

AN AFROCENTRIC PERSPECTIVE ON ALGORITHM WATERMARKING OF AI GENERATED CONTENT

Anonymous authors

Paper under double-blind review

ABSTRACT

Digital-driven misinformation, counterfeiting, and copyright violations have become a growing concern in Africa. The prevalence of Artificial intelligence content (AIGC) has the potential to widen its impact and create more challenges for the people on the continent. AIGC poses a dual challenge. First, creatives who have worked so hard to create a masterpiece see their work being illegally duplicated or used without their consent. The other unsuspecting individuals have fallen prey to misinformation caused by AIGC. The reason, amongst many, could be the regulatory gaps in the law governing data protection, copyright and even artificial intelligence. This paper argues that curating technical watermarking methodologies/techniques is insufficient, considering the uniqueness of the African continent. It further addresses the regulatory gaps by examining the existing laws and proposing an Afrocentric perspective on AIGC using Nigeria, Kenya, Egypt and South Africa as case studies.

1 INTRODUCTION

The technique of watermarking historically was first implemented in the 13th century by an Italian paper manufacturing company acc (2023). Unique designs or symbols were impressed into the paper during the production process Har (2021). The practice was unique in identifying quality and origin and deterring malicious individuals from counterfeiting the product Liu et al. (2025). The technique has evolved from a simple marker for determining paper authenticity to sophisticated digital security features Acc (2023). Watermarking can be engraved in varying visibility, from overt markers to opaque, hidden signals Sco (2024). For instance, Stock images might have a clear, opaque stamp that denotes their origin. In contrast, others might be integrated into their pixel structure or embedded within patterns of text punctuation, making them invincible to a casual observer.

Generative artificial intelligence (GenAI) such as DALL-E OpenAI (2025b), Midjourney MidJourney (2025) and ChatGPT OpenAI (2025a) can produce highly realistic content in varying formats such as text, image, video and audio Jiang et al. (2024). The same capacity allowing swift content generation can be exploited to create harmful or misleading information. AI-generated content (AIGC) has become increasingly prominent and has raised legal and ethical concerns on the African continent Li et al. (2024). As a legal concern, the ability of GenAI to mimic patterns so convincingly raises the issue of intellectual property. Firstly, individuals might falsely claim copyright over content generated by an AI system, Secondly, the original authors of the output from which the data was trained can identify their work. As an ethical issue, it could be weaponised to support disinformation or propaganda campaigns. The market for generative AI was predicted to increase to 50 billion by 2028 MarketsandMarkets (2023) Which shows the increasing growth of the GenAI industry.

In summary, this work contributes the following to the existing body of knowledge:

1. To the best of our knowledge, it is the first Afrocentric-focused work on algorithm watermarking. We perceive watermarking from two perspectives: first, the attribution of Indigenous data that originates from Africa, and second, the methodology of AIGC verification..
2. We explore the regulatory gaps in data protection, intellectual property, and human rights protection using Nigeria, Kenya, South Africa, and Egypt as case studies to consider the rationale behind the prevalence of unattributed and harmful AIGC. We further map out best practices by recommending ways forward for the continent.

2 RELATED WORKS

Various scholars and organisations have designed various literature on algorithm watermarking methodologies. These methodologies have focused on techniques for ensuring robust watermarking metrics.

Zhengyuan Jiang (2024) In their work, they studied watermark-based, user-level attribution of AIGC. In their framework, users are issued a unique watermark (a bistring) stored in a centralised database when registering for a GenAI service. Every AIGC generated by the user carries a generalised watermark. The challenge with the work is that most GenAI companies allow for the anonymous usage of their tool, which might not be practicable in the real world. Kirchenbauer et al. (2024) built on the works of Atallah et al. (2001) And Chiang et al. (2004). Kirchenbauer et al. (2024). proposed a watermarking technique that influences token selection in text generation. They introduced a detection algorithm that identifies watermarked text without access to the model's internal parameters or its API. The framework was further tested without large language models such as stable diffusion, Midjourney, and DALL-E.

3 CHALLENGES AND LIMITATION

An adversary can easily erase the embedded watermark from the generated content and then use it freely without the service provider's regulation. The adversary can create illegal content with forged watermarks from another user, causing the service provider to make wrong attributions Li et al. (2023). These works extensively address the technical framework for watermarking AIGC with limitations in considering the user's privacy, intellectual properties, or the possibilities of watermark mutation by users.

4 REGULATORY LANDSCAPE ON WATERMARKING

We developed four metrics to properly evaluate the regulatory framework governing the watermarking of AIGC in Africa. The aim of creating these metrics is to capture multiple facets of the current landscape. We admit that Africa's regulatory landscape regarding watermarking or algorithm watermarking/attribution matters may be outdated. This is because the laws were enacted long before the modern-day growth of artificial intelligence (AIGC) on content. As a result, there would be noticeable gaps in the frameworks. The metrics include:

1. Provision of watermarks, if any
2. Provision for AIGC
3. Institutional oversight on copyright materials
4. Judicial Opinion/position on algorithm watermarks, if any

4.1 NIGERIA

The Copyright Act 2022 has been revolutionary for protecting the rights of authors and creators in Nigeria Wysebridge Patent Bar Review (2025). However, under the Act, intellectual property safety provides no direct protection for using copyrighted material by unauthorised third parties. Rapid advancements in generative technologies characterised by replicating creators' works necessitate a broad interpretation of existing laws protecting digital watermarking to address the lacuna that could accrue as damages for creators. Section 5 of the Copyright Act provides that only legal persons (natural persons or corporate entities) are eligible for the production of copyrighted material. By its nature, AI-generated content borrows from the original works of others, making it difficult for a creator to rest under the scope of moral rights attributed to creators by section 14 of the Act. Section 14(b) further grants rights to original authors to seek legal redress for any modification of their original content. In defining 'copyright infringement', however, the Act does not make provision for machine reproduction of original content (s. 36), providing ample grounds for a legal argument that AI-generated content can thus be watermarked and passed off as the original work of its generator. The lack of originality in owning and training data on which generative models are run provides a basis for the argument that a derivative product (such as AI-generated content) may

108 be viewed as an inspiration and not an authentic concept. The core principle behind copyrighting
109 works is incentivising people to create; such authorship/creatorship should be given a green light.
110 This will serve as a nod to developers, researchers and individuals involved in the AI development
111 and creation pipeline. However, the recommendations are that such legal protections be limited to a
112 few years (5-7 years) [23].Amatika-Omondi (2025)

114 4.2 KENYA

115 Kenya’s Copyright Act provides that the owner of an original work is a legal person or entity. The
116 Act provides that a person for whom arrangements are provided for the production of a creative
117 work may serve as its creator. In making a case for AI-generated content, creators who provide any
118 necessary arrangement for the production of an expressive output, e.g., a media program, may be
119 permitted to retain copyright over said works .Laws of Kenya (2001) Therefore, if the nature of the
120 AI machine does not substantially derive from the works of others, i.e. a machine that a substantial
121 amount of its output rests primarily on itself, then such generated work may be interpreted as not
122 amounting to infringement and, thus, capable of copyright protections by its prompt-user. The
123 courts and relevant authorities are likely to consider the extent/degree of human input, the novelty
124 or originality of the said work and the purpose for its reproduction, e.g. commercially generated
125 content is more likely to be favoured in the context of copyrighting protections.Kwang’a (2025)

126 While there are no clear-cut regulations against copyrighting, various interpretations of what con-
127 stitutes original works in different jurisdictions could influence AI-generated content in the coming
128 years. Institutions like the Kenya Copyright Board WKA Advocates (2025) are already examining
129 the eligibility of AI-generated content for copyrighting and adjusting existing regulations that may
130 redefine intellectual production or categorise algorithmic output as a distinct category.

132 4.3 EGYPT

133 The establishment of the Egyptian Intellectual Property Law of 2002 did not envision or make pro-
134 visions for AI-generated content in the context of innovative/creative works. Article 4 of the Act
135 provides that natural persons or legal entities are the two categories of persons that may apply for
136 patents.Law on the Protection of Intellectual Property Rights (2002) Article 10 of the Act offers
137 some protection for authors of original works to prevent the "... using, selling or distributing..."
138 of a person’s work by a third party without their authorisation. Law on the Protection of Intel-
139 lectual Property Rights (2002) The judicial institution has yet to address intellectual ownership in the
140 context of AI-generated material and, therefore, has not established a precedent regime for algo-
141 rithmic watermarking on generative works. Recent efforts have been aimed at drafting amendments
142 to these provisions, looking to Saudi Arabia’s National Strategy of Data and AI to develop its IP
143 rights and techniques, such as open licensing. Some schools of thought propose that the doctrine
144 of first sale allows those possessing copyrighted material to exploit such for commercial purposes,
145 although very little is said about actual ownership of derivative works. Still, fair use criteria may
146 be examined in assessing the extent of originality and ‘human participation’ in the innovation pro-
147 cess.Khalaf (2024) A typical example of this would be distinguishing the process of ‘prompting’,
148 which can produce several different, randomised results from artistic reproductions, e.g. text, paint-
149 ings, music, and designs that by their nature require a personalised element of style, tone, thematic
150 elements and then ‘reference’ that is expressive in its most fundamental state. Illuminating the spirit
151 of the copyright concept requires the undisputed existence of those distinguishing features that act
152 as a human imprint on art.

153 4.4 SOUTH AFRICA

154 As is obtainable in other jurisdictions, South African laws do not recognise the copyrighted own-
155 ership of materials generated by artificial intelligence. The National Copyright Act,Republic of
156 South Africa (1978) which applies to private and public entities, provides that a work must have
157 origins reduced to its material form. and authored by one Indigenous to domiciled in South Africa
158 or a member of the Berne Convention.Companies and Intellectual Property Commission (CIPC)
159 (2025) Interestingly, the Act recognises that a work can be computer generated and makes provi-
160 sion to grant authorship to the person for whom the arrangements were made, the premise of which
161 algorithmic watermarks can rely on in granting ownership. This implies the Act places greater pri-

162 ority on the economic theory as justifiable grounds for copyrighting, positioning creators behind
 163 algorithms as incentive contributors to its own work rather than other theories of appropriation and
 164 labour. Anonymous (2024) In future contexts, this categorisation makes a case for a loose interpre-
 165 tation that recognises the identification of an author of AI-generated work as the inventor or creator
 166 of such material. Where such information has been deliberately publicised by its owner or is made
 167 available in public records (in the context of personal information collection), the law permits the
 168 use of such data. Republic of South Africa (1978) Under the 'Terms of Use' provisions of OpenAI,
 169 input and output used to generate content is assigned to its generator subject to the condition that
 170 relevant and applicable country laws allow it. OpenAI (2025c)

171 172 5 ANALYSIS OF FINDINGS 173

174
175 Algorithm watermarks can be essential for helping users make informed choices about how they
 176 interact with AIGCs. However, these tools can violate users' rights and potentially process their
 177 personal data when maliciously weaponised or used as bait for unsuspecting users. In the four ju-
 178 risdictions above, the processing of personal data requires consent. There is no provision for AIGC,
 179 regulations on algorithm watermarking, or decided cases on algorithm watermarking. This can be
 180 challenging because copyright laws are territorial in nature. Buick (2024) Most of these tools are
 181 built somewhere in the Global North, and None of the Centers are located in Africa, The Economist
 182 (2023) making it more difficult for institutional oversights to enforce compulsory localised water-
 183 marking.

184 As a result, if unauthorised reproductions of copyrighted material were to be carried out entirely in a
 185 continent whose law permits such use without rightsholder permission, there would be no copyright
 186 infringement in either country or within the territory. Peukert (2024) This is why the discussion on
 187 algorithm watermarking and trust in AIGC is more weighed on ethics than law: many companies
 188 will exploit regulatory gaps for their benefit.

189 Unlike in jurisdictions like China and the US, offices presiding over copyright matters have estab-
 190 lished legal requirements for publishing generated content to allow users to distinguish their nature
 191 and track authenticity. The OECD recommends that organisations using watermarking techniques
 192 subject generative models to assessments and media literacy to inform their audience. European
 193 Parliament (2023) The US seems to have taken a stance against granting authorship of AI-generated
 194 works with cases like *Feist Publications v Rural Telephone Service Company*. *Feist Publications Inc.*
 195 *v. Rural Telephone Service Co.* (1991) where the Court specified that copyright law only protects
 196 "the fruits of intellectual labour" that "are founded in the creative powers of the mind." IP Think
 197 Tank (2025) Likewise, in *Thaler v. Perlmutter*, the US courts reestablished their position on an
 198 AI-generated painting, stipulating that it does not fulfil the conditions for "human authorship in-
 199 tegral to copyrighted registration. *Stephen Thaler v. Shira Perlmutter* (2023) Similar provisions have
 200 been enforced in Australia's *Acohs Pty Ltd v Ucorp Pty Ltd* *Acohs Pty Ltd v Ucorp Pty Ltd* (2012),
 201 where the Court pronounced that a work generated through computer "intervention" did not come
 202 under the legal protections reserved for human ingenuity. The Court looked to the level of activity
 203 demonstrated to ascertain the degree of authorisation rather than determining authorship based on
 204 the existence or absence of factors considered to prevent infringement. In contrast to the United
 205 States, the European Union has adopted a legislative approach, with the passage of the EU Arti-
 206 ficial Intelligence Act in March and establishing an AI Office to enforce it. China's government has
 207 already introduced mandatory watermarking, and California wants to do the same.

208 It is also observed that all available resources about AIGC algorithm watermarking have been one-
 209 sided. That is companies providing watermark metrics and tools to allow attribution and content
 210 source for their LLM give no room for disclosure of the source. Jernite (2023) For instance, OpenAI
 211 in the paper introducing GPT-4 revealed only that the data on which the model had been trained
 212 was a mixture of "publicly available data (such as internet data) and data licensed from third-party
 213 providers" Byrd (2023). Some AI company justifies their decision to be secretive regarding details
 214 of their training data based on concerns regarding "the competitive landscape and the safety impli-
 215 cations of large-scale models", with no further explanation. OpenAI (2023) They argue that sharing
 further details regarding their training data would facilitate replicating their cutting-edge AI mod-
 els while releasing detailed information would enable careless or malicious actors to develop their
 powerful AI models more efficiently. The Verge (2023)

Watermarking should be double-sided. One is attributing the content of AI-generated works, and the second is attributing source data, especially those that have been copyrighted and used in the jurisdiction of their origin. Although copyrights are only limited to the country where the copyright is registered, the duty is on the company to ensure that copyrighted materials are not at all or not attributed as their own when watermarking.

6 CONCLUSION

Our work views watermarking to serve two dual but broad purposes. First, as a means and secondly, as an end. As a means, algorithm watermarking serves as a robust method for verifying the authenticity of AIGC ensuring that outputs (text, video, image or audio), can be traced back to their source. As an end, to recognize and attribute the contributions of the training data sets of the original/indigenous owners of that data instrumental in the model training. With this, it helps to establish a transparent and unbroken chain of provenance. With this, it validates the legitimacy of the content and simultaneously preserving the historical context of the data used. This dual functionality promotes accountability and trust, offering a clear pathway to resolve disputes related to data usage and copyright claims, and ultimately fostering a more ethical and transparent landscape in the realm of AI development and deployment. Africa is a unique continent and the approach toward the watermarking of AIGC must take a unique approach. Considering the level of digital literacy in the continent is an indication that there will be a rise in risk fostered by AIGC. This would be an issue both for creatives both as the owners of data and the users of AIGC.

7 RECOMMENDATION

1. Governments of African countries should fund the development of open-source AI Afro-centric watermarking tools and oversee the compensation of artists for royalties when copyrighted or indigenous data is used to train algorithms.
2. Copyright regulations should contain such requirements, like data protection regulations that support/restrict cross-border data flow. For example, a provision on cross-border mobility of personal data should be included in copyright regulations, allowing stronger cross-sector/cross-border collaborations.
3. We recommend establishing and collaborating with African countries' copyright repositories/Indigenous databases. That way, it is easy to attribute copyrighted materials and trace their source when generated by AIGC. AI companies should prioritise collaborating with copyright, trademark, and digital commons repos in Africa.
4. Guidelines on identifying watermarks on AIGC and alternated watermarks.
5. Investment in AI literacy is essential to decipher between original content and AIGC. Multi-stakeholder collaboration is encouraged to achieve this.
6. Variation of models deployed to the African market.
7. Regulatory frameworks could demand/require companies to track and list significant datasets used in AI training. We recommend enforcing AI watermarking standards.

REFERENCES

Understanding paper: Structures, watermarks, and a conservator's passion), 2021. URL https://harvardartmuseums.org/article/understanding-paper-structures-watermarks-and-a-conservator-s-passion?utm_source=chatgpt.com. Accessed: Feb 13, 2025.

Identifying generative ai content: When and how watermarking can help uphold human rights, 2023. URL <https://www.accessnow.org/wp-content/uploads/2023/09/Identifying-generative-AI-content-when-and-how-watermarking-can-help-uphold-human-pdf>. Accessed: Feb 13, 2025.

Watermarking generative ai: what, how, why (and why not), 2023. URL <https://www.accessnow.org/>

- 270 watermarking-generative-ai-what-how-why-and-why-not/. Accessed:
271 Feb 13, 2025.
- 272
273 Digital watermarking: Techniques, benefits examples, 2024.
274 URL [https://www.scoredetect.com/blog/posts/
275 digital-watermarking-techniques-benefits-and-examples?utm_
276 source=chatgpt.com#google_vignette](https://www.scoredetect.com/blog/posts/digital-watermarking-techniques-benefits-and-examples?utm_source=chatgpt.com#google_vignette). Accessed: Feb 13, 2025.
- 277 Acohs Pty Ltd v Ucorp Pty Ltd. [2012] fcafc 16 - 201 fcr 173; 287 alr 403; 95 ipr 117. Fed-
278 eral Court of Australia Full Court Decision, 2012. Available at: [https://www.austlii.edu.au/cgi-
279 bin/viewdoc/au/cases/cth/FCAFC/2012/16.html](https://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/FCAFC/2012/16.html).
- 280 F. Amatika-Omondi. Copyright in the age of artificial intelligence. *Copyright News, Kenya*
281 *Copyright Board*, 38:5–6, 2025. URL [https://copyright.go.ke/sites/default/
282 files/newsletters/issue-38.pdf](https://copyright.go.ke/sites/default/files/newsletters/issue-38.pdf). Accessed: February 12, 2025.
- 283
284 Anonymous. A legal approach to whether ai generated content should be protected under
285 copyright. Master’s thesis, School of Law, University of Witwatersrand, South
286 Africa, 2024. URL [https://wiredspace.wits.ac.za/server/api/core/
287 bitstreams/225a2f17-79f2-4657-be82-bc45c2d3b957/content](https://wiredspace.wits.ac.za/server/api/core/bitstreams/225a2f17-79f2-4657-be82-bc45c2d3b957/content). Accessed:
288 February 13, 2025.
- 289 M. J. Atallah, V. Raskin, M. Crogan, C. Hempelmann, F. Kerschbaum, D. Mohamed, and S. Naik.
290 Natural language watermarking: Design, analysis, and a proof-of-concept implementation. In I. S.
291 Moskowitz (ed.), *Information Hiding, Lecture Notes in Computer Science*, pp. 185–200. Springer,
292 Berlin, Heidelberg, 2001. ISBN 978-3-540-45496-0. doi: 10.1007/3-540-45496-9_14.
- 293 Adam Buick. Copyright and ai training data—transparency to the rescue? *Journal of Intellectual*
294 *Property Law Practice*, 2024. ISSN 1747-1532. doi: 10.1093/jiplp/jpae102. URL [https:
295 //doi.org/10.1093/jiplp/jpae102](https://doi.org/10.1093/jiplp/jpae102).
- 296
297 A. Byrd. Truth-telling: Critical inquiries on llms and the corpus texts that train them. *Composition*
298 *Studies*, 51(1):135–142, 2023.
- 299 Y.-L. Chiang, L.-P. Chang, W.-T. Hsieh, and W.-C. Chen. Natural language watermarking using
300 semantic substitution for chinese text. In T. Kalker, I. Cox, and Y. M. Ro (eds.), *Digital Water-*
301 *marking, Lecture Notes in Computer Science*, pp. 129–140. Springer, Berlin, Heidelberg, 2004.
302 ISBN 978-3-540-24624-4. doi: 10.1007/978-3-540-24624-4_10.
- 303 Companies and Intellectual Property Commission (CIPC). Intellectual property regulations and re-
304 sources, 2025. URL https://www.cipc.co.za/?page_id=4586. Accessed: February
305 14, 2025.
- 306
307 European Parliament. Generative ai and watermarking. Technical report, European Parliamen-
308 tary Research Service, February 2023. URL [https://www.europarl.europa.eu/
309 RegData/etudes/BRIE/2023/757583/EPRS_BRI\(2023\)757583_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/757583/EPRS_BRI(2023)757583_EN.pdf). Ac-
310 cessed: Feb. 14, 2025.
- 311 Feist Publications Inc. v. Rural Telephone Service Co. 49 u.s. 340 (1991),
312 no. 89-1909. U.S. Supreme Court Decision, 1991. Available at:
313 <https://supreme.justia.com/cases/federal/us/499/340/>.
- 314 IP Think Tank. Intellectual property right, innovation and artificial int-
315 telligence, 2025. URL [https://www.ipthink-tank.com/post/
316 proposed-bill-could-tip-the-scales-of-justice](https://www.ipthink-tank.com/post/proposed-bill-could-tip-the-scales-of-justice). Accessed: February
317 14, 2025.
- 318
319 Yacine Jernite. Training data transparency in ai: Tools, trends, and policy recom-
320 mendations, December 2023. URL [https://huggingface.co/blog/yjernite/
321 data-transparency](https://huggingface.co/blog/yjernite/data-transparency). Accessed: February 14, 2024.
- 322 Zhengyuan Jiang, Moyang Guo, Yuepeng Hu, and Neil Zhenqiang Gong. Watermark-based attribu-
323 tion of ai-generated content. <https://arxiv.org/pdf/2404.04254>, 2024. URL [https://arxiv.
org/pdf/2404.04254](https://arxiv.org/pdf/2404.04254).

- 324 A. M. M. Khalaf. Copyright law and metaverse: A comparative study of challenges
325 and opportunities of the Egyptian copyright law entering the virtual era. Master's thesis,
326 School of Global Affairs and Public Policy, The American University in Cairo, Egypt,
327 2024. URL [https://fount.aucegypt.edu/cgi/viewcontent.cgi?article=](https://fount.aucegypt.edu/cgi/viewcontent.cgi?article=3406&context=etds)
328 [3406&context=etds](https://fount.aucegypt.edu/cgi/viewcontent.cgi?article=3406&context=etds). Accessed: February 13, 2025.
- 329 John Kirchenbauer, Jonas Geiping, Yuxin Wen, Jonathan Katz, Ian Miers, and Tom Goldstein. A
330 watermark for large language models. <https://arxiv.org/pdf/2301.10226>, 2024. URL <https://arxiv.org/pdf/2301.10226>.
331
332
- 333 B. Kwang'a. Is ai-generated work copyrighted in Kenya? Online
334 Blog Post, 2025. URL [https://www.bondadvocates.com/blog/](https://www.bondadvocates.com/blog/is-ai-generated-work-copyrighted-in-kenya/)
335 [is-ai-generated-work-copyrighted-in-kenya/](https://www.bondadvocates.com/blog/is-ai-generated-work-copyrighted-in-kenya/). Accessed: February 14,
336 2025.
- 337 Law on the Protection of Intellectual Property Rights. Law no. 82 of 2002. Government Legis-
338 lation, 2002. URL [https://www.wipo.int/wipolex/en/legislation/details/](https://www.wipo.int/wipolex/en/legislation/details/22066)
339 [22066](https://www.wipo.int/wipolex/en/legislation/details/22066). Accessed: February 14, 2025.
- 340 Laws of Kenya. Copyright act [no 12] [cap 130] 2001. Government Legisla-
341 tion, 2001. URL [https://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/](https://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/CopyrightAct_No12of2001.pdf)
342 [CopyrightAct_No12of2001.pdf](https://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/CopyrightAct_No12of2001.pdf). Accessed: February 14, 2025.
- 343
- 344 G. Li, Y. Chen, J. Zhang, J. Li, S. Guo, and T. Zhang. Towards the vulnerability of watermarking
345 artificial intelligence generated content. *arXiv preprint*, 2023. doi: 10.48550/arxiv.2310.07726.
346 URL <https://doi.org/10.48550/arxiv.2310.07726>.
- 347 Guanlin Li, Yifei Chen, Jie Zhang, Jiwei Li, Shangwei Guo, and Tianwei Zhang. Warfare: Break-
348 ing the watermark protection of ai-generated content. <https://arxiv.org/html/2310.07726v3>, 2024.
349 URL <https://arxiv.org/html/2310.07726v3>.
- 350
- 351 Aiwei Liu, Sheng Guan, Yiming Liu¹, Leyi Pan, Yifei Zhang, Liancheng Fang, Lijie Wen¹, Philip S.
352 Yu, and Xuming Hu. Can watermarked llms be identified by users via crafted prompts? *arXiv*
353 *preprint arXiv:2005.14165*, 2025. URL <https://arxiv.org/pdf/2410.03168>.
- 354 MarketsandMarkets. Generative ai market report, 2023. URL
355 [https://www.marketsandmarkets.com/Market-Reports/](https://www.marketsandmarkets.com/Market-Reports/generative-ai-market-142870584.html)
356 [generative-ai-market-142870584.html](https://www.marketsandmarkets.com/Market-Reports/generative-ai-market-142870584.html). Accessed: February 14, 2025.
- 357
- 358 MidJourney. Midjourney documentation, 2025. URL <https://docs.midjourney.com/>.
359 Accessed: February 14, 2025.
- 360 OpenAI. Gpt-4 technical report. *arXiv preprint*, 2023. URL [https://arxiv.org/abs/](https://arxiv.org/abs/2303.08774)
361 [2303.08774](https://arxiv.org/abs/2303.08774).
- 362
- 363 OpenAI. Chatgpt: Advancing ai conversations, 2025a. URL [https://openai.com/blog/](https://openai.com/blog/chatgpt)
364 [chatgpt](https://openai.com/blog/chatgpt). Accessed: February 14, 2025.
- 365
- 366 OpenAI. Dall-e 2: Ai image generation, 2025b. URL [https://openai.com/index/](https://openai.com/index/dall-e-2/)
367 [dall-e-2/](https://openai.com/index/dall-e-2/). Accessed: February 14, 2025.
- 368
- 369 OpenAI. Terms of use, 2025c. URL <https://openai.com/policies/terms-of-use/>.
370 Accessed: February 14, 2025.
- 371
- 372 Alexander Peukert. Copyright in the artificial intelligence act – a primer. *GRUR International*, 73:
373 497, 2024.
- 374
- 375 Republic of South Africa. Government gazette, copyrights act 1978. Government Legisla-
376 tion, 1978. URL [https://www.gov.za/sites/default/files/gcis_document/](https://www.gov.za/sites/default/files/gcis_document/201504/act-98-1978.pdf)
377 [201504/act-98-1978.pdf](https://www.gov.za/sites/default/files/gcis_document/201504/act-98-1978.pdf). Accessed: February 13, 2023.
- 378
- 379 Stephen Thaler v. Shira Perlmutter. United states courts decision, case no. 2022cv1564-24. U.S. Dis-
380 trict Court Decision, 2023. URL [https://ecf.dcd.uscourts.gov/cgi-bin/show_](https://ecf.dcd.uscourts.gov/cgi-bin/show_public_doc?2022cv1564-24)
381 [public_doc?2022cv1564-24](https://ecf.dcd.uscourts.gov/cgi-bin/show_public_doc?2022cv1564-24). Accessed: February 13, 2025.

378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431

The Economist. Europe, a laggard in ai, seizes the lead in its regulation, December 2023. URL <https://www.economist.com/europe/2023/12/10/europe-a-laggard-in-ai-seizes-the-lead-in-its-regulation>. Accessed: February 14, 2025.

The Verge. Openai’s gpt-4 launch and closed research: An interview with ilya sutskever. The Verge, Online Article, March 2023. URL <https://www.theverge.com/2023/3/15/23640180/openai-gpt-4-launch-closed-research-ilya-sutskever-interview>. Accessed: February 14, 2025.

WKA Advocates. The rise of deepseek ai and its impact on kenya’s ict, ip, and copyright regulations. Online Blog Post, 2025. URL <https://www.wka.co.ke/the-rise-of-deepseek-ai-and-its-impact-on-ict-ip-and-copyright-regulations-in-kenya>. Accessed: February 14, 2025.

Wysebridge Patent Bar Review. Doctrine of equivalents: Intellectual property terminology explained, 2025. URL <https://wysebridge.com/doctrine-of-equivalents-intellectual-property-terminology-explained/>. Accessed: February 14, 2025.

Yuepeng Hu Neil Zhenqiang Gong Zhengyuan Jiang, Moyang Guo. Watermark-based attribution of ai-generated content. <https://arxiv.org/pdf/2404.04254>, 2024. URL <https://arxiv.org/pdf/2404.04254>.