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Artificial intelligence in web accessibility: A systematic mapping study

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ABSTRACT

The popularization and new renaissance of artificial intelligence (AI) have inspired the creation of new applications that help developers improve website accessibility that benefits users with and without disabilities. Therefore, this research presents a systematic mapping study (SMS) because AI in web accessibility has been gaining more interest nowadays with the exposure of works that require an SMS to systematize and consolidate the literature. Through a literature review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), 53 studies from ACM Digital Library, IEEE Xplore, Scopus, and Web of Science were identified for inclusion in this review. The main results of this SMS are APIs with AI, web applications and plugins with AI, image and voice recognition with AI, limitations and challenges of AI in web accessibility, correction and testing of web accessibility with AI, automatic correction of web accessibility with AI, web navigation with conversational agents with AI, web and mobile application accessibility with AI, good practices in web accessibility for AI, accessibility of web forms and elements with AI. According to the results, in the studies, alternative texts were created for the images of the websites, AI helped generate accessible HTML code using well-defined prompts, AI tools must comply with Web Content Accessibility Guidelines (WCAG), machine learning was the most used approach, the most used language models were large language models (LLM) and accessibility barrier correction using ChatGPT. The primary contribution of this SMS lies in its analysis of the current state of AI research related to web accessibility and the identification of trends and gaps in this research area. This SMS is intended for researchers, programmers, and software development companies that may use language models, AI tools, or emerging technologies in web accessibility to mitigate website accessibility barriers.

Contents

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1. Introduction

In an increasingly digitized world, website content must be accessible to all, including people with disabilities. The World Wide Web Consortium (W3C) [1] has developed guidelines, such as the Web Content Accessibility Guidelines (WCAG), to promote standards that improve the accessibility of websites for people with various disabilities. W3C continues to work on new versions of web accessibility guidelines and standards to ensure that people with disabilities can use the Web on the same basis as people without disabilities. These guidelines or standards have become laws, policies, or references in some countries to comply with accessibility on websites. However, despite these guidelines or standards, many websites are still inaccessible to people with disabilities. Some tools have been created to check the accessibility of websites; some of these tools are automated, but they can only provide preliminary results that must be validated by a human expert. For more comprehensive results on website accessibility, tests must be performed with end users and experts, in addition to automatic evaluation using various tools. Applying these evaluations and tests can be time-consuming and prone to website WCAG compliance errors. Therefore, in the current technological landscape, artificial intelligence (AI) may offer solutions to improve accessibility evaluation on websites for WCAG compliance with less work effort.

In this digitized world, AI can break down barriers and make technology more accessible, regardless of people's capabilities. AI can also improve the accessibility of information on the Web and the user experience [2]. AI tools, such as natural language processing (NLP), machine learning, and computer vision, can help developers create more inclusive websites that accommodate the diversity of web users. Overcoming traditional barriers to web accessibility requires innovative solutions that incorporate AI as a development or testing tool. AI can also reduce the time spent on designing and developing user interfaces [3] by considering web accessibility guidelines and standards, which make websites more accessible. Nevertheless, it is imperative that AI is always safe for society, aligns with human values, and prioritizes the well-being of individuals and communities. Responsible AI [4,5], addresses the development, deployment, and use of artificial intelligence systems in a manner that is ethical, transparent, fair, and accountable. In addition, responsible AI must also consider that AI systems should be designed and deployed in a manner that actively prevents discrimination against people with disabilities, ensuring equitable access and outcomes for all.

According to United Nations Educational, Scientific and Cultural Organization (UNESCO) [6], the changes brought about by the rapid development of information and communication technologies (ICT) not only create diverse opportunities for humanity, but also pose new ethical challenges. One of these challenges is unhindered free access to information in a digitally connected world that allows universal reach. Moreover, the United Nations, in the Convention on the Rights of Persons with Disabilities (CRPD) [7], defines access to ICT as a fundamental human right. Furthermore, the CRPD encourages states to promote access for people with disabilities to ICT, including the Internet.

The World Health Organization (WHO), in its latest "World Report on Health Equity for People with Disabilities", estimates that "approximately 1.3 billion people, or 16% of the population, have a significant disability" [8, pp. 3], compared with the "World Report on Disability" 2011 where "more than a billion people are estimated to live with some form of disability, or about 15% of the world's population (based on 2010 global population estimates). This is higher than previous World Health Organization estimates, which date from the 1970s and suggested around 10%" [9, pp. 7]. According to WHO data, there is an increase in the number of people with disabilities in the world, which can be attributed to genetic factors, accidents, chronic diseases, genetic malformations, etc. Therefore, considering the diverse needs of people with disabilities, companies can access a vital market segment that was previously unattended. For this, companies must adopt accessibility on their websites and digital content to reach a broader customer base. In addition, by complying with web accessibility, companies comply with legal requirements that reduce the risk of legal repercussions that safeguard their reputation.

In web accessibility [10], AI can enable automated testing and customization of user experience, allowing websites to dynamically adapt to the needs of people with visual, hearing, or motor disabilities. Training models can do this adaptation with user behavioral data, such as text size, contrast, or navigation. In addition, NLP and AI-assisted speech recognition systems offer new opportunities to understand, analyze, and respond to human speech. NLP enables machines to recognize and respond to spoken or written language. In some accessibility systems, NLP converts spoken language into text, allowing captions to be created or textual content to be automatically adapted. AI can also automatically translate websites into different languages for people with different linguistic dialects. Users can also manually edit translations to optimize text quality.

Therefore, the systematic mapping study (SMS) aims to objectively and rigorously identify, evaluate, and analyze relevant studies, following a well-defined protocol to ensure the inclusion of as many IA studies on web accessibility as possible. This SMS analyzes trends, findings, and potential research gaps in 53 selected articles. Before conducting this SMS, we ensured that there was no similar literature review [11] through an exhaustive search of scientific databases from ACM Digital Library, IEEE Xplore, Scopus, and Web of Science. An SMS establishes a solid foundation for improving knowledge, promotes theoretical development, closes areas that have been studied too much, and reveals areas that need to be investigated [12]. The methodology is based on a combination of the methods proposed by Kitchenham [13,14], which are widely used in computer science, and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [15,16]. The scope of application of this SMS covers any eligible publication until July 2025.

The document's content has the following structure: Section 2 presents the background of the research to help the reader understand the results and the discussion. The concepts described in the background are: web accessibility, web accessibility tools, artificial intelligence, and generative artificial intelligence. Section 3 presents the methodology used for the development of the SMS. The methodology took into account the PRISMA and Kitchenham guidelines and also followed the structure detected in numerous literature reviews in computer science. Section 4 presents the SMS results. The results present trends in bibliometric analysis and answering the research questions with the findings. Section 5 discusses the results of the SMS. The interpretation and implications of the results are discussed. Section 6 presents the limitations of the SMS. Finally, Section 7 presents the conclusions and future work.

2. Background

This section is necessary to interpret the results obtained from the SMS. It describes the concepts of web accessibility, web accessibility tools, AI, and generative AI.

2.1. Web accessibility

The W3C [17] is a global community that develops open standards to ensure the long-term growth of the Web. The work of W3C includes developing guidelines and resources to make the Web more accessible and inclusive, ensuring that everyone can access and benefit from its information and services. The W3C has created the WCAG [1], with principles, guidelines, and conformance criteria that guide the creation of accessible web content for people with visual, hearing, motor, cognitive, and other disabilities. The WCAG provides recommendations for improving the accessibility of websites. Different versions of the WCAG have been created on the basis of previous versions. The different versions of WCAG are: WCAG 1.0 [18], WCAG 2.0 [19], WCAG 2.1 [20], WCAG 2.2 [21] and the draft of WCAG 3.0 [22]. It is important to note that WCAG 2.2 is based on WCAG 2.1, and, in turn, WCAG 2.1 is based on WCAG 2.0. Therefore, compliance with the most current version of the WCAG will be attributed to compliance with all previous versions. In this context, WCAG 2.2 maximizes the scope of recommendations to improve the accessibility of websites. WCAG improves the accessibility of websites by allowing people with and without disabilities to use the Web under the same conditions. Because of this, the WCAG has become an international standard for web accessibility and has been adopted as law and policy in many countries [23].

2.2. Web accessibility tools

The WCAG has been implemented in programs or online services that allow checking web accessibility [24]. It is important to emphasize that automatic web accessibility evaluation tools perform a preliminary review of websites' accessibility; for a complete review, it is also necessary to perform the evaluation with experts and end users [25]. Another important fact is that automatic web accessibility evaluation tools give different results, that is, the results differ from one to another [26]. Therefore, to find the greatest number of accessibility barriers, websites should be evaluated with several tools. The web accessibility tools can be classified into specific and general tools [27]. Specific tools evaluate the accessibility of one or more success criteria, such as contrast, HTML code, CSS, JavaScript, etc. The general tools try to evaluate the principles, guidelines, and success criteria of the WCAG with their conformance levels A, AA, and AAA.

2.3. Artificial intelligence

AI has transcended and gained greater prominence in the era of big data in various fields of knowledge. Society has witnessed remarkable successes achieved by AI in machine translation, speech recognition, image classification, and information retrieval [28]. AI aims for a machine to simulate and interpret the world as humans do, focusing on intelligent agents that learn from past experiences and solve problems effectively [29]. Therefore, an AI solution relies on the quality, consistency, integrity, precision, size, and completeness of the data and the infrastructure to test, train, and deploy it.

AI technologies may play an essential role in web accessibility by generating more intuitive and easy-to-navigate content for people with disabilities [30]. Currently, AI algorithms like deep learning and reinforcement learning have advanced significantly. Specialized models such as convolutional neural networks and recurrent neural networks have gained prominence for their ability to analyze images, audio, and even video [31]. In addition, Generative artificial intelligence (GenAI) can make real-time adjustments to content presentation, such as layout based on user feedback and modifying text size and contrast, thus improving accessibility [32]. This adaptability is essential in Web 3.0, where semantic web technologies aim to create a more interconnected and intelligent web experience [33].

2.4. Generative artificial intelligence

GenAI is an AI capable of creating new content and solutions using advanced machine learning algorithms from existing data. These algorithms learn from large datasets, allowing GenAI to generate results ranging from new and original content, text, images, video or audio, to complex decision-making scenarios. GenAI is used in different sectors, such as industry, education, commerce, governance, software development, etc. GenAI is one of the most widely used research areas today as it drives innovation through the production and consumption of content [34]. It also influences companies to analyze data more effectively and create new value propositions [35].

In addition, GenAI can automate the generation of alternative text for images and videos, which is essential for users who rely on screen readers. GenAI can produce accurate, descriptive text for visual media content through the use of NLP to improve the accessibility of websites for visually impaired users. This capability improves the user experience and ensures compliance with accessibility standards such as WCAG [30]. Some of the GenAI tools [36] are Bing, ChatGPT, ChatSonic, Bard, Copilot, DeepSeek, HuggingChat, Jasper AI, Perplexity AI, YouChat, Poe, etc.

3. Methodology

The methodology applied in this SMS is based on a combination of the method proposed by Kitchenham [13,14], widely used in computer science, and PRISMA [15,16] to ensure the quality of the review process and minimize bias. PRISMA aims to perform transparent and systematic reviews with or without meta-analysis using a checklist. Therefore, this section presents an overview of the SMS methodology following the

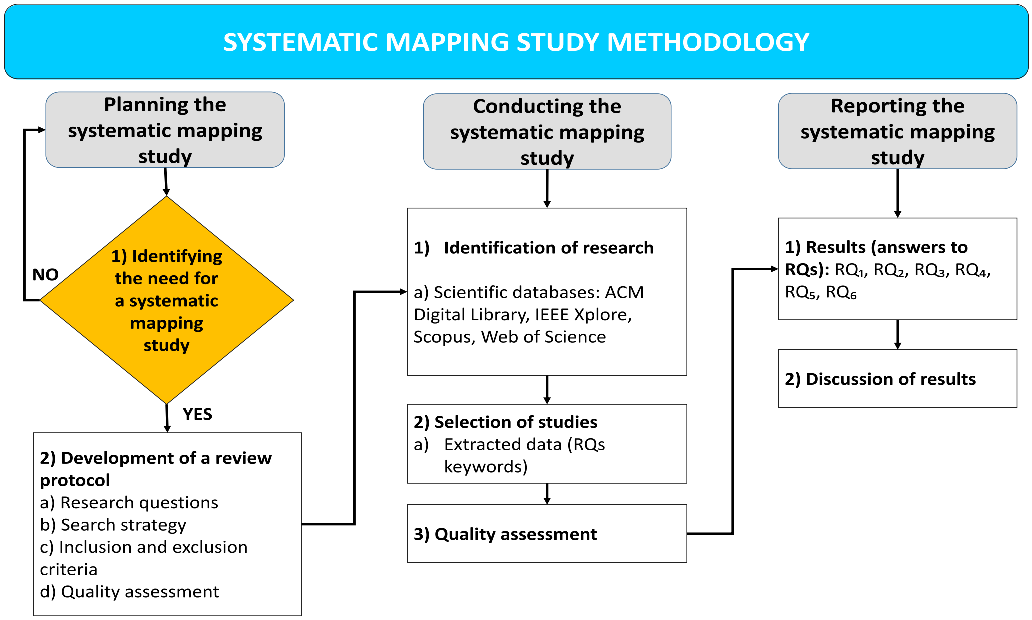

Fig. 1. Flow chart of the SMS methodology.

Kitchenham guidelines, which include the following steps: planning the review, conducting the review, and reporting the review. The scope of this SMS encompasses any eligible publication up to and including July 2025. Fig. 1 presents the flow chart of the SMS methodology, which includes the steps to plan, conduct, and report the SMS. Fig. 2 presents the PRISMA flow chart summarized with the stages of identification, screening/eligibility, and included studies.

The following subsections detail each step in the Planning and Conducting phases. The Sections 4 Results and 5 Discussion presents the document's reporting.

3.1. Planning the systematic mapping study

This subsection identifies the need to develop an SMS by performing search strings with keywords that allow finding existing literature reviews in scientific databases. In addition, the review protocol that guides this SMS is defined.

3.1.1. Identifying the need for a systematic mapping study

Before making an SMS, it is necessary to check whether similar literature reviews have already been performed and, if so, to verify when they have been performed and how they differ from ours to see if it makes sense to make a new SMS and not repeat what has already been done. The need for an SMS was determined by creating custom search strings with keywords "artificial intelligence" and "web accessibility" and their synonyms or substitute terms for the scientific databases ACM Digital Library, IEEE Xplore, Scopus, and Web of Science. ChatGPT is used as a replacement term or synonym in search strings because it is often used as a general term for AI. In addition, we searched for studies published in the ACM Digital Library and IEEE Xplore by adding "review" at the end of the search strings. Likewise, we searched for studies published in Scopus classified as "Review" by adding to the end of the search string (LIMIT-TO (DOCTYPE, "re")). Finally, we searched the Web of Science for studies classified as "Review Article" by adding to the end of the search string (DT=("REVIEW")). The search strings created for each scientific database are the following:

- **ACM Digital Library:** Title:((("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG) AND (review))) OR Abstract:((("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG) AND (review))) OR Keyword:((("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG) AND (review)))
- **IEEE Xplore:** (("Document Title":"artificial intelligence" OR "Document Title":AI OR "Document Title":chatgpt OR "Document Title":"large language model*" OR "Document Title":LLM*) AND ("Document Title":"web accessibility" OR "Document Title":WCAG) AND ("Document Title":review)) OR (("Abstract": "artificial intelligence" OR "Abstract":AI OR "Abstract":chatgpt OR "Abstract":"large language model*" OR "Abstract":LLM*) AND ("Abstract": "web accessibility" OR "Abstract":WCAG) AND ("Abstract":review)) OR (("Author Keywords":"artificial intelligence" OR "Author Keywords":AI OR "Author Keywords":chatgpt OR "Author Keywords":"large language model*" OR "Author Keywords":LLM*) AND ("Author Keywords":"web accessibility" OR "Author Keywords":WCAG) AND ("Author Keywords":review))
- **Scopus:** TITLE-ABS-KEY-AUTH(("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG)) AND (LIMIT-TO (DOCTYPE, "re"))
- **Web of Science:** ((TI="artificial intelligence" OR TI=AI OR TI=chatgpt OR TI="large language model*" OR TI=LLM*) AND (TI="web accessibility" OR TI=WCAG)) OR ((AB="artificial intelligence" OR AB=AI OR AB=chatgpt OR AB="large language model*" OR AB=LLM*) AND (AB="web accessibility" OR AB=WCAG)) OR ((AK="artificial intelligence" OR AK=AI OR AK=chatgpt OR AK="large language model*" OR AK=LLM*) AND (AK="web accessibility" OR AK=WCAG)) AND (DT= ("REVIEW"))

We used previously created search strings to search for studies in the scientific databases ACM Digital Library, IEEE Xplore, Scopus, and Web of Science. We found nine reviews: three in ACM Digital Library, four in Scopus, two in Web of Science, and none in IEEE Xplore. Two of the nine studies were discarded because they were duplicates and three because they were not a literature review per se. The remaining four studies were joined by three other studies from conferences that were excluded from the SMS. Three of the seven studies are not related to our SMS, so they are discarded, leaving four reviews of the literature for analysis. The Table 1 shows a synthesis of the four literature reviews and their differences with our SMS.

Table 1
Literature reviews over time on AI in web accessibility.

Reference	Synthesis of literature reviews	What makes our SMS different?
[37]	In 2022, existing work on AI developments for evaluating web accessibility was analyzed. The findings identified some potentialities of AI and possible challenges in web accessibility. It was noted that AI can significantly improve the interaction of people with disabilities through the automatic generation of image descriptions, captions in videos, and chatbot systems. However, challenges to be solved, such as the generation of inadequate image descriptions and problems related to accuracy and system infrastructure, were also identified. In addition, applying AI techniques has limitations, such as complexity and associated costs. Finally, the paper highlights the importance of further research and developing technologies that optimize web accessibility for all users.	This literature review identified some potentialities of AI and possible challenges in web accessibility. The main difference from our SMS is that we analyzed AI approaches, models, classification and libraries.
[38]	In 2022, AI-based sign language recognition was examined, and its importance for people with hearing and speech impairments was highlighted. In addition, various methodologies employed, such as computer vision and machine learning algorithms, were analyzed. The results identified challenges in recognition accuracy and including multiple sign languages. One finding was the need for the development of accessible applications for mobile devices, concluding that an approach is required to enable the creation of more innovative sign language recognition systems.	This literature review examined AI-based sign language recognition. The main difference with our SMS is that we determined AI tools, web accessibility tools, and other technologies included in the selected studies on AI in web accessibility.
[39]	In 2025, the latest advances in assistive technologies for web accessibility were analyzed. The results showed accessible multimodal systems for data visualization, intelligent readers for blind people, open-source libraries for accessible visualizations, and lexical simplification systems for users of diverse languages. It is concluded that AI and speech recognition offer more employment opportunities for people with visual impairments.	This literature review analyzed the latest developments in assistive technologies for web accessibility. The main difference with our SMS is that we determine the WCAG and disabilities analyzed in the studies.
[40]	In 2025, a systematic review analyzed web accessibility and AI in 31 studies conducted between 2019 and 2025. The review highlights generating alternative text for images using AI, automating compliance assessments, correction suggestions, and alternative interface design.	This review analyzes the intersection between web accessibility and AI using AI-based methods and WCAG principles. The main difference with our SMS is that we determine the WCAG, principles, guidelines, success criteria and conformance levels (A, AA and AAA).

In summary, the first review of the literature [37] identified some potentialities of AI and possible challenges in web accessibility. The second review of the literature [38] examined AI-based sign language recognition. The third review of the literature [39] analyzed the latest developments in assistive technologies for web accessibility. The fourth review of the literature [40] analyzed the intersection of web accessibility and AI. Unlike these four reviews of the literature, our SMS focuses on AI in web accessibility. Our SMS begins with a bibliometric analysis that answers the frequency of publications of IA studies on web accessibility over time, the countries of the first authors, and the venues of publication. The second part answers six RQs: empirical results that have been conducted on the use of AI in web accessibility, approaches, models, classification and libraries, IA tools, web accessibility tools and other technologies, WCAG and disabilities.

3.1.2. Development of a review protocol

According to some studies [41,42], Scopus includes more journals than Web of Science. However, some journals are included in the Web of Science, but not in Scopus. Therefore, for results to be comprehensive on a topic, several databases should be selected for query in most cases, which should be relevant or even partially relevant [43]. In our SMS, the IEEE Xplore database was used, in addition to the ACM Digital Library, Scopus, and Web of Science databases. Considering that IEEE Xplore and ACM Digital Library are scientific databases on engineering and computer science, they are expected to have many publications on web accessibility and AI. In addition, they provide an advanced search interface that allows replicating the same search strings proposed for Scopus and Web of Science. The review protocol determines research questions, search strategies in scientific databases and other publication venues, criteria for including and excluding studies, and quality assessment parameters.

Research questions. This SMS addresses several research questions (RQ) that we have classified into four dimensions: empirical results (RQ_1), AI technology (RQ_2, RQ_3), tools (RQ_4), and web accessibility (RQ_5, RQ_6). These questions were defined according to an iterative process as the articles were reviewed. Initially, there were fewer questions because some were very general and encompassed several concepts. However, after reviewing the articles and given the results obtained, it was considered better to have a finer granularity, so six questions were finally defined. We list our RQs below along with the rationale for each one.

1. *Empirical results dimension.* An RQ has been created to determine the empirical results obtained in the selected studies. The RQ and its motivation are presented below.

   > RQ_1. What empirical results have been conducted on the use of AI in web accessibility?

   SMS analyzes empirical results through the objectives and results of selected studies that attempt to use AI to solve web accessibility problems through data mining, data synthesizing, results interpreting, and knowledge generation. This question focuses on determining and analyzing the objectives and results of the selected studies. The SMS answers this question by conducting a comprehensive review of each study.
2. *AI technology dimension.* Two RQs have been created to respond to AI approaches, AI models, AI classifications, and libraries used in the selected studies. The RQs and their motivation are presented below.

   > RQ_2. What are the AI approaches and models used in the studies on AI in web accessibility?

   > RQ_3. What are the AI classifications and libraries used in the studies on AI in web accessibility?

   These questions focus on AI approaches, AI models, AI classifications, and AI libraries used for web accessibility. The results of the selected studies answer these questions in the SMS.

3. *Tools dimension.* An RQ has been created to determine the AI tools, the web accessibility tools, and other technologies included in the results of the selected studies. The RQ and its motivation are presented below.

> RQ_4. What AI technologies, web accessibility evaluation tools, and other technologies are used to improve web accessibility?

The question focuses on determining the AI technologies, web accessibility evaluation tools, and other technologies included in terms of design, evaluation, testing, etc., in the selected studies. The question is answered in the SMS with the results found in each study.

4. *Web accessibility dimension.* Two RQs have been created to respond to the WCAG and the disabilities included in the results of the selected studies. The two RQs and their motivations are presented below.

> RQ_5. What WCAGs are included in the studies?

This question determines the WCAG, the principles, the guidelines, the success criteria, and the conformance levels (A, AA, and AAA). This question is answered in the SMS with the results found in each study.

> RQ_6. What disabilities are included in the studies?

This question collects the disabilities of those who benefit from the contributions of the selected studies. In addition, disabilities are defined by the WCAG success criteria to argue that other disabilities may benefit from the contributions. This question is answered in the SMS with the results found in each study.

After defining the RQs related to AI in web accessibility, these questions will be answered by reviewing the selected studies. However, to determine the scope of the review, we use the PICOC (Population, Intervention, Comparison, Outcomes, Context) method proposed by [44]:

- **Population (P):** AI.
- **Intervention (I):** AI in web accessibility.
- **Comparison (C):** Approaches, models, classification and libraries, AI tools, web accessibility tools and other technologies, WCAG and disabilities.
- **Outcomes (O):** AI awareness in the application of web accessibility.
- **Context (C):** Accessibility on websites.

The results section in this SMS answers the defined RQs. The RQs are responded to after an exhaustive analysis of each selected study, and then the results are interpreted and synthesized.

Search strategy. This research focuses on two keywords: "artificial intelligence" and "web accessibility". These keywords with their synonyms or substitution terms used in the search strings are presented below.

- Artificial intelligence: ("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*)
- Web accessibility: ("web accessibility" OR WCAG)

The search strategy consists of creating custom search strings with keywords, synonyms, Boolean operators (AND, OR), double quotes (""), and the asterisk (*) as a wildcard symbol. Boolean operators help to join and combine keywords and synonyms, while double quotes allow searching for specific phrases. The asterisk will enable us to search for singular and plural forms of keywords or synonyms.

Considering that in this SMS, we seek to integrate various sources and perspectives on AI in web accessibility, it is necessary to consult several sources of information or scientific databases to extract many articles [45]. Therefore, the documents were extracted from ACM Digital Library, IEEE Xplore, Scopus, and Web of Science. For this purpose, we created a specific search string for each scientific database. The search strings used are presented below:

- **ACM Digital Library:** Title:((("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG))) OR Abstract:((("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG))) OR Keyword:((("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG)))
- **IEEE Xplore:** (("Document Title":"artificial intelligence" OR "Document Title":AI OR "Document Title":chatgpt OR "Document Title":"large language model*" OR "Document Title":LLM*) AND ("Document Title":"web accessibility" OR "Document Title":WCAG)) OR (("Abstract":"artificial intelligence" OR "Abstract":AI OR "Abstract":chatgpt OR "Abstract":"large language model*" OR "Abstract":LLM*) AND ("Abstract":"web accessibility" OR "Abstract": WCAG)) OR (("Author Keywords":"artificial intelligence" OR "Author Keywords":AI OR "Author Keywords": chatgpt OR "Author Keywords":"large language model*" OR "Author Keywords":LLM*) AND ("Author Keywords":"web accessibility" OR "Author Keywords":WCAG))
- **Scopus:** TITLE-ABS-KEY-AUTH(("artificial intelligence" OR AI OR chatgpt OR "large language model*" OR LLM*) AND ("web accessibility" OR WCAG))
- **Web of Science:** ((TI="artificial intelligence" OR TI=AI OR TI=chatgpt OR TI="large language model*" OR TI=LLM*) AND (TI="web accessibility" OR TI=WCAG)) OR ((AB="artificial intelligence" OR AB=AI OR AB=chatgpt OR AB="large language model*" OR AB=LLM*) AND (AB="web accessibility" OR AB=WCAG)) OR ((AK="artificial intelligence" OR AK=AI OR AK=chatgpt OR AK="large language model*" OR AK=LLM*) AND (AK="web accessibility" OR AK=WCAG))

Inclusion and exclusion criteria. Inclusion and exclusion criteria in an SMS guide the search and analysis process, ensuring that only articles that contribute value to the research topic are included. Inclusion criteria allow the selection of studies that contribute significantly to the review. However, exclusion criteria try to eliminate irrelevant studies, those with bias, or those that do not meet the expectations of the review. The inclusion criteria defined for this SMS are as follows:

- I_1. Studies written in English AND,
- I_2. Studies must be articles, books, book chapters, or conferences AND,
- I_3. Studies must be a full or short paper (not an abstract, extended-abstract, novelty, conference review, poster, preprint, or dissertation/thesis).

The exclusion criteria defined for this SMS are as follows:

- E_1. Studies that are review articles (e.g., an SLR, scoping review, mapping review, etc.) OR,
- E_2. Studies duplicate OR,
- E_3. Studies that do not have "artificial intelligence" on "web accessibility" as an object of study (for example, accessible PDF, social network, educational websites, etc.) OR,
- E_4. Studies not available (Studies that cannot be downloaded).

Table 2
Quality assessment checklist.

No.	Quality assessment question	Expected valuation
QA_1	Do the studies answer one or more of the research questions?	Yes (value=1.00) if the studies answer one or more of the RQs; No (value=0.00)
QA_2	Are the research objectives related to AI in web accessibility?	Yes (value=1.00) if the two keywords defined in the "search strategy" (AI and web accessibility) or the substitute terms are included in the objective; Partially (value=0.50), if only one of the two is included in the objective; No (value=0.00) if none.
QA_3	Are the keywords defined in the search strategy in the title, abstract or author keywords of the studies?	Yes (value=1.00) if the two keywords defined in the "search strategy" (AI and web accessibility) or the substitute terms are included in the title; Partially (value=0.50) if the two keywords are included in the abstract and authors' keywords; No (value=0.00) if not included in any of the two cases.

Quality assessment checklist. Quality assessment (QA) is a set of questions to evaluate the inclusion or exclusion of studies in the SMS. Therefore, three QAs have been created to determine whether the selected studies allow the RQs to be answered. Each QA has been assigned a maximum value of 1.00, giving a total score of 3.00. The minimum score that studies must achieve to be included in the SMS is 2.00. The defined QAs are presented in Table 2, together with their expected valuation.

3.2. Conducting the systematic mapping study

In conducting the SMS, the process of searching and selecting sources, study selection, and quality assessment is determined. In addition, the studies considered in our SMS are extracted and selected from the defined scientific databases, complied with the inclusion and exclusion criteria, quality assessment, and thematic analysis.

3.2.1. Identification of research

This research considers studies indexed in ACM Digital Library, IEEE Xplore, Scopus, and Web of Science on AI in web accessibility up to July 2025. These scientific databases are used because they index studies published in high-impact journals and top-level conferences. In addition, these scientific databases meet the following requirements:

- Peer reviewers evaluate the studies.
- Index research articles, review articles, books, chapters of books, conference proceedings, etc.
- Allows the use of custom search strings.

3.2.2. Selection of studies

After applying search strings in the scientific databases ACM Digital Library, IEEE Xplore, Scopus, and Web of Science, 259 studies were found. Then, after applying the inclusion and exclusion criteria, 53 studies were selected for the analysis in this SMS. The details of the study selection process are presented in Fig. 2.

3.2.3. Quality assessment

The studies extracted after applying the inclusion and exclusion criteria were also evaluated with the QA defined in Table 2. After applying the QA, the results are presented in Table 3, with their QA values and total scores sorted by year, document type and country of first author affiliation. The studies selected in this SMS had to score a minimum of 2.00 in the final Score. The minimum-maximum normalization [46] was used to calculate the Score. The normalization formula is presented in the following Eq. (1):

$$Normalization = \frac{Score - min(Score)}{[max(Score) - min(Score)]} \quad (1)$$

The min(Score) value is equal to 0.00, max(Score) value is equal to 3.00 and the Score is the value to be calculated with normalization.

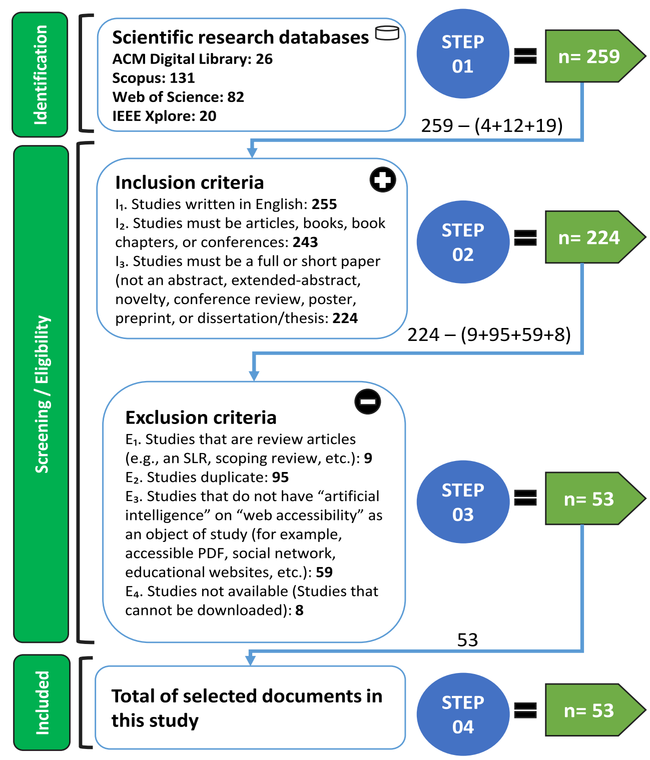

Fig. 2. PRISMA flow chart of the process of inclusion and exclusion of studies.

3.2.4. Thematic analysis

The six-phase thematic analysis [100] was performed to analyze the studies. In the first phase, familiarizing yourself with your data, the selected studies were read repeatedly and initial ideas and insights were noted. In the subsequent phase, generating initial codes, the identification of preliminary codes was performed. In the third phase, searching for themes, potential themes were identified from the codes. Following this, reviewing themes, the identified themes were further reviewed to assess their validity. In the fifth phase, defining and naming themes, the themes were refined, defined, and named. Finally, producing the report, the named themes were reported in the last step of the PRISMA process, as shown in Fig. 2.

3.3. Reporting the systematic mapping study

In this stage, the RQs are answered according to the findings found in the selected studies. The results highlight the most important aspects found in the studies. The report of trends and findings is presented in the following section.

Table 3
Selected studies and quality assessment results, sorted by year, document type, and country.

Reference	Year	Document type	Country	Quality assessment			
				QA_1	QA_2	QA_3	Score
[47]	2018	Conference paper	France	1.00	0.50	1.00	2.50
[48]	2018	Conference paper	India	1.00	1.00	1.00	3.00
[49]	2018	Conference paper	Italy	1.00	1.00	1.00	3.00
[50]	2020	Conference paper	Ecuador	1.00	1.00	1.00	3.00
[51]	2020	Conference paper	United Kingdom	1.00	1.00	1.00	3.00
[52]	2022	Conference paper	India	1.00	1.00	1.00	3.00
[53]	2022	Conference paper	United Kingdom	1.00	1.00	1.00	3.00
[54]	2023	Article	Bulgaria	1.00	1.00	1.00	3.00
[55]	2023	Article	India	1.00	1.00	0.50	2.50
[56]	2023	Article	United Kingdom	1.00	0.50	0.50	2.00
[57]	2023	Conference paper	Italy	1.00	0.50	0.50	2.00
[58]	2023	Conference paper	Italy	1.00	0.50	0.50	2.00
[59]	2023	Conference paper	Qatar	1.00	1.00	1.00	3.00
[60]	2024	Article	Brazil	1.00	0.50	0.50	2.00
[61]	2024	Article	Brazil	1.00	1.00	0.50	2.50
[62]	2024	Article	Ecuador	1.00	0.50	1.00	2.50
[63]	2024	Article	India	1.00	1.00	1.00	3.00
[64]	2024	Article	Norway	1.00	1.00	1.00	3.00
[65]	2024	Article	Norway	1.00	1.00	1.00	3.00
[66]	2024	Article	Spain	1.00	1.00	1.00	3.00
[67]	2024	Article	Turkey	1.00	1.00	0.50	2.50
[68]	2024	Article	United States	1.00	1.00	1.00	3.00
[69]	2024	Conference paper	Bulgaria	1.00	1.00	1.00	3.00
[70]	2024	Conference paper	Canada	1.00	1.00	1.00	3.00
[71]	2024	Conference paper	China	1.00	1.00	1.00	3.00
[72]	2024	Conference paper	Ecuador	1.00	0.50	1.00	2.50
[73]	2024	Conference paper	France	1.00	1.00	1.00	3.00
[74]	2024	Conference paper	India	1.00	1.00	0.50	2.50
[75]	2024	Conference paper	India	1.00	1.00	1.00	3.00
[76]	2024	Conference paper	Italy	1.00	0.50	0.50	2.00
[77]	2024	Conference paper	Italy	1.00	1.00	1.00	3.00
[78]	2024	Conference paper	Republic of Korea	1.00	1.00	1.00	3.00
[79]	2024	Conference paper	United States	1.00	1.00	1.00	3.00
[80]	2024	Conference paper	United States	1.00	1.00	1.00	3.00
[81]	2024	Conference paper	United States	1.00	1.00	1.00	3.00
[82]	2024	Conference paper	United States	1.00	1.00	1.00	3.00
[83]	2024	Conference paper	United States	1.00	1.00	0.50	2.50
[84]	2024	Conference paper	United States	1.00	1.00	1.00	3.00
[85]	2024	Conference paper	United States	1.00	1.00	1.00	3.00
[86]	2025	Article	India	1.00	1.00	0.50	2.50
[87]	2025	Article	Italy	1.00	1.00	0.50	2.50
[88]	2025	Article	United States	1.00	1.00	1.00	3.00
[89]	2025	Article	United States	1.00	1.00	1.00	3.00
[90]	2025	Book Chapter	Canada	1.00	1.00	1.00	3.00
[91]	2025	Book Chapter	United States	1.00	1.00	1.00	3.00
[92]	2025	Conference Paper	India	1.00	1.00	0.50	2.50
[93]	2025	Conference Paper	India	1.00	1.00	0.50	2.50
[94]	2025	Conference Paper	Italy	1.00	1.00	1.00	3.00
[95]	2025	Conference Paper	Portugal	1.00	1.00	1.00	3.00
[96]	2025	Conference Paper	Romania	1.00	1.00	1.00	3.00
[97]	2025	Conference Paper	Romania	1.00	1.00	1.00	3.00
[98]	2025	Conference Paper	Saudi Arabia	1.00	1.00	1.00	3.00
[99]	2025	Conference Paper	United States	1.00	1.00	1.00	3.00

***Country.** Countries were obtained from the affiliation of the first author of each document.

4. Results

This section is divided into two parts: a bibliometric analysis and an answer to the research questions based on the findings. The bibliometric analysis outlines the publication trends of the selected studies. Subsequently, the research questions (RQ_1, RQ_2, RQ_3, RQ_4, RQ_5, and RQ_6) are answered based on the results derived from the selected studies.

4.1. Bibliometric analysis of selected studies

The bibliometric analysis presents an overview of the data (trend by year of publication, countries of the first author, publication venues, and document types) of the 53 studies selected for analysis. The 53 studies were published in 47 publication venues between 2018 and July 2025, 18 countries of the first author, 35 studies are published as conference articles, 16 studies are published as journal articles, and 2 studies are published as book chapters.

4.1.1. Scientific production per year

The 53 studies selected for analysis in this SMS were published between 2018 and July 2025. The most publications occurred in 2025 to July, with 14 documents; in 2024, with 26 documents; in 2023, with 6 documents; in 2018, with 3 documents; and in 2022 and 2020, with 2 documents every year. The results show an increase of 49.06% in 2024, indicating a growing interest in AI in web accessibility. In recent years, advances in AI have shown impressive performance in various generation tasks in different domains, such as computer vision and computational design [101].

4.1.2. Scientific production of countries over time

The 53 selected studies were published in 18 countries. For this analysis, the country of affiliation of the first author of each selected study was linked. The countries with publications in this SMS are the United States with 12 studies; India with 9 studies; Italy with 7 studies; Ecuador and the United Kingdom with 3 studies each country; Brazil, Bulgaria, Canada, France, Norway and Romania with 2 studies each country; China, Portugal, Qatar, Republic of Korea, Saudi Arabia, Spain and Turkey with 1 study each country.

4.1.3. Most relevant venues

Of the 53 studies selected for this SMS, 35 have been published in conferences, 16 in journals, and 2 in book chapters. This may be because AI technology has begun to experience breakthroughs in recent years, transforming unprecedented sectors, economies, and everyday interactions [102]. In the "International Web for All Conference", 5 studies [47,48,82–84] have been published; in the journal "Studies in Health Technology and Informatics", 2 studies [64,65] have been published; in the "Consumer Communications & Networking Conference", 2 studies [49,77] have been published; and 1 study in each of the remaining 44 publication venues. In Table A.1, we present the references of the studies selected in this SMS with their publication venues and acronyms sorted by year.

4.2. Answering the research questions with the findings

This subsection answers RQ_1, RQ_2, RQ_3, RQ_4, RQ_5, and RQ_6 according to the findings found in the selected studies. The RQs synthesize empirical results, approaches, models, classification and libraries, AI tools, web accessibility tools, other technologies, WCAG, and disabilities.

4.2.1. RQ_1. What empirical results have been conducted on the use of AI in web accessibility?

The empirical results are synthesized in this RQ through the analysis of the objectives and results of the selected studies. The most frequent words or phrases with the number of studies are analyzed in the objectives and the results are classified into nine categories that are the result of the thematic analysis.

Analysis of objectives of the selected studies. The objectives of the 53 selected studies were determined. Then, the most frequent words or phrases related to SMS were selected from the targets by counting the number of studies per word. In Fig. 3, we present the most frequent words or phrases with the number of studies of the words in the targets of the selected studies. The words that stand out the most are "AI" and "web accessibility", which allows us to determine the contribution of each study to SMS (see Appendix A for all data, Table A.2).

Analysis of results of the selected studies. The results of the selected studies have been classified by category. Therefore, the following are the most important findings on AI and web accessibility grouped into nine categories that are the result of the thematic analysis.

1. **API, web application and plugin.** Accessify API proposes creating alternative descriptions for images of any website with machine learning [48], Farfalla plugin uses AI to produce alternative texts and crowdsourcing to correct them for images or other resources [49], speech-enabled web application that integrates Dialogflow with Text-to-Speech and Speech-to-Text to improve web accessibility [74], and the WebSight extension that generates AI-based image descriptions [75], a chrome extension (WEBSumm) to summarize web content using LLMs [86], Visual Studio Code plugin integrates calls to an LLM to help developers identify and resolve accessibility issues [94], and CodeA11y a GitHub Copilot extension have been developed [99].

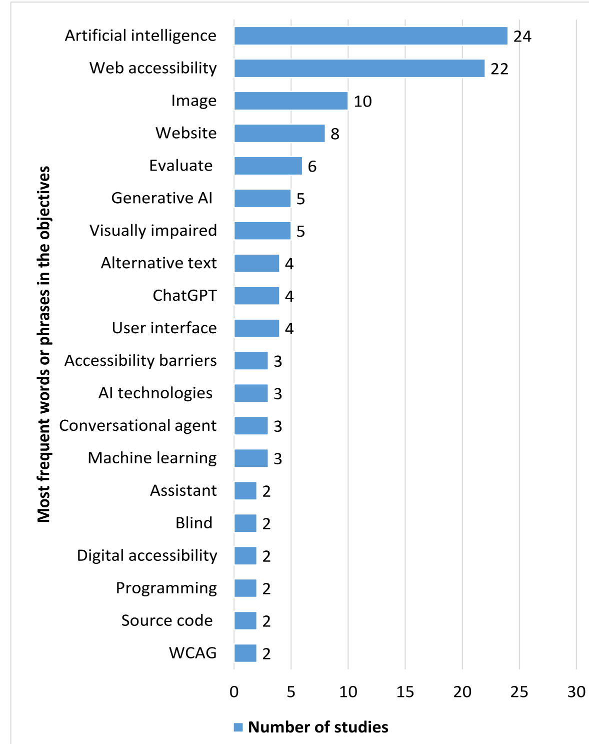

Fig. 3. Frequent words or phrases in the objectives sorted by the number of studies and words.

2. **Image and speech recognition.** Large vendors, such as Amazon, Facebook, Google, Microsoft, etc., implement image and speech recognition [47], and computer vision improves accessibility in images and websites [73].
3. **Limitations and challenges of AI in web accessibility.** Lack of accuracy and reliability in AI for web accessibility [51], promote the European Accessibility Act policy [53], new challenges with digital accessibility, AI and advanced technologies [56], accessibility barriers in AI tools [62,72], evaluation and comparison of the accessibility and readability of Google BARD and GPT [93], AI technologies and their implications for their application: bias and inclusiveness, privacy issues, complexity and usability [68], conveying the meaning of complex images to visually impaired users through descriptions remains a challenge for AI engines [83], integrating AI and internet of things with assistive technologies improves accessibility in smart cities [91], AI and machine learning can be used to detect and correct accessibility issues, but they cannot replace professional expertise in these cases [85], generative search engines can generate content with low verifiability or even hallucinatory content [71], and leverage ChatGPT's capabilities to promote awareness of accessibility, knowledge, and practical skills among professional expectations [96].
4. **Correcting and testing web accessibility with AI.** AI tools correct accessibility barriers, when their functionalities are activated but do not permanently remove them from websites [54], LLMs generate accessible content, perform tests [77], and detect problems that pure software testing currently overlooks [66], AI-based techniques reduce manual work in accessibility testing [65], AI models create the description of alt attributes of an image [67], the websites built with generative AI tools are not accessible [88], accessibility analysis of the TATA 1 mg application with a survey of 124 participants [92], system for identifying and correcting accessibility issues in real time using

machine learning algorithms [63], an artificial intelligence application that uses LLM to adaptively analyze and modify the source code of web pages, such as changing text size, color contrast settings, and font changes [90], evaluation of AI-generated user interfaces in terms of text contrast and element size requirements [97], and GenA11y automated tool that extracts elements from a page related to each success criterion and feeds them into an LLM to detect web accessibility issues [89].

5. **Automatic web accessibility correction.** Web system that allows automatic correction of web accessibility barriers associated with multimedia elements [50], ChatGPT fixes HTML accessibility issues [59], ChatGPT 3.5 outperforms Gemini and Copilot in accessibility [69], ChatGPT had accessibility violations in 84% of cases [84], ChatGPT may not be reliable for certain checks [64], Copilot improves web accessibility but requires explicit instructions [82], and automated accessibility assessments with LLM for heading-related barriers [95].
6. **Web browsing with conversational agents.** Conversational AI improves web inclusion [57], conversational navigation patterns and accessibility for 26 blind and visually impaired people with the use of assistive technology [58], and ConWeb improves accessibility for screen readers [76].
7. **Mobile application and web accessibility.** The accessibility of Seeing AI, Supersense, Envision, and Lookout applications were evaluated [55], SaGol: mobile application to search and understand images on smartphones [78], and the accessibility of mobile applications decreases compared to most current versions [60].
8. **Best practices in accessibility for AI.** Twenty-one best practices for accessibility in generative AI [79], AI coding assistant requires accessibility knowledge [80], and the combination of AI-supported practical tasks improves students' mastery of web accessibility [98].
9. **Accessibility in web forms and elements.** Generation of alt text for images [52], using LLMs to automatically generate high-quality alternative text for complex web images [87], Smart-Caption AI, a solution that uses LLM to generate descriptive text for images on web pages [70], GenAI improves accessibility in web forms [81], and design and evaluation of a tool for automatic generation of navigation aids for screen readers with topicalisation and labeling algorithms [61].

In summary, the results present multiple heterogeneous studies on AI in web accessibility. The category "API, web application and plugin" (7 studies) presents the following results: Accessify API, Farfalla plugin, Dialogflow application, WebSight extension, Chrome extension (WEBSumm), Visual Studio Code plugin, and CodeA11y extension for GitHub Copilot. The category "image and speech recognition" (3 studies) presents the following results: large providers that implement image and speech recognition (Amazon, Facebook, Google, Microsoft, etc.) and artificial vision improve accessibility in images. The category "limitations and challenges of AI in web accessibility" (12 studies) presents the following results: AI technologies and their implications for their application and improvement of accessibility, such as machine learning, which can be used to detect and correct accessibility issues but cannot replace professional expertise; GenAI tools do not comply with accessibility standards; AI and the Internet of Things with assistive technologies to improve accessibility in smart cities. The category "correcting and testing web accessibility with AI" (11 studies) presents the following results: AI tools that correct accessibility barriers using large language models (LLMs), AI-based techniques, AI models, AI tools, machine learning algorithms, and AI-generated user interfaces. The category "automatic web accessibility correction" (7 studies) presents the following result: automatic correction of web accessibility using GenAI tools such as ChatGPT, Gemini, and Copilot. The category "web browsing with conversational agents" (3 studies) presents the following result: the evaluation of the accessibility of conversational systems with the use of assistive technology. The category "mobile application and web accessibility" (3 studies) presents the following results: the evaluation of the accessibility of the Seeing AI, Supersense, Envision, and Lookout applications, as well as the SaGol application, and the accessibility of mobile applications decreases compared to most current versions. The category "best practices in accessibility for AI" (3 studies) presents the following results: 21 best practices, AI-supported practical tasks, and awareness of the use of AI in web accessibility. The category "accessibility in web forms and elements" (5 studies) presents the following results: the use of GenAI and LLMs for the creation of alternative texts, improves accessibility in web forms, and topicalization and labeling algorithms for screen readers.

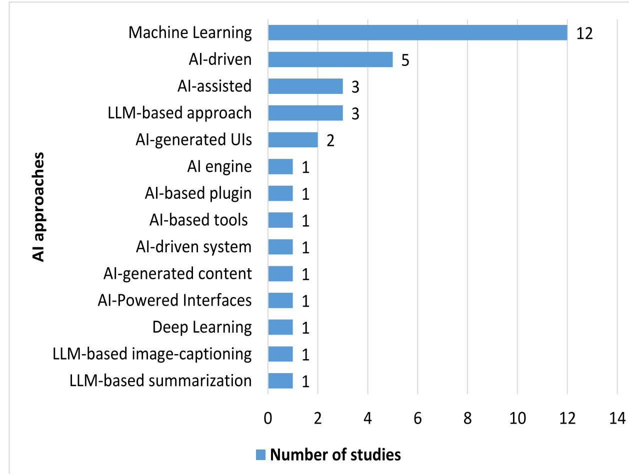

Fig. 4. AI approaches sorted by the number of studies and approaches.

4.2.2. RQ_2. What are the AI approaches and models used in the studies on AI in web accessibility?

To answer this RQ, the frequencies of AI approaches found in the selected studies have been determined to identify the most commonly used. The AI approaches found in the selected studies are the following: Machine learning [47–49,51,54,55,63,65,67,73,85,95], AI-driven [68, 71,81,88,98], AI-assisted [80,82,99], LLM-based approach [66,84,89], AI-generated UIs [96,97], AI engine [83], AI-based plugin [94], AI-based tools [61], AI-driven system [90], AI-generated content [93], AI-powered interfaces [91], Deep learning [52], LLM-based image-captioning [87], and LLM-based summarization [86] (see Appendix A for all data, Table A.3). Fig. 4 presents the AI approaches of the selected studies, sorted by the number of studies and the approach.

The frequencies of AI models found in the selected studies have been determined to identify the most commonly used. The AI models found in the selected studies are the following: Large language model (LLM) [59–61,66,69–71,77,79,80,84,86–90,94–96,98,99], Convolutional neural networks model [73,75,85], BLIP model [67,78], Neural networks model [51,85], BERT model [61], COCO-SSD24 model [51], Code generation model [82], Decision Trees [85], Deep Belief Network model [52], IDEFICS and Visual Language Model [83], Inception-v3 model [48], Language detection model and Pre-trained neural model [65], Recurrent Neural Networks Model [75], You Only Look Once (YOLO) model [73] (see Appendix A for all data, Table A.3). Fig. 5 presents the AI models of the selected studies, sorted by the number of studies and the models.

4.2.3. RQ_3. What are the AI classifications and libraries used in the studies on AI in web accessibility?

Only 22 of the 53 selected studies present an AI classification. These 22 studies are classified into Computer Vision and NLP. The AI classifications found in the selected studies are the following: NLP [47,51,52,

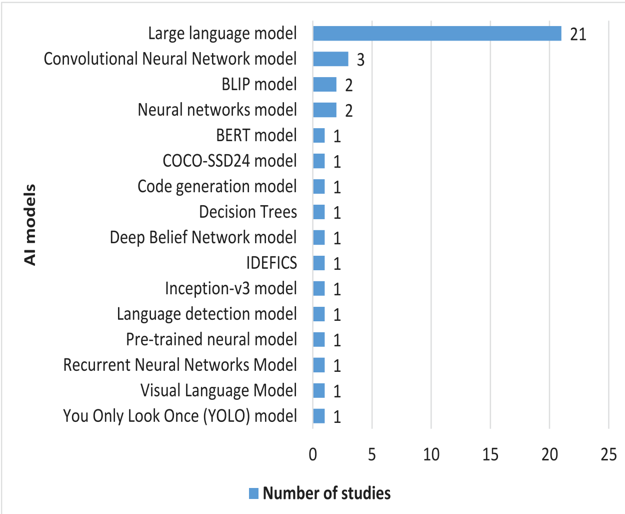

Fig. 5. AI models sorted by the number of studies and models.

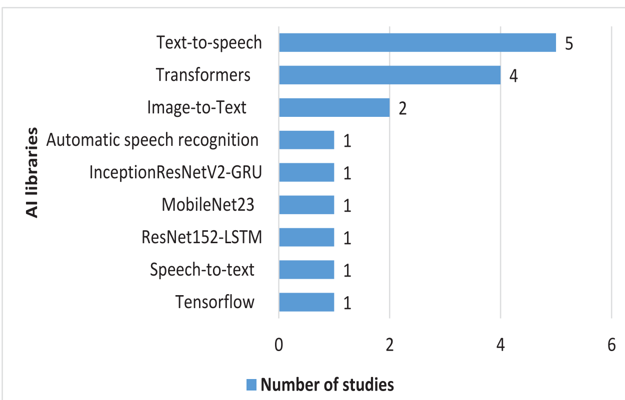

Fig. 6. AI libraries sorted by the number of studies and libraries.

54,57,58,61,64–67,71,76,84,85,87,95,96], and Computer Vision [48, 49,55,73].

Only 12 of the 53 selected studies use an AI library. The libraries found in the selected studies are the following: Text-to-speech [56,70, 71,74,75], Transformers [64,66,84,87], Image-to-Text [67,70], Automatic speech recognition [71], InceptionResNetV2-GRU and ResNet152-LSTM [75], MobileNet23 [51], Speech-to-text [74], and Tensorflow [48] (see Appendix A for all data, Table A.3). Fig. 6 presents the AI libraries of the selected studies, sorted by the number of studies and libraries.

4.2.4. *RQ_4. What AI technologies, web accessibility evaluation tools, and other technologies are used to improve web accessibility?*

This RQ examines the AI technologies and web accessibility evaluation tools used in the selected studies. It also discusses other technologies, such as programming languages, databases, screen readers, etc.

AI technologies. To determine the most commonly used AI technologies, they are identified based on their frequency of use in the selected studies. The most used AI technologies are ChatGPT, which is considered in 17 studies [59–61,64,66,69–71,77,79,80,84,87,89,93, 95,98]; Gemini, which is considered in 4 studies [66,69,87,93]; GitHub Copilot, which is considered in 4 studies [64,80,82,99]; Copilot, which is considered in 3 studies [69,76,80]; Figma AI, which is considered in 3 studies [64,96,97]; Llama, which is considered in 3 studies [86,94,95],

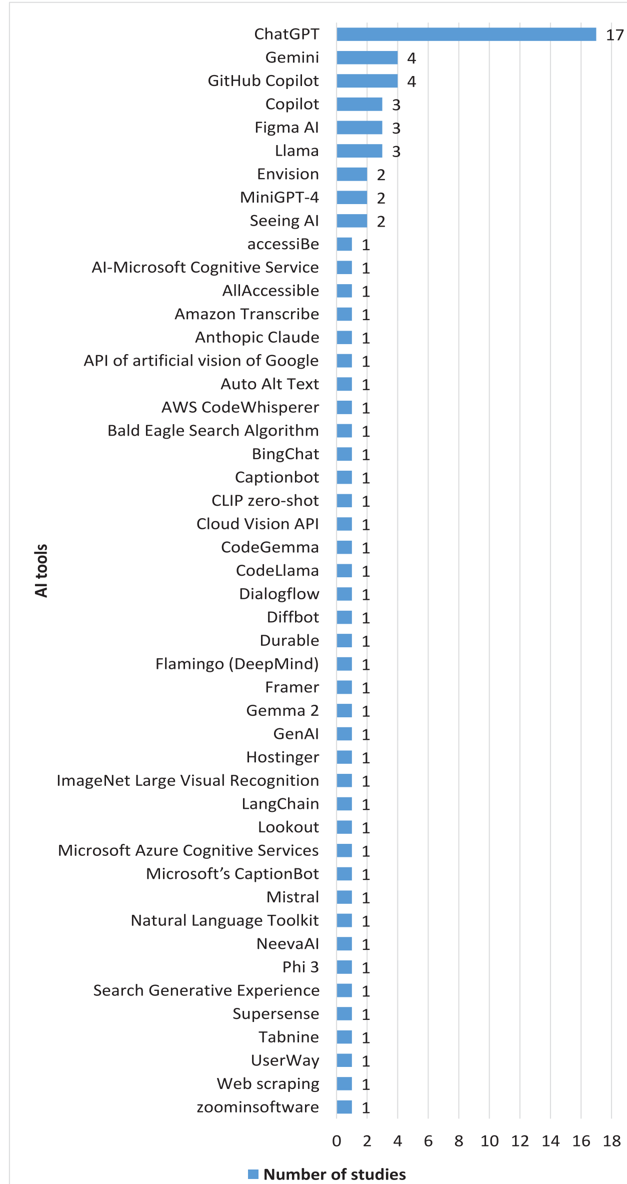

Fig. 7. AI technologies sorted by the number of studies and technologies.

Envision, which is considered in 2 studies [55,76], MiniGPT-4, which is considered in 2 studies [78,95], and Seeing AI, which is considered in 2 studies [55,92]. The rest of the AI technologies are used in only one study each (see Appendix A for all data, Table A.4). Fig. 7 presents the AI technologies of the selected studies, sorted by the number of studies and technologies.

One of the most recent models is OpenAI's GPT-4 [103], capable of analyzing text and extracting and decoding information from images. In addition, it is capable of operating with multiple languages, and, most impressively, it has shown excellent performance in tests of various difficulties, normally designed for humans. The capabilities of ChatGPT-4o [104] that stand out are its ability to solve mathematical and logical problems with detailed and clear explanations, generate source code for programming languages, and be practical and versatile in academic, technical and professional environments, including medical education. ChatGPT-4o demonstrates superiority in handling complex creative writing tasks, text analysis, and understanding scientific, literary, and logical scenarios. However, GPT-4 [105] has been found to have difficulties in value retrieval and color distinction and

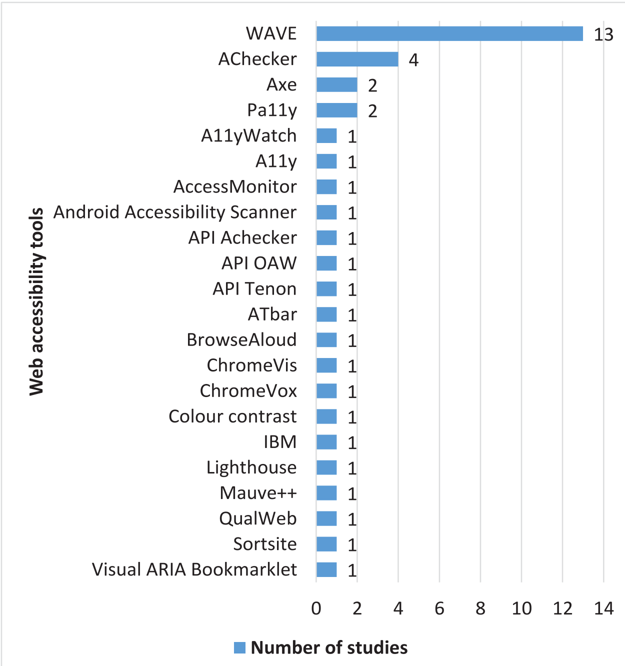

Fig. 8. Web accessibility tools sorted by the number of studies and tools.

suffers from incoherence and hallucination. In this study [105], the current capabilities and limitations of GPT-4 have been demonstrated. In addition, task sets that provide the evaluation mechanisms of multimodal LLMs have been published. Therefore, researchers need to use these models in a safer, more informed, and responsible manner.

Web accessibility evaluation tools. To determine the most widely used web accessibility evaluation tools, they are identified based on their frequency of use in selected studies. The widely used web accessibility tools are WAVE, which is considered in 13 studies [49,54,59,62,72,77,79,84,85,88,89,93,98]; AChecker, which is considered in 3 studies [66,84,93,98]; Axe, which is considered in 2 studies [85,89], Pa11y, which is considered in 2 studies [51,66]. The rest of the web accessibility tools are used in only one study each (see Appendix A for all data, Table A.4). Fig. 8 presents the web accessibility tools of the selected studies, sorted by the number of studies and tools.

Other technologies. To determine the other technologies most commonly used, they are identified based on their frequency of use in the selected studies. The other most used technologies are HTML, which is considered in 19 studies [56–59,61,63,67,69,70,73,76,77,80,84,85,89,90,95,99]; JavaScript, which is considered in 8 studies [54,63,69,70,80,84,85,87]; CSS, which is considered in 7 studies [69,70,80,84,85,90,99]; JAWS, which is considered in 5 studies [56,76,79,81,88]; Python, which is considered in 5 studies [63,65,67,70,84]; React, which is considered in 4 studies [51,80,84,94]; JSON, which is considered in 3 studies [48,50,63]; Node.js, which is considered in 3 studies [48,63,84]; NVDA, which is considered in 3 studies [56,76,81]; PHP, which is considered in 3 studies [50,54,63]. The rest of the other technologies are used in only one study each (see Appendix A for all data, Table A.4). Table 4 presents the other technologies found in the selected studies, sorted by number of studies and tools.

Table 4
The other technologies included in the studies sorted by number of studies and tools.

Other technologies	Number of studies
HTML	19
JavaScript	8
CSS	7
JAWS	5
Python	5
React	3
JSON	3
Node.js	3
NVDA	3
PHP	3
Accessmonkey	1
AxsJAX	1
BERT	1
ESLint	1
Fix The Web	1
Flesch Reading Ease	1
Flesch-Kincaid Grade Level	1
GitHub	1
Html2canvas	1
HubSpot	1
Hugging Face	1
IntelliJ IDEA plugin	1
INTENT HANDLERS	1
jQuery	1
K-Nearest Neighbour	1
Lighthouse	1
Linear Discriminant Analysis	1
Logistic Regression	1
Magento	1
Microsoft Computer Vision API	1
Microsoft's Emotion API	1
Naive Bayes	1
NoSql DB	1
Query	1
Random forest	1
RESTful API	1
Ruby on Rails	1
Shopify	1
SMMRY	1
SUMMATE	1
Support Vector Machine	1
Talkback	1
TypeScript	1
Visual Studio Code	1
Volusion	1
WebVisum	1
Weebly	1
Wix	1
Word Movers Distance	1
WordPress	1

4.2.5. RQ_5. What WCAGs are included in the studies?

The WCAGs considered in the selected studies are WCAG 1.0, WCAG 2.0, WCAG 2.1, and WCAG 2.2. WCAG 1.0 has been considered in 1 study [49], WCAG 2.0 in 9 studies [47,48,50,55,69,80,82,93,98], WCAG 2.1 in 18 studies [51–54,59,61,63–66,73,77,78,88,91,96,97,99], and WCAG 2.2 in 11 studies [60,62,68,72,79,83,84,89,92,94,95]. Fourteen studies [56–58,67,70,71,74–76,81,85–87,90] mention accessibility and analyze accessibility, but do not cite any WCAG. Table 5 shows the versions of the WCAG, with their principles and conformance levels, that were included in the selected studies (see Appendix A for all data, Table A.5). In addition, the "Reference" column is presented, which is linked only to the WCAG versions.

4.2.6. RQ_6. What disabilities are included in the studies?

After reviewing the results of the selected documents, the WCAG success criteria were found and analyzed in each document. It is important to emphasize that the studies [62,72] evaluate the accessibility of AI tools; therefore, these studies have not been considered in the analysis of disabilities. In this analysis, we considered the disabilities of the WCAG success criteria, taking into account that these include the disabilities mentioned in the selected studies. Only 47 of the 86 success criteria of WCAG 2.2 have been considered, contributing to 32 disabilities. In Table 6, we present the success criteria by principle, conformance level, and the disabilities it benefits.

Table 5
The versions of the WCAG, with their principles and conformance levels, that were included in the studies.

Reference	WCAG version	Perceivable	Operable	Understandable	Robust	A	AA	AAA
[49]	WCAG 1.0	1	0	0	0	1	0	0
[47,48,50,55,69,80,82,93,98]	WCAG 2.0	6	1	1	1	7	4	3
[51–54,59,61,63–66,73,77,78,88,91,96,97,99]	WCAG 2.1	10	6	4	2	11	8	4
[60,62,68,72,79,83,84,89,92,94,95]	WCAG 2.2	8	6	5	6	8	6	3
[56–58,67,70,71,74–76,81,85–87,90]	None (✗)	28	40	43	44	26	35	43
Total		**53**	**53**	**53**	**53**	**53**	**53**	**53**

Table 6
Success criteria by principle, conformance level and disabilities benefited sorted by success criteria.

N°	SC	CL	Disabilities (see Appendix B for all WCAG disabilities, Table B.1)	Reference
	Principle 1: Perceivable			
1	1.1.1	A	Blind, deaf, deaf-blind	[47–50,52,63,65–67,69,73,75,78,82–84,87,89,92,98,99]
2	1.2.1	A	Blind, deaf, deaf-blind	[50,84]
3	1.2.2	A	Deaf	[84]
4	1.2.3	A	Blind	[84]
5	1.3.1	A	Blind, deaf-blind	[84,89,95,96,98]
6	1.3.2	A	Blind	[89]
7	1.3.3	A	Blind, low vision	[84,89]
8	1.3.4	AA	Low vision, Motor	[89]
9	1.3.5	AA	Cognitive, language and learning, motor	[89]
10	1.4.1	A	Color-blindness, low vision	[64,84,89,97]
11	1.4.2	A	Blind	[89]
12	1.4.3	AA	Color vision deficiency, low vision, see no color	[64,82,84,89,96–98]
13	1.4.4	AA	Low vision	[84,89,98]
14	1.4.5	AA	Cognitive disabilities, low vision, visual tracking problems	[65,84,89]
15	1.4.6	AAA	Color vision deficiency, low vision, see no color	[89,98]
16	1.4.8	AAA	Cognitive, language and learning, low vision	[89]
17	1.4.9	AAA	Cognitive, language and learning, low vision	[89]
18	1.4.10	AA	Low vision	[89]
19	1.4.11	AA	Color vision deficiency, low vision	[89,97]
20	1.4.12	AA	Cognitive disabilities, dyslexia, low vision	[84,89,96,97]
	Principle 2: Operable			
1	2.1.1	A	Blind, hand tremors, low vision	[84]
2	2.1.2	A	Blind, physical disabilities	[84]
3	2.2.1	A	Blind, cognitive or language limitations, deaf, learning disabilities, low vision, physical disabilities, reading disabilities	[84,89]
4	2.2.2	A	Deaf	[84,89]
5	2.4.1	A	Blind, cognitive limitations, low vision	[89,95]
6	2.4.2	A	Cognitive disabilities, short-term memory, severe mobility impairments, reading disabilities, visual impairments	[84,89,98]
7	2.4.4	A	Cognitive limitations, motion impairment, visual disabilities	[51,66,84,89,98]
8	2.4.5	AA	Cognitive disabilities, visual impairments	[84,89]
9	2.4.6	AA	Reading disabilities, short-term memory, visual impairments	[84,89,95,98]
10	2.4.7	AA	Attention limitations, short term memory limitations	[84]
11	2.4.8	AAA	Attention limitations	[89]
12	2.4.9	AAA	Blind, language and learning	[89]
13	2.4.10	AAA	Attention limitations, short-term memory	[89]
14	2.5.1	A	Cognitive or learning disabilities	[84]
15	2.5.3	A	Blind, Speech-input users	[89]
16	2.5.5	AAA	Hand tremors, large fingers, low vision, mobility impairments, motor movements difficult	[89,96,97]
17	2.5.8	AA	Motor	[89]
	Principle 3: Understandable			
1	3.1.1	A	Blind, cognitive disabilities, language and learning disabilities, reading disabilities	[65,89,98]
2	3.1.2	AA	Blind, cognitive disabilities, language and learning disabilities, reading disabilities	[65,66,89]
3	3.1.4	AAA	Low vision, Language and learning	[89]
4	3.2.2	A	Blind, intellectual disabilities, low vision, reading disabilities	[89]
5	3.2.5	AAA	Blind, cognitive, difficulty interpreting visuals, low vision, reading disabilities	[89]
6	3.3.1	A	Blind, colorblind, cognitive disabilities, language and learning disabilities	[84]
7	3.3.2	A	Cognitive disabilities, language and learning disabilities	[84,89,98]
8	3.3.3	AA	Blind, impaired vision, learning disabilities, motion impairments	[84]
	Principle 4: Robust			
1	4.1.1	A	All disabilities	[84,98]
2	4.1.2	A	Blind	[84,89,95,98]

*__SC.__ Success criteria WCAG 2.2. *__CL.__ Conformance Level.

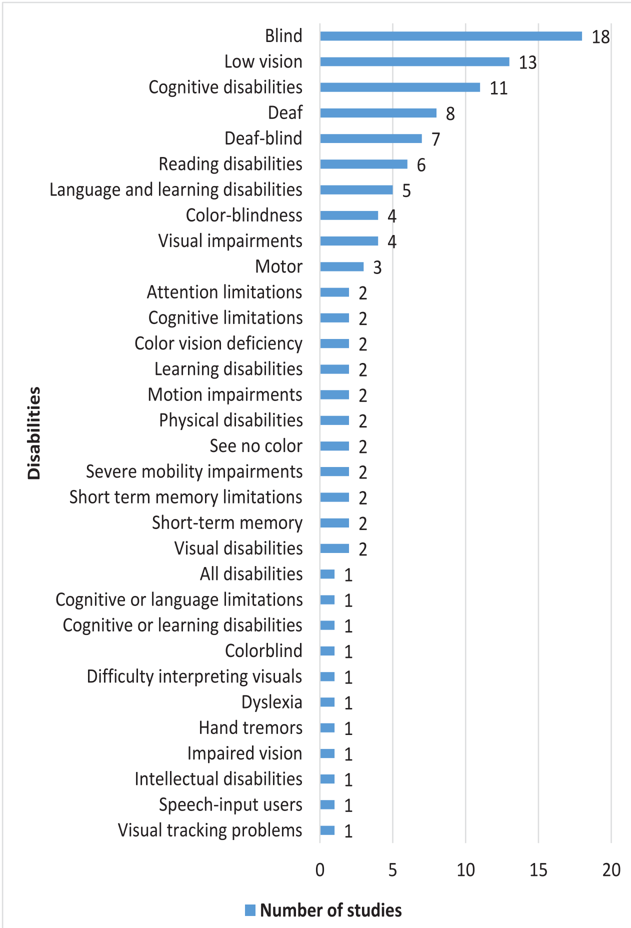

Fig. 9. Disabilities found for each WCAG success criterion sorted by number of studies and disabilities.

In Fig. 9, we can see the disabilities found for each WCAG success criterion sorted by disability and number of studies. The disabilities that stand out most in the selected studies are: blind (18 success criteria), low vision (13 success criteria), cognitive disabilities (11 success criteria), deaf (8 success criteria), deaf-blind (7 success criteria), reading disabilities (6 success criteria), language and learning disabilities (5 success criteria), color-blindness (4 success criteria), visual impairments (4 success criteria), motor (3 success criteria) (see Appendix A for all data, Table A.6).

A heat map of the WCAG guidelines found in the selected studies vs. disabilities has also been designed. Heat maps are two-dimensional graphical representations of data in which the values are represented in color [106]. In Fig. 10, the columns of the heat map represent the different WCAG guidelines, while the rows represent the different disabilities. For the color scheme, red indicates the lowest expression, yellow an intermediate expression, and green the highest expression.

Fig. 10 presents a matrix-style visualization that illustrates the relationship between Web Content Accessibility Guidelines (WCAG) guidelines and different categories of disabilities, as identified in the reviewed studies. Each row corresponds to a specific disability group (e.g., cognitive, physical, visual, auditory), while each column represents a distinct WCAG guideline. The numerical values within each cell indicate the frequency with which a given WCAG guideline has been associated with a particular type of disability in the reviewed literature. Fig. 10 employs a heatmap-like color scheme to facilitate interpretation: cells with zero frequencies are highlighted in red, moderate frequencies (one to three occurrences) in yellowish, and higher

All disabilities	0	0	0	0	0	0	0	0	0	0	0	1
Cognitive disabilities	0	0	1	5	0	3	13	1	6	4	5	0
Physical disabilities	0	0	2	0	2	1	1	2	0	0	1	0
Blind	1	2	5	18	3	2	7	3	3	5	4	1
Deaf	2	3	1	0	0	2	0	0	0	0	0	0
Guidelines WCAG	**1.1 Text Alternatives**	**1.2 Time-based Media**	**1.3 Adaptable**	**1.4 Distinguishable**	**2.1 Keyboard Accessible**	**2.2 Enough Time**	**2.4 Navigable**	**2.5 Input Modalities**	**3.1 Readable**	**3.2 Predictable**	**3.3 Input Assistance**	**4.1 Compatible**

Fig. 10. Heat map of the WCAG guidelines vs. disabilities.

frequencies (four or more occurrences) in greenish. This color coding enables a quick visual assessment of which accessibility guidelines are most and least frequently addressed in relation to specific disability categories. The data reveal a pronounced focus on the needs of blind users, with the highest frequency (n = 18) associated with guideline 1.4 ("Distinguishable"), underscoring the importance of visual clarity and perceptibility in accessible web design. Similarly, guideline 2.1 ("Keyboard Accessible") appears prominently in relation to both visual (n = 3) and physical disabilities (n = 2), reflecting the emphasis on operability via non-mouse input methods. For users with cognitive disabilities, guidelines 2.4 ("Navigable", n = 13), 3.1 ("Readable", n = 6), 3.2 ("Predictable", n = 4), and 3.3 ("Input Assistance", n = 5) were the most frequently cited, indicating a research emphasis on content interaction and comprehensibility. In the case of users with hearing disabilities, the most relevant guideline is 1.2 ("Time-based Media", n = 3), which aligns with the need for alternatives to audio content, such as captions or transcripts for videos. Overall, Fig. 10 highlights which WCAG guidelines have received greater attention in existing studies for each disability category, while also suggesting areas where further research may be needed—particularly for disabilities and guidelines that show minimal or no representation.

5. Discussion

This section discusses the trends and findings found in the SMS. In terms of trends, years of publication, countries of first authors, and publication venues are analyzed. In terms of findings, the results of the selected studies are discussed.

The trends found were answered in the bibliometric analysis of the selected studies. The AI trends on web accessibility in recent years show a significant increase in 2023, 2024, and 2025 to July with fourteen studies. The studies selected in this SMS have been published in 35 conferences, 16 journals, and 2 book chapters. The countries with the highest publications from 2018 until July 2025 are the United States, India, and Italy.

The findings found in the selected studies respond to RQ_1, RQ_2, RQ_3, RQ_4, RQ_5, and RQ_6. The following is a summary of the main findings found in the studies selected by RQ or the RQs.

RQ_1 analyzes the objectives stated in the selected studies on AI in web accessibility. The most important findings that have common objectives are generate and correct alternative texts in images using AI, provide alternative image description with machine learning, conversational agents, evaluation of accessibility of 20 and 50 generative AI tools. In addition, accessibility evaluation of websites built by AI and hands-on learning using LLMs of web accessibility by students.

This RQ also analyzes the results presented in selected studies on AI in web accessibility. In the results of the studies, we could find the challenges and limitations of AI in web accessibility; another essential finding is that 28.30% of the studies seek to create alternative text for images on websites. Another important finding is that AI helps web developers generate accessible HTML code using well-defined prompts. Regarding mobile applications, a study shows that the accessibility of applications is considered only in their first versions, and in the new versions, it is assumed that accessibility is maintained, which generates accessibility barriers in the latest versions.

Another finding in two selected studies is that the accessibility of AI tools was evaluated and found to have web accessibility barriers [62, 72]. Therefore, AI tools must themselves comply with the WCAG so that people with and without disabilities can use them.

Another finding is that websites built with AI tools (Durable, Hostinger, and Framer) [88] present accessibility barriers. The inaccessibility of AI-generated websites points to a significant problem with AI work if it is to reach a more substantial number of users.

Another finding is that 21 best practices [79] have been defined for designing inclusive and accessible GenAI tools for screen readers. The 21 best practices defined are grouped into the following categories: inclusive and collaborative design, technology testing and adaptation, accessible content, multisensory, navigation and structure, labeling and interactive elements.

RQ_2, and RQ_3 analyze the approaches, models, classifications, and libraries used in selected studies on AI in web accessibility. One of the findings is that machine learning is the widely used approach to promote compliance with AI on web accessibility. Another finding is that the most used model is LLMs. In terms of classification, NLP and computer vision are the most used. The most used libraries are text-to-speech and transformers.

RQ_4 analyzes AI tools, web accessibility tools, and other technologies included in selected studies on AI in web accessibility. One of the findings is that the most widely used AI tool to promote web accessibility compliance with AI is ChatGPT. This may be due to OpenAI's free release of ChatGPT [107], which made it one of the most popular GenAI tools. In addition, ChatGPT initiated the current wave of LLM-powered products [108]. However, a major drawback of AI for web accessibility is the lack of accuracy and reliability [47]. ChatGPT and similar systems can invent wrong answers (hallucinations) [109,110] due to the weakness of the dataset and the algorithms used. Therefore, these tools should be used as support material, considering that their dataset does not cover all the information [107]. Thus, AI is not mature enough to replace content authors who implement accessibility standards and features [47].

The AI tools with the highest impact on WCAG compliance are ChatGPT, used in 17 studies, with a 21.79% impact; Gemini and GitHub Copilot, used in 4 studies, with an impact of 5.12% each; Copilot, Figma AI and Llama, used in 3 studies, with an impact of 3.84% each; Envision, MiniGPT-4, and Seeing AI, used in 2 studies each, with an impact of 2.56% each per AI tool; accessible, AI-Microsoft Cognitive Service, AllAccessible, Amazon Transcribe, Anthopic Claude, API of artificial vision of Google, Auto Alt Text, AWS CodeWhisperer, Bald Eagle Search, Algorithm, BingChat, Captionbot, CLIP zero-shot, Cloud Vision API, CodeGemma, CodeLlama, Dialogflow, Diffbot, Durable, Flamingo (DeepMind), Framer, Gemma 2, GenAI, Hostinger, ImageNet Large Visual Recognition, LangChain, Lookout, Microsoft Azure Cognitive Services, Microsoft's CaptionBot, Mistral, Natural Language Toolkit, NeevaAI, Phi 3, Search Generative Experience, Supersense, Tabnine, UserWay, Web scraping, zoominsoftware, used in 1 study each AI tool with a 1.28% impact per AI tool (see Appendix A for all data, Table A.4).

Another finding is that the most used web accessibility tool is WAVE to corroborate accessibility after correcting accessibility barriers using ChatGPT; as for other technologies, the most used is HTML, considering that web pages are made with HTML.

RQ_5 analyzes the WCAGs included in the selected studies on AI in web accessibility. The WCAGs most commonly used are WCAG 2.0, WCAG 2.1 and WCAG 2.2. WCAG enables people with disabilities to use the Web under the same conditions as people without disabilities.

The W3C published the draft WCAG 3.0 in December 2024 [22], which offers a wide range of recommendations to make web content more accessible to users with disabilities. However, some of the implications of WCAG with AI accessibility testing tools are as follows [111]:

- AI tools can solve accessibility issues for WCAG, such as color contrast, alternative text, and others, in seconds on thousands of web pages. However, AI is less effective when accessibility issues are not stipulated in the WCAG.
- In cases where an accessibility issue requires some level of human judgment, AI tools can make mistakes. For example, AI can determine whether or not an image has alt text, but not whether the alt text is adequately descriptive. AI can create captions and transcripts for videos, but those text alternatives may not be accurate 100% and may not meet the requirements of the WCAG.
- AI is a powerful tool when used correctly. However, human judgment is essential for detecting and solving the most complex accessibility problems.

Therefore, W3C, the author of the WCAG, recommends the use of automated and manual methods to test content, which will help to further improve the accessibility of web content [112]. In addition, the W3C has created an API for WebXR devices that provides the necessary interfaces for developers to create engaging, convenient, and secure immersive applications on the Web and on a wide variety of hardware formats [113]. Governments must also provide policies or legal frameworks that drive organizational commitment and investment in web accessibility.

RQ_6 analyzes the disabilities included in the studies on AI in web accessibility. The selected studies seek to contribute mostly to the accessibility of websites for people with blindness, low vision, cognitive disabilities, deafness, and reading disabilities.

Certain disabilities, such as cognitive disabilities, are underrepresented in AI solutions due to several factors. Cognitive disabilities encompass a wide range of conditions, including developmental disabilities, brain injuries, Alzheimer's disease, and severe mental illnesses [114,115]. This diversity makes it challenging to create one-size-fits-all AI solutions. Cognitive disabilities are often poorly understood and difficult for those without them to conceptualize [116]. This lack of understanding can hinder the development of effective AI solutions. Moreover, AI algorithms can include biases due to imbalanced training data and lack of representation of disabled voices in AI development. These biases can lead to the underrepresentation of cognitive disabilities in AI solutions [117]. But probably the main reason for this is that accessibility has historically focused on people with sensory and physical impairments (vision, hearing, or mobility) [118]. Therefore, other groups of people with disabilities were underrepresented in existing accessibility guidelines, mainly the W3C accessibility guidelines [115].

Despite the growing interest in using AI in web accessibility, the literature presents a major gap: compliance with only 47 success criteria out of 86 of the WCAG 2.2. This result leads to limited accessibility compliance for a small number of disabilities that WCAG seeks to support. In addition, two selected studies [62,72] assess the accessibility of some AI tools, showing that AI tools present accessibility barriers for people with disabilities. Therefore, another gap is that the AI tools themselves should be accessible to people with disabilities.

Web accessibility evaluation is a costly process that often requires manual intervention [66]. LLMs can be used to automate the testing of WCAG success criteria. The ability of LLMs to solve various tasks with human-like performance comes at the cost of slow training and inference, high hardware requirements, and high operating costs [119]. Hence, in computational cost, real-time captioning (speech recognition, natural language processing, etc.) does not cost the same as simply generating the alternative text for an image. LLMs are resource-intensive and it is expected that the most costly tasks have not been addressed or have been addressed to a lesser extent in the WCAG success criteria.

Web accessibility is not only an ethical issue, but also a legal issue considering that anyone can be fined [120]. For example, in the United States of America in recent years [121], there has been an increase in litigation due to the lack of accessibility of corporate websites. The plaintiffs alleged that the websites do not allow the use of assistive tools such as screen readers, subtitles, etc. The increase trend figures according to the "ADA Title III Website Accessibility Lawsuits in Federal Court 2017-2020: 2017: 814; 2018: 2,258 (177% increase from 2017); 2019: 2,256 (.01% decrease from 2018), 2020: 2,523 (12% increase from 2019); 2021: 2,895 (14% increase from 2020)" [122]. This analysis was conducted in 10 U.S. states (New York, Florida, California, Pennsylvania, Massachusetts, Illinois, Connecticut, Indiana, Oregon, and Wisconsin). The state with the highest number of claims is New York, followed by Florida and California.

6. Limitations of the study

An SMS may be affected by several limitations. One may be the selection of studies according to the inclusion and exclusion criteria defined by the authors, which may omit some relevant studies. Another limitation is the number of scientific databases used in the SMS, which can lead to bias in the selection of studies, taking into account that relevant studies that are not indexed in them can be excluded.

It should be emphasized that both authors participated in the development of the review protocol for the SMS. First, the search strings were developed and then applied to the databases to extract the studies selected for the SMS, considering the inclusion and exclusion criteria and quality questions. Finally, research questions were created to respond to the trends and findings found in the selected studies.

Another limitation is the search strings used to extract relevant studies from scientific databases. Although based on a well-structured review protocol, SMS does not guarantee that all relevant studies are obtained for analysis. The use of synonyms in search strings helps to minimize this problem.

Another significant limitation is that our SMS does not consider the Multivocal Literature Review (MLR) approach [123]. MLRs differ from SMS [124] because MLRs include gray literature, such as blogs, reports, podcasts, and other non-academic content. The MLR [125] is a research approach comprising a broad range of writings on a common and usually current topic. An MLR is applied in complex and rapidly evolving fields [126]. In addition, they cover different aspects of the topic and use multiple sources of research, both formal (academic) and informal (gray literature) [127]. By incorporating diverse studies, MLR can help identify hidden assumptions, biases, and gaps [128] in the existing literature and open new lines of research and innovation.

7. Conclusions and future work

The objective of this SMS was to identify, extract, and consolidate existing trends, findings, and gaps on AI in web accessibility. This study determined the trend of publications by year, country of first author affiliation, and publication venues. In addition, findings on the empirical results of selected studies, approaches, models, classifications, libraries, AI tools, web accessibility tools, and other technologies, WCAGs, and disabilities were determined. The RQs were grouped into four dimensions: empirical results (RQ_1), AI technology (RQ_2, RQ_3), tools (RQ_4), and web accessibility (RQ_5, RQ_6).

The emergence of AI has also made inroads into how websites are designed and developed to ensure compliance with accessibility for all. The selected studies identified web accessibility assessments, discussion of challenges and limitations, use of GenAI tools to create accessible HTML code, creation of alternative text for images using machine learning, conversational agents using AI, mobile applications, APIs, web applications, plugins and AI best practices in web accessibility. In addition, machine learning is the most predominant AI technology. In addition, 16 models classified in computer vision and NLP are used, applying libraries (Automatic speech recognition, Image-to-Text, Inception-ResNetV2-GRU, MobileNet23, ResNet152-LSTM, Speech-to-text, Tensorflow, Text-to-speech, Transformers). Finally, ChatGPT is the widely used AI tool, and WAVE is used to check that the web accessibility errors have been corrected. Other technologies, such as HTML, JavaScript, CSS, JAWS, Python, React, JSON, Node.js, NVDA, PHP, etc., have also been used.

WCAG has become a worldwide benchmark for web accessibility compliance. Therefore, some countries have adopted the WCAG as laws or policies for compliance to ensure accessibility on their websites. Other countries have created accessibility laws or policies derivative from the WCAG [23]. In the United States, web accessibility compliance is governed by the Americans with Disabilities Act (ADA) [129]. The European Accessibility Act (EAA) aims to make digital products and services accessible to everyone in the European Union (EU) [130]. The versions of WCAG used are 1.0, 2.0, 2.1, and 2.2. In addition, compliance with 47 success criteria is sought, 24 of which have a conformance level A, 14 of which have a conformance level AA, and 9 of which have a conformance level AAA. The 47 success criteria found in the selected studies benefit 32 disabilities.

AI is one of the biggest challenges to making inroads in web accessibility. AI can automatically detect accessibility barriers on websites, such as images without alternative text, allowing these errors to be quickly corrected using machine learning descriptors. AI may encourage compliance with WCAG and accessibility regulations implemented in different countries around the world. Therefore, implementing AI in web development and design allows the creation of more accessible websites for users regardless of their capabilities.

On the other hand, AI still has certain limitations, such as correcting accessibility errors of a website in real-time without modifying the website code, which results in the website no longer being accessible when this tool is removed. Another is that it cannot yet generate alternative text for complex images. In addition, it is essential to refine new algorithms for creating AI that help to comply with accessibility for other disabilities. The creation of AI technologies for web accessibility must be a multidisciplinary effort involving accessibility experts, AI developers, and people with disabilities to ensure that technology solutions contribute to inclusion.

This SMS proposes to perform as future work an MLR of AI algorithms to determine existing algorithms for web accessibility and analyze which users with disabilities benefit from them. Another future work may also include developing an AI that not only detects and corrects accessibility problems when they occur, but also predicts and prevents problems before they affect users. In addition, other future work will propose practical steps to adapt AI tools to evolving accessibility legislation, such as the EAA [130], and suggest practical measures, such as developing a framework for AI integration in WCAG or benchmarking tools against accessibility metrics.

CRediT authorship contribution statement

Milton Campoverde-Molina: Writing – review & editing, Writing – original draft, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Sergio Luján-Mora:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

Data collected. See Tables A.1, A.2, A.3, A.4, A.5, and A.6. The information in these tables will allow the reader to review and understand the results of the SMS.

Appendix B

WCAG disabilities. See Table B.1. The information in these tables will allow the reader to understand the results of the SMS.

Appendix C

Data available. The manuscript contains a link to a repository in Mendeley (DOI: https://doi.org/10.17632/zn3nmswy28.3)

Table A.1
Trend of scientific production by publication venue sorted by year.

Reference	Year	Publication type	Publication venue	Acronym
[47]	2018	Conference	15th International Web for All Conference	W4A
[48]	2018	Conference	15th International Web for All Conference	W4A
[49]	2018	Conference	15th IEEE Annual Consumer Communications and Networking Conference	CCNC
[50]	2020	Conference	International Conference on Applied Human Factors and Ergonomics	AHFE
[51]	2020	Conference	17th International Conference on Computers Helping People with Special Needs	ICCHP
[52]	2022	Conference	3rd International Conference on Issues and Challenges in Intelligent Computing Techniques	ICICT
[53]	2022	Conference	24th International Conference on Human-Computer Interaction	HCII
[54]	2023	Journal	Baltic Journal of Modern Computing	BJMC
[55]	2023	Journal	ITU Journal on Future and Evolving Technologies	ITU
[56]	2023	Journal	SCIentific RESearch and Information Technology	SCIRES-IT
[57]	2023	Conference	CEUR Workshop Proceedings	CEUR
[58]	2023	Conference	Conference on Human Factors in Computing Systems	CHFCS
[59]	2023	Conference	16th International Conference on PErvasive Technologies Related to Assistive Environments	PETRA
[60]	2024	Journal	Journal of the Brazilian Computer Society	JBCS
[61]	2024	Journal	ACM Transactions on Accessible Computing	TACCESS
[62]	2024	Journal	Emerging Science Journal	ESJ
[63]	2024	Journal	Jurnal Online Informatika	JOI
[64]	2024	Journal	Studies in health technology and informatics	HTI
[65]	2024	Journal	Studies in health technology and informatics	HTI
[66]	2024	Journal	Universal Access in the Information Society	UAIS
[67]	2024	Journal	International Journal on Technical and Physical Problems of Engineering	IJTPE
[68]	2024	Journal	North American Journal of Engineering Research	NAJER
[69]	2024	Conference	Digital Presentation and Preservation of Cultural and Scientific Heritage	DiPP
[70]	2024	Conference	International Conference on Computer and Applications	ICCA
[71]	2024	Conference	International Conference on Artificial Intelligence and Communication	ICAIC
[72]	2024	Conference	Tenth International Conference on eDemocracy & eGovernment	ICEDEG
[73]	2024	Conference	IEEE Thirteenth International Conference on Image Processing Theory, Tools and Applications	IPTA
[74]	2024	Conference	International Conference on Electrical Electronics and Computing Technologies	ICEECT
[75]	2024	Conference	International Conference on Science Technology Engineering and Management	ICSTEM
[76]	2024	Conference	First International Workshop on Participatory Design & End-User Development - Building Bridges	FIWPD
[77]	2024	Conference	IEEE 21st Consumer Communications & Networking Conference	CCNC
[78]	2024	Conference	Thirty-Third International Joint Conference on AI	IJCAI24
[79]	2024	Conference	IEEE International Professional Communication Conference	ProComm
[80]	2024	Conference	26th International ACM SIGACCESS Conference on Computers and Accessibility	ASSETS
[81]	2024	Conference	IEEE International Conference on Systems, Man and Cybernetics	SMC
[82]	2024	Conference	21st International Web for All Conference	W4A
[83]	2024	Conference	21st International Web for All Conference	W4A
[84]	2024	Conference	21st International Web for All Conference	W4A
[85]	2024	Conference	Third International Conference on Artificial Intelligence, Computational Electronics and Communication System	AICECS
[86]	2025	Journal	SN Computer Science	CS
[87]	2025	Journal	IEEE Access	IEEE Access
[88]	2025	Journal	Journal of Business and Technical Communication	JBTC
[89]	2025	Journal	Proceedings of the ACM on Software Engineering	PACMSE
[90]	2025	Book Chapter	Springer Nature Switzerland	SN
[91]	2025	Book Chapter	Taylor and Francis	TF
[92]	2025	Conference	15th Indian Conference on Human-Computer Interaction Design and Research	CHCIDR
[93]	2025	Conference	Emerging Trends and Technologies on Intelligent Systems	ETTIS
[94]	2025	Conference	IEEE/ACM Second IDE Workshop	IDE
[95]	2025	Conference	30th International Conference on Intelligent User Interfaces	ICIUI
[96]	2025	Conference	Proceedings of the 2025 ACM Designing Interactive Systems Conference	DIS25
[97]	2025	Conference	Companion Proceedings of the ACM on Web Conference 2025	WWW25
[98]	2025	Conference	56th ACM Technical Symposium on Computer Science Education	SIGCSE
[99]	2025	Conference	2025 CHI Conference on Human Factors in Computing Systems	CHI25

Table A.2
Data extracted for RQ_1.

Reference	RQ_1	
	Objectives	Results
[47]	Review some existing products and services and their compatibility with web accessibility.	There are image and voice recognition products and services being publicly deployed by large vendors, such as Amazon, Facebook, Google and Microsoft, among many others.
[48]	Propose alternative descriptions for images of any website with the help of machine learning.	Accessify API
[49]	Review websites using AI to produce alternative texts and crowdsourcing to correct them, for images or other types of resources.	Farfalla plugin (https://farfalla-project.org/)
[50]	Develop a website that automatically identifies, evaluates and corrects web accessibility barriers associated with multimedia elements.	Semi-automatic web accessibility recommendation and correction tool using AI.
[51]	Explore the need to find new ways to address the requirements included in the WCAG success criteria for websites.	The main drawback of AI for web accessibility at the moment is the lack of accuracy and reliability.
[52]	Discusses solutions for generating alternative text in website images using AI techniques.	DBN-BES system to improve web accessibility.
[53]	A systematic framework on the role of AI technologies in promoting the European Accessibility Act policy was presented.	The framework brought together multimodal data formats representing computer vision, audio processing, linguistic toolkits, and haptic language developments.
[54]	Proposes a heuristic evaluation method for AI-based web accessibility assistants.	AI-based accessibility tools correct accessibility errors when users activate their functionalities but are not permanently removed, which should be the job of web developers.
[55]	Evaluate the challenges visually impaired persons face when using AI/Computer Vision-based mobile apps.	Despite engineering advances based on AI and computer vision, there is still much room for improvement in the design of reliable, performance-oriented applications.
[56]	Deepen the concepts and practice of digital accessibility for people with disabilities.	New issues that could arise or are emerging around AI and more advanced technologies is a challenge.
[57]	Defines a new paradigm of Conversational Web Browsing, to enable users to browse the Web through Natural-Language interaction mediated by a Conversational Agent.	Exploited conversational AI to define new methodologies and technologies to increase the inclusiveness of web resources from blind and visually impaired users.
[58]	Investigates the difficulties of 26 blind and visually impaired people in using assistive technology to access the Web and their attitudes and preferences about adopting conversational agents.	The paper introduces patterns for conversational Web browsing and discusses design implications that can promote conversational AI as a technology to improve web accessibility.
[59]	Improves the accessibility of web pages by automatically remediating them using LLMs (ChatGPT).	ChatGPT has proven to be an effective tool for remediating many accessibility problems in HTML code on websites.
[60]	Extends previous research by manually analyzing content to better understand accessibility issues and improvements (WCAG 2.2).	Accessibility barriers in the Distinguishable and Adaptive guidelines, including color scheme, font size, unlabeled elements, and lack of customization options.
[61]	Design and evaluation of a tool for automatic generation of navigation aids for screen readers with topicalisation and labeling algorithms.	Design of navigation aids for screen reader users using NLP techniques, including the potential use of GenAI.
[62]	Examines accessibility of 50 Generative AI tools.	Presence of significant accessibility barriers in the applications evaluated.
[63]	Describes the AI-enabled system for enhancing web accessibility.	Artificial intelligence-based system to improve web accessibility.
[64]	Frontend programming, user interface design, and accessibility testing.	ChatGPT may not be reliable enough for certain accessibility checks.
[65]	Four prototypes to identify accessibility issues in web pages using open-source machine learning models.	AI-based techniques could significantly reduce the need for manual checks in accessibility testing.
[66]	Tested: 1.1.1 Non-text Content, 2.4.4 Link Purpose (In Context), and 3.1.2 Language of Parts.	LLMs can augment automated accessibility testing to detect problems that pure software testing currently overlooks.
[67]	A series of analyses were performed for Image-to-Text translation using the Blip-Processor model of the Python programming language and the HuggingFace platform libraries.	The models allowed the creation of the ALT title description of the image; however, the study had a limitation: the written text could not be extracted from the images.
[68]	Examine AI technologies and their implications applied to digital accessibility.	AI can assist in everyday human tasks through screen readers, voice assistants and predictive text.
[69]	Improve accessibility using ChatGPT 3.5, Gemini and Copilot, with source code examples in HTML, CSS, JavaScript.	ChatGPT 3.5 produces the best accessibility improvements compared to Gemini and Copilot in the experiments.
[70]	Leverage LLMs to generate descriptive text for images.	The results demonstrated the effectiveness of SmartCaption AI, with an average score of 8.3/10.
[71]	Focus on three techniques: text-to-speech (TTS), automatic speech recognition (ASR), and automatic image captioning.	Generative search engines can generate content with low verifiability or even hallucinatory content.
[72]	Examine accessibility of 20 Generative AI tools.	Improvements are needed in several tools with common problems, such as difficulties in image descriptions, semantic structures, contrast, keyboard navigation, and synchronization.
[73]	Develop an automatic image accessibility audit tool for websites based on the RGAA criteria.	Computer vision can significantly help improve the accessibility of images and, therefore, of websites.
[74]	Integrate Dialogflow with Text-to-Speech and Speech-to-Text to improve web accessibility.	The results indicate improvements in user interaction and inclusiveness.
[75]	An innovative web extension that generates image descriptions based on AI.	The WebSight web extension will significantly improve the accessibility of web content for the visually impaired.
[76]	Improve web accessibility, offering benefits to blind and visually impaired users through conversational agents.	The ConWeb prototype has demonstrated that conversational agents can overcome the limitations of screen readers, providing a more intuitive and efficient way to navigate and interact with web content (https://protect.di.uniba.it/).

(continued on next page)

Table A.2 (*continued*).

Reference	RQ_1	
	Objectives	Results
[77]	Investigate how LLMs can be successfully used to evaluate and correct web accessibility.	LLMs can be successfully exploited to generate accessible content, perform accessibility testing (HTML forms, HTML tables, and HTML images).
[78]	Improve image accessibility for people with visual impairments users.	Developed and evaluated a smartphone application (SaGol) that allows users to search and understand images on their smartphones.
[79]	A mixed methods study was conducted on the user interfaces of three websites on which GenAI tools reside and the accessibility of their web editors.	Contributed 21 best practices for designing accessible interfaces for generative AI tools.
[80]	Report on a study in which developers with no accessibility training were tasked with creating web user interface components with and without an AI coding assistant.	Suggest that while current AI coding wizards show potential for creating more accessible user interfaces, they currently require accessibility knowledge and expertise, limiting their intended impact.
[81]	Explore the main accessibility barriers in creating web forms and investigate how GenAI technologies can provide solutions.	Incorporating GenAI into web form development can significantly improve accessibility.
[82]	Examine accessibility in AI-assisted web development.	Copilot helps to improve web accessibility, albeit with limitations (requiring explicit instruction).
[83]	Explore the feasibility of using AI engines to generate alternative descriptions for STEM images.	Human-created descriptions continue to be perceived as higher quality, more correct and useful.
[84]	Source code generated by ChatGPT to web accessibility standards.	ChatGPT exhibited accessibility violations (84%).
[85]	Proposes a new technique that uses AI and machine learning to identify and correct weaknesses in web applications.	AI and machine learning can be used to detect and correct accessibility issues.
[86]	Introduce a Chrome extension to summarize web content for visually impaired people.	WEBSumm developed accessible and high quality summaries for visually impaired people who can navigate and understand the content of the web.
[87]	Explore the use of LLMs to create an accessibility tool that automatically generates high-quality alternative text for complex web images.	The results show that the descriptions generated with AlternAtIve obtained high quality scores.
[88]	Examine whether AI-built websites are accessible to visually impaired users who use screen readers.	None of the three websites generated by the AI tools (Durable, Hostinger and Framer) are fully accessible to screen readers.
[89]	Development of an automated tool called GenA11y.	Introduces GenA11y, an automated accessibility checker that leverages generative artificial intelligence.
[90]	Introduces a novel artificial intelligence application using LLM.	The Adaptive User Interface Framework (AUIF) in our system adapts digital content in real time to respond to user preferences.
[91]	Design inclusive solutions and drive user experience in interfaces created with AI and IoT for smart cities.	Integrating AI and IoT with assistive technologies improves accessibility in smart cities so that all people have equal opportunities and participate in urban life.
[92]	Address accessibility issues of the TATA 1mg pharmacy ordering application and improve its user experience.	The TATA 1mg application has accessibility barriers, and it is suggested that AI technologies be used to improve its accessibility and user experience.
[93]	Evaluate and compare the accessibility and readability of Google BARD and GPT.	Google BARD consistently provides more readable content than GPT.
[94]	Introduces a Visual Studio Code extension that integrates an LLM to help developers identify and resolve accessibility issues.	Discuss two use cases: FixWithAI and CheckAndFixWithAI
[95]	Explore the ability of LLMs to detect accessibility barriers related to web page headers.	The results demonstrated the potential of LLMs to improve automated accessibility assessments.
[96]	Examine the effects of different evaluation strategies on ninety interfaces generated by two AI tools in three application areas.	The results contribute to the growing debate on AI-based design for generating accessible UIs.
[97]	Evaluation of fifty user interfaces using five AI design tools.	Presents the results of the evaluation of fifty user interfaces using five AI design tools.
[98]	Leverage the capabilities of LLMs such as ChatGPT to improve accessibility awareness, knowledge and practical skills of students.	The results showed that combining practical tasks supported by AI effectively improves students' mastery of web accessibility.
[99]	Formative study to developers without accessibility training.	Developed CodeA11y, a GitHub Copilot Extension.

Table A.3
Data extracted for RQ_2, and RQ_3.

Reference	RQ_2		RQ_3	
	AI approaches	AI models	AI classifications	AI libraries
[47]	Machine Learning	.....	NLP	.....
[48]	Machine Learning	Inception-v3 model	Computer Vision	Tensorflow
[49]	Machine Learning	.....	Computer Vision	.....
[50]	.....	.....	.....	.....
[51]	Machine Learning	Neural networks model, COCO-SSD24 model	NLP	MobileNet23
[52]	Deep Learning	Deep Belief Network model	NLP	.....
[53]	.....	.....	.....	.....
[54]	Machine Learning	.....	NLP	.....
[55]	Machine Learning	.....	Computer Vision	.....
[56]	.....	.....	.....	Text-to-speech
[57]	.....	.....	NLP	.....
[58]	.....	.....	NLP	......
[59]	.....	LLM	.....	.....
[60]	.....	LLM	.....	.....
[61]	AI-based tools	LLM, BERT model	NLP	.....
[62]	.....	.....	.....	.....
[63]	Machine Learning	.....	.....	.....
[64]	.....	.....	NLP	Transformers
[65]	Machine Learning	Language detection model, pre-trained neural model	NLP	.....
[66]	LLM-based approach	LLM	NLP	Transformers
[67]	Machine Learning	Blip-Processor model	NLP	Image-to-Text
[68]	AI-driven	.....	.....	.....
[69]	.....	LLM	.....	.....
[70]	.....	LLM	.....	Text-to-speech, image-to-Text
[71]	AI-driven	LLM	NLP	Text-to-speech, automatic speech recognition
[72]	.....	.....	.....	.....
[73]	Machine Learning	Convolutional Neural Networks (CNNs), You Only Look Once (YOLO) model	Computer Vision	.....
[74]	.....	.....	.....	Text-to-speech, speech-to-text
[75]	.....	Convolutional Neural Network model, Recurrent Neural Networks Model	.....	Text-to-Speech, ResNet152-LSTM, InceptionResNetV2-GRU
[76]	.....	.....	NLP	.....
[77]	.....	LLM	.....	.....
[78]	.....	Bootstrapping Language-Image Pre-training (BLIP)	.....	.....
[79]	.....	LLM	.....	.....
[80]	AI-assisted	LLM	.....	.....
[81]	AI-driven	.....	.....	.....
[82]	AI-assisted	Code generation model	.....	.....
[83]	AI engine	Visual Language Model, IDEFICS	.....	.....
[84]	LLM-based approach	LLM	NLP	Transformers
[85]	Machine Learning	Neural Networks, Decision Trees, Convolutional Neural Networks	NLP	.....
[86]	LLM-based summarization	LLM	.....	.....
[87]	LLM-based image-captioning	LLM	NLP	Transformers
[88]	AI-driven	LLM	.....	.....
[89]	LLM-based approach	LLM	.....	.....
[90]	AI-driven system	LLM	.....	.....
[91]	AI-Powered Interfaces	.....	.....	.....
[92]	.....	.....	.....	.....
[93]	AI-generated content	.....	.....	.....
[94]	AI-based plugin	LLM	.....	.....
[95]	Machine Learning	LLM	NLP	.....
[96]	AI-generated UIs	LLM	NLP	.....
[97]	AI-generated UIs	.....	.....	.....
[98]	AI-driven	LLM	.....	.....
[99]	AI-assisted	LLM	.....	.....

*Information not provided is marked as "....."

Table A.4
Data extracted for RQ_4.

Reference	RQ_4		
	AI technologies	Web accessibility tools	Other technologies
[47]	Microsoft's CaptionBot	.....	Microsoft's Emotion API
[48]	ImageNet Large Visual Recognition	.....	Microsoft Computer Vision API, Node.js, JSON, RESTful API, NoSql DB
[49]	Diffbot, Auto Alt Text, Captionbot	WAVE, Visual ARIA Bookmarklet, ChromeVox, ChromeVis, ATbar, BrowseAloud	AxsJAX, SUMMATE, SMMRY, Accessmonkey, WebVisum, Fix The Web, Ruby on Rails, Query
[50]	API of artificial vision of Google	API OAW, API Tenon, API Achecker	JSON, PHP
[51]	.....	Pa11y	React, Word Movers Distance
[52]	Bald Eagle Search Algorithm	Sortsite	Random forest, Support Vector Machine, K-Nearest Neighbour, Logistic Regression, Linear Discriminant Analysis, Naive Bayes
[53]	.....	.....	.....
[54]	accessiBe, AllAccessible, UserWay	WAVE	PHP, JavaScript, WordPress, HubSpot, Wix, Weebly, Volusion, Shopify, Magento
[55]	Seeing AI, Supersense, Envision, Lookout	.....	.....
[56]	Cloud Vision API, Amazon Transcribe, Microsoft Azure Cognitive Services, zoominsoftware	Color contrast	HTML, JAWS, NVDA
[57]	.....	.....	INTENT HANDLERS, HTML
[58]	.....	.....	HTML
[59]	ChatGPT	WAVE	HTML
[60]	ChatGPT 4	.....	.....
[61]	ChatGPT 3, Natural Language Toolkit	.....	HTML
[62]	.....	WAVE	.....
[63]	CLIP zero-shot	.....	PHP, Node.js, Python, JSON, HTML, JavaScript, html2canvas
[64]	ChatGPT 4, GitHub Copilot, Figma AI	.....	.....
[65]	.....	.....	Python
[66]	ChatGPT (GPT-3.5, GPT-4), Anthopic Claude, Google Bard LLMs, LangChain	A11y, Pa11y, Mauve++, AChecker, AccessMonitor, Lighthouse	.....
[67]	.....	.....	HTML, Python, Hugging Face
[68]	.....	.....	.....
[69]	ChatGPT 3.5, Copilot, Gemini	.....	HTML, CSS, JavaScript
[70]	GPT-4o, AI-Microsoft Cognitive Service	.....	HTML, CSS, JavaScript, Python
[71]	ChatGPT, BingChat, Search Generative Experience, NeevaAI	.....	.....
[72]	.....	WAVE	.....
[73]	Web scraping	.....	HTML
[74]	Dialogflow	.....	Lighthouse
[75]	.....	.....	.....
[76]	Copilot, Envision	.....	HTML, JAWS, NVDA
[77]	ChatGPT (GPT-3.5)	WAVE	HTML
[78]	MiniGPT-4	.....	.....
[79]	ChatGPT	WAVE	JAWS
[80]	Copilot, GitHub Copilot, ChatGPT, Tabnine, AWS CodeWhisperer	.....	HTML, CSS, JavaScript, React
[81]	GenAI	.....	NVDA, JAWS
[82]	GitHub Copilot	.....	.....
[83]	Flamingo (DeepMind)	.....	.....
[84]	ChatGPT	AChecker, WAVE	JavaScript, Python, HTML, CSS, TypeScript, Node.js, React, jQuery, GitHub
[85]	.....	Axe, WAVE	HTML, CSS, JavaScript
[86]	Llama 3.1, Phi 3, Gemma 2, Mistral	.....	Flesch Reading Ease, Flesch-Kincaid Grade Level, BERT
[87]	ChatGPT-4, Gemini 1.5 Pro	.....	JavaScript
[88]	Durable, Hostinger, Framer	WAVE	JAWS
[89]	GPT-4o	IBM, QualWeb, Axe-Core, A11yWatch, WAVE	HTML
[90]	.....	.....	HTML, CSS

(*continued on next page*)

Table A.4 (*continued*).

Reference	RQ_4		
	AI technologies	Web accessibility tools	Other technologies
[91]	.....	.....	.....
[92]	Seeing AI	Android Accessibility Scanner	Talkback
[93]	GPT, Google BARD	AChecker, WAVE	.....
[94]	Llama2, Llama3, CodeLlama, CodeGemma	.....	React, ESLint, Visual Studio Code
[95]	Llama 3.1, ChatGPT 4, MiniGPT-4	.....	HTML
[96]	FigmaAI, Galileo	.....	.....
[97]	Figma, GalileoAI, Uizard, Banani, Visily	.....	.....
[98]	ChatGPT 3.5	AChecker, WAVE	.....
[99]	GitHub Copilot	Axe-Core Accessibility	IntelliJ IDEA plugin, HTML, CSS

*Information not provided is marked as "....."

Table A.5
Data extracted for RQ_5.

Reference	RQ_5							
	WCAG Principles				WCAG version	Conformance level		
	Perceivable	Operable	Understandable	Robust		A	AA	AAA
[47]	✓	✗	✗	✗	WCAG 2.0	✓	✗	✗
[48]	✓	✗	✗	✗	WCAG 2.0	✓	✗	✗
[49]	✓	✗	✗	✗	WCAG 1.0	✓	✗	✗
[50]	✓	✗	✗	✗	WCAG 2.0	✓	✗	✗
[51]	✗	✓	✗	✗	WCAG 2.1	✓	✗	✗
[52]	✓	✗	✗	✗	WCAG 2.1	✓	✗	✗
[53]	✗	✗	✗	✗	WCAG 2.1	✗	✗	✗
[54]	✓	✓	✓	✓	WCAG 2.1	✓	✓	✓
[55]	✗	✗	✗	✗	WCAG 2.0	✗	✗	✗
[56]	✗	✗	✗	✗	✗	✗	✗	✗
[57]	✗	✗	✗	✗	✗	✗	✗	✗
[58]	✗	✗	✗	✗	✗	✗	✗	✗
[59]	✓	✓	✓	✓	WCAG 2.1	✓	✓	✓
[60]	✓	✓	✓	✓	WCAG 2.2	✓	✓	✓
[61]	✗	✗	✗	✗	WCAG 2.1	✗	✗	✗
[62]	✓	✓	✓	✓	WCAG 2.2	✓	✓	✓
[63]	✗	✗	✗	✗	WCAG 2.1	✗	✗	✗
[64]	✓	✗	✗	✗	WCAG 2.1	✓	✓	✗
[65]	✓	✗	✓	✗	WCAG 2.1	✓	✓	✗
[66]	✓	✓	✓	✗	WCAG 2.1	✓	✓	✗
[67]	✗	✗	✗	✗	✗	✗	✗	✗
[68]	✗	✗	✗	✗	WCAG 2.2	✗	✗	✗
[69]	✓	✗	✗	✗	WCAG 2.0	✓	✗	✗
[70]	✗	✗	✗	✗	✗	✗	✗	✗
[71]	✗	✗	✗	✗	✗	✗	✗	✗
[72]	✓	✓	✓	✓	WCAG 2.2	✓	✓	✗
[73]	✓	✗	✗	✗	WCAG 2.1	✓	✗	✗
[74]	✗	✗	✗	✗	✗	✗	✗	✗
[75]	✗	✗	✗	✗	✗	✗	✗	✗
[76]	✗	✗	✗	✗	✗	✗	✗	✗
[77]	✗	✗	✗	✗	WCAG 2.1	✗	✗	✗
[78]	✓	✗	✗	✗	WCAG 2.1	✓	✗	✗
[79]	✗	✗	✗	✗	WCAG 2.2	✗	✗	✗
[80]	✗	✗	✗	✗	WCAG 2.0	✗	✓	✓
[81]	✗	✗	✗	✗	✗	✗	✗	✗
[82]	✓	✗	✗	✗	WCAG 2.0	✓	✓	✗
[83]	✓	✗	✗	✗	WCAG 2.2	✓	✗	✗
[84]	✓	✓	✓	✓	WCAG 2.2	✓	✓	✗
[85]	✗	✗	✗	✗	✗	✗	✗	✗
[86]	✗	✗	✗	✗	✗	✗	✗	✗
[87]	✗	✗	✗	✗	✗	✗	✗	✗
[88]	✗	✗	✗	✗	WCAG 2.1	✗	✗	✗
[89]	✓	✓	✓	✓	WCAG 2.2	✓	✓	✓
[90]	✗	✗	✗	✗	✗	✗	✗	✗
[91]	✗	✗	✗	✗	WCAG 2.1	✗	✗	✗
[92]	✓	✗	✗	✗	WCAG 2.2	✓	✗	✗
[93]	✗	✗	✗	✗	WCAG 2.0	✓	✓	✓
[94]	✗	✗	✗	✗	WCAG 2.2	✗	✗	✗
[95]	✓	✓	✗	✓	WCAG 2.2	✓	✓	✗
[96]	✓	✓	✗	✗	WCAG 2.1	✓	✓	✓
[97]	✓	✓	✗	✗	WCAG 2.1	✓	✓	✓
[98]	✓	✓	✓	✓	WCAG 2.0	✓	✓	✓
[99]	✗	✗	✗	✗	WCAG 2.1	✗	✓	✗

Table A.6
Data extracted for RQ_6.

Reference	RQ_6		
	Disabilities	Success criteria	Disabilities Table B.1
[47]	Behavioral disorders (anxiety, and autism), cognitive and learning disabilities, deaf, hard of hearing	1.1.1	Blind, deaf, deaf-blind
[48]	Blind, low vision	1.1.1	Blind, deaf, deaf-blind
[49]	Blind, low vision	1.1.1	Blind, deaf, deaf-blind
[50]	Visual	1.1.1, 1.2.1	Blind, deaf, deaf-blind
[51]	.....	2.4.4	Cognitive limitations, motion impairments, visual disabilities
[52]	Blind	1.1.1	Blind, deaf, deaf-blind
[53]	.....	.....	.....
[54]	Blind, visually impaired	.....	.....
[55]	Blind, low-vision	.....	.....
[56]	.....	.....	.....
[57]	.....	.....	.....
[58]	Blind, visually impaired	.....	.....
[59]	Individuals with disabilities	.....	.....
[60]	Visual disabilities	.....	.....
[61]	Blind	.....	.....
[62]	.....	1.1.1, 1.2.4, 1.2.5, 1.2.6, 1.3.1, 1.3.4, 1.3.5, 1.4.1, 1.4.2, 1.4.3, 1.4.5, 1.4.6, 1.4.8, 1.4.11, 1.4.12, 1.4.13, 2.1.1, 2.2.2, 3.1.1, 3.2.3, 3.3.2, 3.3.5, 4.1.2, 4.1.3	Blind, cerebral palsy, cognitive limitations, color vision deficiency, color-blindness, deaf, deaf-blind, dexterity impairments, dyslexia, hand tremors, head injury, intellectual disabilities, language and learning disabilities, language and memory related disabilities, low pointer accuracy, low vision, motor impairments, motor neuron disease, reading disabilities, see no color, stroke, visual tracking problems, writing disabilities
[63]	Blind, Low vision	1.1.1	Blind, deaf, deaf-blind
[64]	.....	1.4.1, 1.4.3	Color-blindness, color vision deficiency, low vision, see no color
[65]	Blind	1.1.1, 1.4.5, 3.1.1, 3.1.2	Blind, cognitive disabilities, deaf, deaf-blind, language and learning disabilities, low vision, reading disabilities, visual tracking problems
[66]	Blind, cognitive or learning disabilities, low vision	1.1.1, 2.4.4, 3.1.2	Blind, cognitive limitations, deaf, deaf-blind, language and learning disabilities, motion impairments, reading disabilities, visual disabilities
[67]	Visually impaired	1.1.1	Blind, deaf, deaf-blind
[68]	Blind, color-blind, low-vision, physical disabilities	.....	.....
[69]	Visually impaired	1.1.1	Blind, deaf, deaf-blind
[70]	Visually impaired	.....	.....
[71]	Visual impairment, hearing impairment, cognitive impairment	.....	.....
[72]	.....	1.1.1, 1.3.1, 1.4.3, 2.1.1, 2.4.1, 2.4.4, 2.4.6, 3.1.1, 3.3.2, 4.1.2	Blind, cognitive disabilities, cognitive limitations, color vision deficiency, deaf, deaf-blind, hand tremors, language and learning disabilities, low vision, reading disabilities, see no color, short-term memory, visual impairments
[73]	Auditory, cognitive, motor, visual	1.1.1	Blind, deaf, deaf-blind
[74]	Motor disabilities, visual impairments	.....	.....
[75]	Visually impaired	1.1.1	Blind, deaf, deaf-blind
[76]	Blind, visually impaired	.....	.....
[77]	.....	.....	.....
[78]	Blind	1.1.1	Blind, deaf, deaf-blind
[79]	Blind	.....	.....
[80]	.....	.....	.....
[81]	Visual impairment	.....	.....
[82]	.....	1.1.1, 1.4.3	Blind, color vision deficiency, deaf, deaf-blind, low vision, see no color
[83]	Blind, low-vision	1.1.1	Blind, deaf, deaf-blind

(*continued on next page*)

Table A.6 (*continued*).

Reference	RQ_6		
	Disabilities	Success criteria	Disabilities Table B.1
[84]	.....	1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.3.1, 1.3.3, 1.4.1, 1.4.3, 1.4.4, 1.4.5, 1.4.12, 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.4.2, 2.4.4, 2.4.5, 2.4.6, 2.4.7, 2.5.1, 3.3.1, 3.3.2, 3.3.3, 4.1.1, 4.1.2	All disabilities, attention limitations, blind, cognitive disabilities, cognitive limitations, cognitive or language limitations, color vision deficiency, colorblind, deaf, deaf-blind, dyslexia, hand tremors, learning disabilities, low vision, motion impairments, physical disabilities, reading disabilities, see no color, severe mobility impairments, short term memory limitations, short-term memory, visual disabilities, visual impairments, visual tracking problems
[85]	Visual, cognitive, motor.	.....	.....
[86]	Visual impaired	.....	.....
[87]	Visual impaired	1.1.1	Blind, deaf, deaf–blind
[88]	Visual disabilities	.....	.....
[89]	.....	1.1.1, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.5, 1.4.1, 1.4.2, 1.4.3, 1.4.4, 1.4.5, 1.4.6, 1.4.8, 1.4.9, 1.4.10, 1.4.11, 1.4.12, 2.2.1, 2.2.2, 2.4.1, 2.4.2, 2.4.4, 2.4.5, 2.4.6, 2.4.8, 2.4.9, 2.4.10, 2.5.3, 2.5.5, 2.5.8, 3.1.1, 3.1.2, 3.1.4, 3.2.2, 3.2.5, 3.3.2, 4.1.2	Attention limitations, blind, cognitive, color-blindness, deaf, deaf-blind, difficulty interpreting visuals, intellectual disabilities, language and learning, low Vision, motor, reading disabilities, severe mobility impairments, short-term memory, speech-input users, visual disabilities, visual impairments
[90]	Visual impairment	.....	.....
[91]	Communicating, hearing, learning, mental health, movement, remembering, thinking, vision	.....	.....
[92]	Visual impairment	1.1.1	Blind, deaf, deaf-blind
[93]	.....	.....	.....
[94]	.....	.....	.....
[95]	.....	1.3.1, 2.4.1, 2.4.6, 4.1.2	Blind, cognitive limitations, deaf-blind, low vision, reading disabilities, short-term memory, visual impairments
[96]	.....	1.3.1, 1.4.3, 1.4.12, 2.5.5	Blind, deaf–blind, cognitive, color-blindness, low vision, motor
[97]	.....	1.4.1, 1.4.3, 1.4.11, 1.4.12, 2.5.5	Cognitive, color-blindness, low vision, motor
[98]	.....	1.1.1, 1.3.1, 1.4.3, 1.4.4, 1.4.6, 2.4.2, 2.4.4, 2.4.6, 3.1.1, 3.3.2, 4.1.1, 4.1.2	All disabilities, blind, cognitive disabilities, cognitive limitations, color vision deficiency, deaf, deaf-blind, language and learning disabilities, low vision, motion impairments, reading disabilities, see no color, severe mobility impairments, short-term memory, visual impairments
[99]	Colorblind	1.1.1	Blind, deaf, deaf-blind

*Information not provided is marked as "....."

Table B.1
Users who will benefit from correcting errors found in the WCAG 2.0, 2.1 and 2.2 success criteria.

Principles, guidelines, success criteria and level (A, AA, AAA)	**Disabilities**
Principle 1: Perceivable	
Guideline 1.1 Text Alternatives	
1.1.1 Non-text Content – Level A	Blind, deaf, deaf-blind
Guideline 1.2 Time-based Media	
1.2.1 Audio-only and Video-only (Prerecorded) – Level A	Blind, deaf, deaf–blind
1.2.2 Captions (Prerecorded) – Level A	Deaf
1.2.3 Audio Description or Media Alternative (Prerecorded) – Level A	Blind
1.2.4 Captions (Live) – Level AA	Deaf
1.2.5 Audio Description (Prerecorded) – Level AA	Blind, cognitive limitations, low vision
1.2.6 Sign Language (Prerecorded) – Level AAA	Deaf
1.2.7 Extended Audio Description (Prerecorded) – Level AAA	Blind, cognitive limitations, low vision
1.2.8 Media Alternative (Prerecorded) – Level AAA	Deaf-blind
1.2.9 Audio-only (Live) – Level AAA	Deaf
Guideline 1.3 Adaptable	
1.3.1 Info and Relationships – Level A	Blind, deaf-blind
1.3.2 Meaningful Sequence – Level A	Blind
1.3.3 Sensory Characteristics – Level A	Blind, low vision
1.3.4 Orientation – Level AA (Added in 2.1)	Dexterity impairments, low vision
1.3.5 Identify Input Purpose – Level AA (Added in 2.1)	Cerebral palsy, head injury, language and memory related disabilities, motor neuron disease, motor impairments, stroke
1.3.6 Identify Purpose – Level AAA (Added in 2.1)	Cognitive disabilities
Guideline 1.4 Distinguishable	
1.4.1 Use of Color – Level A	Color-blindness, low vision
1.4.2 Audio Control – Level A	Blind

(*continued on next page*)

Table B.1 (*continued*).

1.4.3 Contrast (Minimum) – Level AA	Color vision deficiency, low vision, see no color
1.4.4 Resize Text – Level AA	Low vision
1.4.5 Images of Text – Level AA	Cognitive disabilities, low vision, visual tracking problems
1.4.6 Contrast (Enhanced) – Level AAA	Color vision deficiency, low vision, see no color
1.4.7 Low or No Background Audio – Level AAA	Hearing impairments
1.4.8 Visual Presentation – Level AAA	Cognitive disabilities, language and learning disabilities, low vision
1.4.9 Images of Text (No Exception) – Level AAA	Cognitive disabilities, low vision, visual tracking problems
1.4.10 Reflow – Level AA (Added in 2.1)	Low vision
1.4.11 Non-text Contrast – Level AA (Added in 2.1)	Color vision deficiency, low vision
1.4.12 Text Spacing – Level AA (Added in 2.1)	Cognitive disabilities, dyslexia, low vision
1.4.13 Content on Hover or Focus – Level AA (Added in 2.1)	Cognitive disabilities, low vision, dyslexia, low pointer accuracy
Principle 2: Operable	
Guideline 2.1 Keyboard Accessible	
2.1.1 Keyboard – Level A	Blind, hand tremors, low vision
2.1.2 No Keyboard Trap – Level A	Blind, physical disabilities
2.1.3 Keyboard (No Exception) – Level AAA	Blind, low vision
2.1.4 Character Key Shortcuts – Level A (Added in 2.1)	Cognitive disabilities, motor impairments
Guideline 2.2 Enough Time	
2.2.1 Timing Adjustable – Level A	Blind, cognitive or language limitations, deaf, learning disabilities, low vision, physical disabilities, reading disabilities
2.2.2 Pause, Stop, Hide – Level A	Deaf
2.2.3 No Timing – Level AAA	Blind, cognitive or language limitations, deaf, low vision, physical disabilities
2.2.4 Interruptions – Level AAA	Low vision, attention deficit disorders
2.2.5 Re-authenticating – Level AAA	Cognitive limitations, deaf, motor impairments
2.2.6 Timeouts – Level AAA (Added in 2.1)	Cognitive disabilities
Guideline 2.3 Seizures and Physical Reactions	
2.3.1 Three Flashes or Below Threshold – Level A	Photosensitive epilepsy, photosensitive seizure disorders
2.3.2 Three Flashes – Level AAA	Photosensitive epilepsy, photosensitive seizure disorders
2.3.3 Animation from Interactions – Level AAA (Added in 2.1)	Vestibular disorder
Guideline 2.4 Navigable	
2.4.1 Bypass Blocks – Level A	Blind, cognitive limitations, low vision
2.4.2 Page Titled – Level A	Cognitive disabilities, short-term memory, severe mobility impairments, reading disabilities, visual impairments
2.4.3 Focus Order – Level A	Mobility impairments, reading disabilities, visual impairments
2.4.4 Link Purpose (In Context) – Level A	Cognitive limitations, motion impairments, visual disabilities
2.4.5 Multiple Ways – Level AA	Cognitive disabilities, visual impairments
2.4.6 Headings and Labels – Level AA	Reading disabilities, short-term memory, visual impairments
2.4.7 Focus Visible – Level AA	Attention limitations, short term memory limitations
2.4.8 Location – Level AAA	Cognitive disabilities, short attention span
2.4.9 Link Purpose (Link Only) – Level AAA	Blind, learning disabilities
2.4.10 Section Headings – Level AAA	Attention limitations, short term memory limitations
2.4.11 Focus Not Obscured (Minimum) – Level AA (Added in 2.2)	Cognitive disabilities, low vision, motor impairments
2.4.12 Focus Not Obscured (Enhanced) – Level AAA (Added in 2.2)	Cognitive disabilities, low vision, motor impairments
2.4.13 Focus Appearance – Level AAA (Added in 2.2)	Cognitive disabilities, motor impairments
Guideline 2.5 Input Modalities	
2.5.1 Pointer Gestures – Level A (Added in 2.1)	Cognitive or learning disabilities
2.5.2 Pointer Cancellation – Level A (Added in 2.1)	Cognitive limitations, motor impairments, visual disabilities
2.5.3 Label in Name – Level A (Added in 2.1)	Blind, speech-input users, text-to-speech users
2.5.4 Motion Actuation – Level A (Added in 2.1)	Physical disabilities
2.5.5 Target Size (Enhanced) – Level AAA (Added in 2.1)	Hand tremors, large fingers, low vision, mobility impairments, motor movements difficult
2.5.6 Concurrent Input Mechanisms – Level AAA (Added in 2.1)	Mobility impairments
2.5.7 Dragging Movements – Level AA (Added in 2.2)	Motor impairments
2.5.8 Target Size (Minimum) – Level AA (Added in 2.2)	Motor impairments
Principle 3: Understandable	
Guideline 3.1 Readable	
3.1.1 Language of Page – Level A	Blind, cognitive disabilities, language and learning disabilities, reading disabilities
3.1.2 Language of Parts – Level AA	Blind, cognitive disabilities, language and learning disabilities, reading disabilities
3.1.3 Unusual Words – Level AAA	Cognitive disabilities, language and learning disabilities, visual
3.1.4 Abbreviations – Level AAA	Cognitive disabilities, limited memory, visual disabilities
3.1.5 Reading Level – Level AAA	Cognitive disabilities
3.1.6 Pronunciation – Level AAA	Cognitive disabilities
Guideline 3.2 Predictable	
3.2.1 On Focus – Level A	Cognitive limitations, motor impairments, visual disabilities
3.2.2 On Input – Level A	Blind, intellectual disabilities, low vision, reading disabilities
3.2.3 Consistent Navigation – Level AA	Blind, cognitive limitations, intellectual disabilities, low vision
3.2.4 Consistent Identification – Level AA	Reading disabilities
3.2.5 Change on Request – Level AAA	Blind, cognitive limitations, difficulty interpreting visual, intellectual disabilities, low vision, reading disabilities
3.2.6 Consistent Help – Level A (Added in 2.2)	Cognitive disabilities, language and learning disabilities
Guideline 3.3 Input Assistance	
3.3.1 Error Identification – Level A	Blind, colorblind, cognitive disabilities, language and learning disabilities
3.3.2 Labels or Instructions – Level A	Cognitive disabilities, language and learning disabilities
3.3.3 Error Suggestion – Level A	Blind, impaired vision, learning disabilities, motion impairments

(*continued on next page*)

Table B.1 (*continued*).

3.3.4 Error Prevention (Legal, Financial, Data) – Level AA	All disabilities
3.3.5 Help – Level AAA	Intellectual disabilities, reading disabilities, writing disabilities
3.3.6 Error Prevention (All) – Level AAA	All disabilities
3.3.7 Redundant Entry – Level A (Added in 2.2)	Cognitive disabilities
3.3.8 Accessible Authentication (Minimum) – Level AA (Added in 2.2)	Cognitive disabilities
3.3.9 Accessible Authentication (Enhanced) – Level AAA (Added in 2.2)	Intellectual disabilities, reading disabilities, writing disabilities
Principle 4: Robust	
Guideline 4.1 Compatible	
4.1.1 Parsing – Level A	All disabilities
4.1.2 Name, Role, Value – Level A	Blind
4.1.3 Status Messages – Level AA (Added in 2.1)	Blind, cognitive disabilities, low vision

Data availability

I have shared the link to my data in an appendix in the article.

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