sesgo" OR "discriminación" OR "pristranost" OR "diskriminacija" OR "elfogultság" OR "diszkrimináció" OR "novirzes" OR "diskriminācija" OR "pārtinire" OR "discriminare" OR "zaujatost" OR "diskriminace" OR "forskelsbehandling" OR "kallutatus" OR "diskrimineerimine" OR "pregiudizi" OR "discriminazione" OR "Bias" OR "Diskriminierung" OR "partiskhet" OR "biais" OR "diskriminering" OR "пристрастност" OR "дискриминация" OR "šališkumas" OR "diskriminacija" OR "prejudizzju" OR "diskriminazzjoni" OR "ageism" OR "ageismi" OR "vyravimas" OR "възрастова дискриминация" OR "възрастовата дискриминация" OR "ейджизъм" OR "ageismus" OR "alderdom" OR "Ageismus" OR "el Ageism" OR "L'âgisme" OR "ageizam" OR "Altersdiskriminierung" OR "ageizmus" OR "ageismo" OR "l-etaizmu" OR "ageizm" OR "Ageism" OR "ageizem" OR "ηλικιωτισμός" OR "aioseachas" OR "Ageisms" OR "vanus" OR "Ageisme" OR "age discrimination" OR "diskriminace na základě věku" OR "forskelsbehandling på grund af alder" OR "Altersdiskriminierung" OR "διακρίσεις λόγω ηλικίας" OR "discriminación por edad" OR "vanuseline diskrimineerimine" OR "ikäsyrjintä" OR "discrimination fondée sur l'âge" OR "idirdhealú aoise" OR "diskriminacija na temelju dobi" OR "életkoron alapuló hátrányos megkülönböztetés" OR "discriminazione in base all'età" OR "diskriminacija dėl amžiaus" OR "diskriminācija vecuma dēļ" OR "diskriminazzjoni bbažata fuq l-età" OR "leeftijdscriminatie" OR "dyskryminacja ze względu na wiek" OR "discriminação em razão da idade" OR "discriminarea pe motive de vârstă" OR "diskriminácia na základe veku" OR "diskriminacija na podlagi starosti" OR "äldersdiskriminering"))

Annex I – Methodology

Source selection

The manually curated list of Mainstream media outlets used for this report is composed of 581 EU27 online media sources monitored as index [pi_ee24campaign] by Europe Media Monitor (EMM). This sample of sources represents the most popular open news websites in each EU country in terms of visitors. The number of outlets per country was weighted based on the member states' population.

Keyword-based article selection

Articles relevant to the topic are selected by searching for a pre-established set of relevant combined keywords that appear in the title or text of the article. To obtain the selected keywords in all official EU languages for this report, we translated the keywords automatically from English to all other EU24 languages by using the European Commission's E-Translation services.

Automated Clustering

Clusters are computed by a community-based algorithm on the original language titles of the articles and are based on semantic similarity. Stopwords were not removed from the titles but are not shown in the keyword section. The model transforms sentences into language-independent vectors, suiting our need to compare articles coming from the various EU countries. It is also easy to use and easy to deploy thanks to its python implementation.

In order to facilitate the analysis, automatically translated English titles are generated. The minimum cluster size is set to 5 articles. The maximum cluster size is not fixed. The colours of the bubbles represent the cluster, the size of the cluster has no meaning, it is purely a graphical solution since many of them are concentric or very close and otherwise wouldn't be visible. Distance from other items is representing semantic similarity. The clustering algorithm can process maximum 10 000 articles per input combination. Depending on the distribution of its neighbours, a document may belong to a cluster or not. In other words, not all articles can be clustered.

Automated Summaries

To generate automated summaries for each cluster, we use Large Language Models (LLM). For this use case, the model – an instantiated Nous-Hermes-2-Mixtral-8x7B-DPO – is treated like a News Digest AI that is capable of analysing a list of news articles and generating a high-level summary with a significant title. For each cluster, the translated headlines are provided as input, and a title and a summary were generated for each cluster. The used and openly available Nous-Hermes model allows to receive good quality output in combination with a very fast response time. A carefully-crafted prompt is used so that the model is not too generic and instead always focused on the listed facts. The temperature of the model is set to "0" in order for it to not hallucinate.

Automated framing detection

Automated detection of framing dimensions constituted an extension of our analysis conducted in this report. This work was based on in-house machine learning classifiers that detect framing dimensions in the articles. The machine-learning algorithm trained on a multilingual corpus.

Framing refers to the perspective under which an issue or a piece of news is presented. We consider 14 frames: *Economic, Capacity and resources, Morality, Fairness and equality, Legality, constitutionality and jurisprudence, Policy prescription and evaluation, Crime and punishment, Security and defence, Health and safety, Quality of life, Cultural identity, Public opinion, Political, External regulation and reputation.*

For more information see the JRC Technical Report: News Categorization, Framing and Persuasion Techniques: Annotation Guidelines: https://knowledge4policy.ec.europa.eu/text-mining/news-categorization-framing-persuasion-techniques-annotation-guidelines_en

Named entities recognition

Names Entities Recognition has been done using the NEROne module which has been developed in the context of the Europe Media Monitoring project. For detailed information, see: *Guillaume Jacquet, Jakub Piskorski, and Sophie Chesney. 2019. Out-of-context fine-grained multi-word entity classification. In Proceedings of the 34th ACM/SIGAPP Symposium On Applied Computing (SAC 2019).*

Annex II - About the authors

Text Mining & Analysis Competence Centre (TMA-CC)

DG JRC's Text Mining & Analysis Competence Centre (TMA-CC) of the European Commission is specialised in making sense of vast amounts of text through computing and analytics. It is an in-house consultancy and innovation service supporting EU Institution's policymakers, investigators and analysts in their knowledge-intensive tasks by providing consultancy and advanced analytical tools in the field of text mining.

The TMA-CC aims to be an incubator for text mining ideas and solutions within the European Commission - a single focal point where expertise is concentrated, then shared and applied to the benefit of its clients.

Please check https://knowledge4policy.ec.europa.eu/text-mining_en for more information on TMA-CC.

European Science-Media Hub

The European Science-Media Hub (ESMH), operating under the political responsibility of the European Parliament Panel for the Future of Science and Technology (STOA), is a platform to promote networking, training and knowledge sharing between the European Parliament, the scientific community and the media.

The ESMH creates a network among policy-makers, scientists and media involving science, academia, educational and research entities, and professional associations of journalists and scientists. For journalists and media representatives, the ESMH organises training sessions and workshops on current technological developments, both as subjects of their reporting and as means of facilitating their work. Via media monitoring and media intelligence tools, the ESMH follows the most popular topics in the field of science and technology on different platforms including journals, newspapers and social media.

The ESMH makes information available to journalists, other media and citizens about new scientific developments, as well as about scientific topics that attract media attention, and promotes information based on evidence.

Check <https://sciencemediahub.eu/> for more information, methodology and technology.

For an overview of all science media intelligence reports produced in collaboration between TMA-CC and ESMH, please check <https://sciencemediahub.eu/science-media-intelligence-reports/>.

Europe Media Monitor

Europe Media Monitor (EMM) is a tool developed and maintained by the Text and Data Mining Unit of the Joint Research Centre (JRC) of the European Commission. The main purpose of EMM is to provide monitoring of a large set of online media, reducing the information flow to manageable proportions by clustering related news, categorising articles and applying Language Technology tools to derive further metadata, such as recognising and disambiguating entities in the text, extracting quotes by and about people, applying sentiment/tonality analysis and more. Since 2018, EMM can also grab content from live Twitter streams.

A lot of EMM's functionalities are freely available. To access the tool that best fits your need, please check https://knowledge4policy.ec.europa.eu/text-mining/topic/europe-media-monitor-emm_en.

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- via the following form: european-union.europa.eu/contact-eu/write-us_en.

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For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

Open data from the EU

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

