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Heuristic Evaluation of AI-Powered Web Accessibility Assistants

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Abstract. Web-based services occupy an increasingly large place in the lives of people around the world. Users with disabilities may find it difficult to use many websites and platforms due to technical barriers. To improve access to websites, international organisations like International Organization for Standardization (ISO), European Telecommunications Standards Institute (ETSI), or World Wide Web Consortium (W3C) develop web accessibility standards and guidelines, which provide an introduction to accessibility issues. By following some basic recommendations, any website and platform can become a good environment for exchanging information to digitally include people with disabilities. Due to the rapid development of artificial intelligence (AI) recent 5 years and its application in various sectors (e.g., game industry, e-commerce, facial recognition systems, agriculture, financial and economic sectors, cyber security, education, etc.), this also implies its application to help people with special needs to ensure digital accessibility. In this regard, the aim of this paper is related to proposing a method for heuristic evaluation of AI-powered web accessibility assistants. The method was tested using AI-powered accessibility assistants. The paper's objectives that meet its purpose and research questions are: (1) review of artificial intelligence application in web accessibility practices; (2) evaluation of selected tools based on the proposed method to prove its applicability. The method has been tested by heuristic evaluation of AI-powered accessibility assistants for websites. Web accessibility, measured in number of errors and alerts by applying WAVE tool, was compared before and after accessibility assistants were enabled.

Keywords: accessibility assistants, AI accessibility support, accessibility automation, digital inclusion, heuristic evaluation

Introduction

More and more people with disabilities have the opportunity to access their surroundings thanks to assistive technologies. They can handle computer resources, get training opportunities, find work and improve their digital skills. Assistive technologies help to: ensure the independence of people with special needs by giving them the opportunity to perform various tasks or have great difficulty in performing; increasing or changing the methods of interaction with the technology necessary to perform a given task.

The need to provide a digitally accessible environment is growing with the increase in the number of users with special needs, the orientation of a number of business activities online, as well as the ever-increasing number of users of digital devices. According to the World Health Organization (WHO), data in December 2022 show that "1.3 billion people or 1 in 6 people worldwide experience significant disability" (WHO, 2022). This is about 16% of the world's population - a significant percentage of people who need different types of support depending on their disability. For comparison, WHO reports a higher percentage compared to 2011, when the share of people with disabilities worldwide was 15%, and in the 1970s – 10% (WHO, 2011). The European Commission reports 42.8 million persons with disabilities within the EU according to data from 2022 (European Commission, 2022a).

According to data published by the United Nations (UN), 386 million of the world's working-age people have some form of disability, and unemployment among people with disabilities is very high (United Nations, 2022a). Eurostat data for 2021 show that within the EU, employment problems for people with disabilities are serious – "29.7% of the EU population with a disability was at risk of poverty or social exclusion, compared with 18.8% among people with no limitations" (Eurostat, 2022). According to statistics, the most serious risk for people with disabilities from poverty is in the Baltic States - 37.5% in Latvia, 34.0% in Estonia and 32.6% in Lithuania, and the lowest is in Finland (13.5%), Slovakia (13.0%) and Czechia (12.7%) (Eurostat, 2022). The same source states that in Romania (31.5%) and Bulgaria (28.4%), people with disabilities experience the most serious material and social difficulties. This percentage is lowest again in the Czech Republic (2.9%) and Finland (2.3%).

In order to reduce inequalities, the UN introduced a global goal for sustainable development 10, which is also aimed at "promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status" (United Nations, 2022b). On the other hand, the enhancement of inclusive and sustainable economic growth is no less important, which is the task of Goal 8. The UN is committed to achieving "full and productive employment and decent work for all women and men" (United Nations, 2022c). The UN also supports the Convention on the Rights of Persons with Disabilities (CRPD), according to the principles that disabled people should not be subjected to discrimination, should receive equal opportunities, accessibility, full and effective participation, and inclusion in society (United Nations, 2022d). The Strategy for the Rights of Persons with Disabilities 2021-2030 adopted by the European Commission is in accordance with it. It aims to spread and implement principles such as equal access to healthcare and education for people with disabilities, independent living, respect for human rights, free movement in EU member states. The strategy also affects digital transformation, including "information and communication technology (ICT), artificial intelligence and robotics to design on-site and remote services tailored to the needs of persons with disabilities" (European Commission, 2021). The United Nations Disability Inclusion Strategy is another document of international importance that addresses the rights of people with disabilities, as well as corporate-level organizational functions and indicators for disability inclusion (United Nations, 2022e). The UN is committed to the full inclusion of people with disabilities in working meetings by providing appropriate means of accessibility - physical and digital. The World Bank also announced key areas for the inclusion of people with disabilities, such as education, digital development, gender, transport, private sector investments, social protection, and more (World Bank, 2022).

According to the World Bank, one of the leading principles is accessibility to the environment, which promotes the full inclusion of people with disabilities in society.

Providing a digitally accessible environment is one of the methods for including people with disabilities in the labour market. This can be achieved with the help of artificial intelligence (Olson et. al., 2018; Guo et. al., 2019; Joamets and Chochia, 2021; Goldenthal et. al., 2021). This is also one of the fastest-growing technologies in recent years is artificial intelligence. It actively enters the daily life of users. Some of the areas in which it is used are: improving the user experience in commerce (Vasilev and Milkova, 2022), in education (Vasilev and Iliev, 2023; Todericiu et. al., 2021; Polkowski et. al., 2016), in the financial sector (Stefanov et. al., 2022); for risk management in heritage preservation (Fomin et. al., 2022); in logistics (Boute and Udenio, 2021); when applying algorithms to predict the results of the implementation of business goals (Tarasov et. al., 2017); to effectively manage information across platforms and environments (Czaplewski, 2021); in the gaming industry (Rath and Preethi, 2021); in the arts (Liu and Tao, 2022); in human resource management (Marinova and Barbov, 2022; Peicheva, 2021; Antonova and Ivanova, 2021), and many others.

In this connection, **the aim of this paper** is related to proposing a method for heuristic evaluation of AI-powered web accessibility assistants. The method was tested using AI-powered accessibility assistants.

The main research questions are:

RQ 1: What standards and guidelines formalize web accessibility issues?

RQ 2: Which are the main directions for improving digital accessibility that can be used as a basis for developing a method for heuristic assessment of accessibility?

The paper's objectives that meet its purpose and research questions are:

(1) review of artificial intelligence application in web accessibility practices;
(2) evaluation of selected tools based on the proposed method to prove its applicability.

The method has been tested by heuristic evaluation of AI-powered accessibility assistants for websites. The study has potential limitations of the chosen design and collected data. In the first place, they are related to insufficient sample size for statistical measurement, and in particular, this is the number of examined assistants. They have been used to demonstrate the practical applicability of the evaluation approach proposed in this paper. Another limitation of the study is related to the instruments used to collect the data – only WAVE is applied for comparing the accessibility before and after activation of examined assistants. WAVE is based on Web Content Accessibility Guidelines (WCAG). If other tools are used, they may show different results.

1. Literature Review

1.1. International Standards and Guidelines

Various international organizations deal with the standardization of recommendations and guidelines for ensuring digital accessibility. They are essential for providing accessible workplaces for people with special needs. To answer RQ1, we compared some of the most commonly used in Table 1. We applied several criteria, the most important of which are the existence of a formal method for evaluating the software accessibility, target user groups and platforms.

Table 1. Accessibility Standards and Guidelines

Standard / Guideline	Last version	Issuer	Formal method	Target user group	Target platform
WCAG 2.1	2018	W3C	No	sensory, cognitive, motor, speech disabilities	web and mobile
UAAG 2.0	2015	W3C	No	sensory, cognitive, motor, speech disabilities	user agents that render web content
ATAG 2.0	2015	W3C	No	auditory, cognitive, neurological, physical, speech, and visual disabilities	authoring tools
ISO 9241-171	2008	ISO	No	physical, sensory and cognitive impairments, elderly people, people with temporary disabilities	wide range of software
ISO/IEC 24751-1	2008	ISO	No	learners with disabilities and anyone in a disabling context	e-learning, education and training services
ISO/IEC Guide 71	2014	ISO	Yes, partial	older persons, children and persons with disabilities	various ICT systems
ISO/IEC 30071-1	2019	ISO	No	users with disabilities and older people	various ICT systems
ISO/IEC 40500	2019	ISO	No	users with disabilities and older people	web and mobile
ETSI EG 202 116	2009	ETSI	No	sensory, cognitive, motor, speech disabilities, allergies	variety of ICT solutions
ETSI ES 202 975	2015	ETSI	No	sensory, cognitive, motor, speech disabilities	variety of ICT solutions
EN 301 549	2021	ETSI, CEN, CENELEC	No	users with disabilities and older people	variety of ICT solutions
ETSI ES 200 381 – Parts 1 and 2	2012	ETSI	No	hearing impaired people	wireless terminals

Source: Own Elaboration

The Table 1 includes a non-exhaustive list of all existing standards and guidelines worldwide. Some countries support their own accessibility policies at the national level. Such are: Section 508 and ADA Standards for Accessible Design of USA government, Japanese accessibility standard JIS X 8341, Nordic Council of Ministers' Guidelines for

Computer Accessibility, Spain's accessibility standards UNE 139801 and UNE 139804, PAS 78: Guide to good practice in commissioning accessible websites in UK, Référentiel Général d'Accessibilité pour les Administrations (RGAA) in France, etc. They are applicable at the local level but are nevertheless based on international frameworks.

Most of the standards and guidelines in Table 1 are aimed at a broad group of users in order to be as useful as possible to the general audience. European accessibility standards are based on the "Design for All" approach, the main one of which is EN 301 549, aimed at accessibility of ICT products and services (European Commission, 2022b). Only ISO/IEC 24751-1 targets learners with disabilities, while the others cover people with sensory, cognitive, motor, and speech disabilities, as well as adult users (ISO, 2008b). ISO/IEC Guide 71 is a standard development guide that contains basic accessibility principles adopted in other ISO standards (ISO, 2014).

A disadvantage of the standards is that they are updated at least every 5 years, and Table 1 shows that some of them were last revised in 2008. This makes them out of date given the rapid development of information and communication technologies.

Most standards support a variety of software and services, with WCAG serving web applications with the ability to adapt to mobile as well. User Agent Accessibility Guidelines (UAAG) 2.0 is aimed at user agents, while Authoring Tool Accessibility Guidelines (ATAG) 2.0 – at "web-based or non-web-based application(s) that can be used by authors (alone or collaboratively) to create or modify web content for use by other people" (W3C, 2015a) or these are so-called "authoring tools". The W3C standards and guidelines work with three levels of accessibility - Level A, AA, or AAA, and provide specific guidelines for the technical implementation of applications. Another common feature between WCAG, UAAG, and ATAG is that they are based on the following basic principles of digital accessibility: perceivable, operable, and understandable (W3C, 2015a, 2015b, 2018). According to the principles:

- the information must be visible to the users' senses so that they can perceive it (perceivable);
- the user interface must support users in working with the software (operable);
- users must perform operations with the software that are comprehensible to them (understandable).

To these principles, WCAG adds robustness, according to which users should not be restricted from using assistive technologies. UAAG adds principles to facilitate programmatic access and comply with applicable specifications and conventions, according to which user agents must include functionalities that support digital accessibility and are compatible with established standards and guidelines such as WCAG.

In general, ISO standards are more general in focus, as they provide general guidelines for improving digital accessibility, without the technical details of providing it. The exception is ISO 9241-171, which includes guidelines and practical examples for accessible software design (ISO, 2008a). ISO/IEC 40500 approved WCAG 2.0 and it is exactly the same as W3C's guidelines (ISO, 2019b).

ETSI's standards are also aimed at multi-platform digital accessibility, as well as providing recommendations for optimizing the functionality, content and vision of ICT products and services for people with various disabilities. These standards maintain compatibility with ISO and W3C standards and guidelines. ETSI standards do not offer a

formal approach to accessibility assessment, but refer to ISO/IEC 17007:2009 "Conformity assessment — Guidance for drafting normative documents suitable for use for conformity assessment". The latter is aimed at evaluating regulatory documents, but its principles and recommendations can also be adapted to software design.

To answer RQ2, we can summarize some main directions for improving digital accessibility that are established in international standards and suggested by guidelines:

- improving the presentation of content so that it is visible to people with various visual or hearing disabilities, such as providing a text alternative to images or subtitles to video clips and audio files;
- supporting compatibility with assistive technologies that users use to access computer resources and perceive information;
- provision of alternative navigation options in the software so as to provide a multivariate approach to achieving user goals;
- ensuring multi-platform digital accessibility so that users are not limited to using only one software or service;
- maintaining compatibility with conventions imposed in the real world and in established software user interface design guidelines and standards to enable users with cognitive disabilities, for example, to recognize the purpose of interface elements without difficulty.

1.2. Artificial Intelligence Application in Web Accessibility

Scientists and practitioners are also working intensively on different algorithms to support "various data-intensive natural language processing (NLP) and machine-learning tasks" (Pranckevičius and Marcinkevičius, 2017). NLP is a branch of artificial intelligence or AI, aimed at recognizing human languages and manipulating them by machines (Mah et. al., 2022; Yuan and Gao, 2021). NLP is most often used in text summarization, sentiment analysis, chatbots and virtual assistants, machine translations, and spam detection (Mah et. al., 2022).

Personal digital assistants for people with disabilities are part of virtual assistants powered by artificial intelligence and use text-based systems for language processing and automatic transcription of signed content (Bragg et. al., 2019). Examples of widely known virtual assistants are Google Assistant, Apple Siri, Microsoft Cortana, Amazon Alexa, BlackBerry Assistant, and Viv. This type of software can be mobile or desktop applications, as well as to browse and interact with the Web and improve the accessibility of the web content (Abou-Zahra et. al., 2018). They can also use face recognition technologies to verify passwords or read CAPTCHA tests by measuring the characteristics of the user's face from different angles, in different environmental contexts, including camera images (Rajaram, 2023).

AI-powered web accessibility assistants can help visually impaired people to interact with digital media content and to convert it into text form in real-time (Tiwary et. al., 2019). These types of tools automatically generate a sound match based on the recognized images and video so that they can be recognized by a screen reader. They are also used to read voice commands, including working as voice and image recognition assistants, currency recognition, e-book, chatbot (Felix et. Al., 2018).

Another type of AI-powered web accessibility assistant also supports hearing-impaired people by translating real-time audio content into sign language or text

correspondence in the form of subtitles (Ozarkar et. al., 2020). On the other hand, they can also be used for lipreading from video, automatically generating a textual match (Rajaram, 2023).

On the other hand, this type of application can also help people with motor and cognitive disabilities who operate the software with voice commands (Correia et. al., 2020; Pradhan et. al., 2018). The software recognizes the user's voice and converts commands into text messages, for example, when writing emails and filling out forms, or supports user interface interactions instead of using hardware devices such as a mouse and keyboard.

Cognitively impaired people can also use AI-driven assistants when interacting with websites and apps. The algorithms account for "mistakes, confusions, or wanderings which further helps in differentiating between performances of different impaired individuals" (Javed et. al., 2023). Assistants help users make everyday decisions by reducing instructions to simple steps to follow to reach the end goal. For example, they can find applications in the development of e-shops and support the purchase decision.

Based on the above, we can highlight some more essential characteristics of AI-powered web accessibility assistants:

- they operate in a real-time and support user interactions with websites and applications, as well as decision-making when performing tasks;
- are created in accordance with international accessibility standards and guidelines;
- automatically recognize content (multimedia or text) and translate it into an understandable form for the target group (text, sound, sign language);
- the main technologies on which these assistants are based are image recognition, facial recognition, speech recognition, automatic lip reading, and text recognition.

2. Evaluation Method for AI-based Accessibility Tools

We propose to use the process approach to serve as a framework for the process of evaluating accessibility tools. It is defined in the ISO 9001 standard, according to which it is used to understand the requirements, consider the processes from the point of view of added value and improve them based on the evaluation of data and information (ISO, 2015). One of the advantages of the process approach is a shift to integration and business orientation of processes from specialization and functional orientation (Papulova, 2020).

Website and Accessibility Requirements are obtained as input of the process (Fig. 1) and as output - Evaluation Report and Recommendations.

We propose that the evaluation process be carried out in the following phases:

- *Set-Up the Experiment* - the objectives of the study are determined, including: the need to use accessibility tools; the platforms they need to support; what groups of users should be facilitated, and whether there are requirements for international accessibility standards to be maintained; is a mobile version of the tools required; whether supporting documentation is maintained; whether users will interact with the tool with mouse only, keyboard only, or a combination; will assistive technologies be supported;

- *Selection of AI-Powered Accessibility Assistants* - based on the criteria defined in the previous phase, a selection of AI-based accessibility tools that meet the specified criteria is made;
- *Testing the Selected Tools* - the tools are tested by being integrated into a chosen platform - website, or mobile application. When selected accessibility profiles are activated, an accessibility testing control tool is also applied to check whether it improves according to international standards;
- *Heuristic Evaluation of Selected Tools* - evaluation of the instruments is carried out on the basis of the conducted tests and in accordance with certain evaluation criteria;
- *Reporting* - recommendations are given to improve accessibility support from selected AI-based tools.

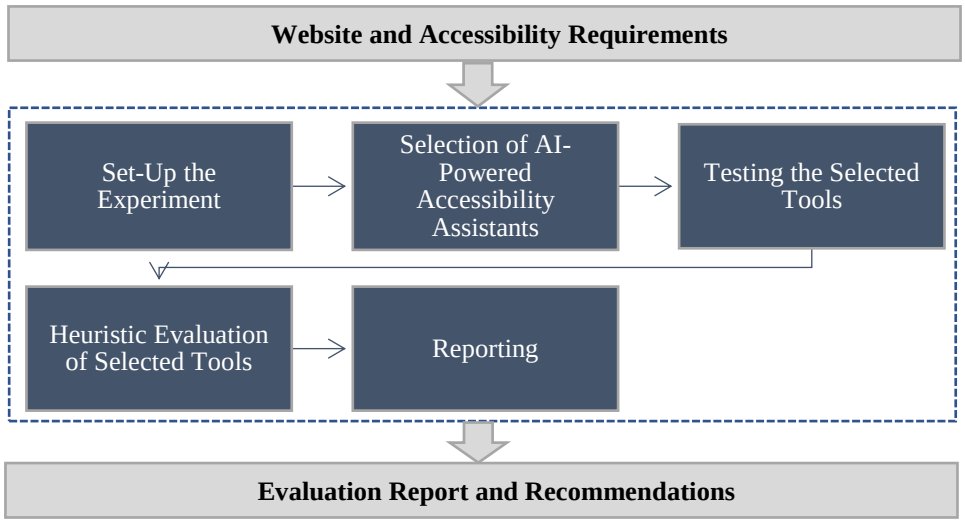

Fig. 1. Proposed Evaluation Method
Source: Own Elaboration

In order to perform the heuristic evaluation, it is necessary to apply an appropriate multiple-criteria decision analysis method. We propose to use an AHP that allows setting a 9-point rating of the set criteria. Its scale is: 1- Equal Importance, 3- Moderate importance, 5- Strong importance, 7- Very strong importance, 9- Extreme importance (2,4,6,8 values in-between). Since the criteria can be evaluated in pairs, this makes it suitable for fine-tuning their weights according to the importance of the pairs.

The evaluation criteria of AI-based accessibility tools that we propose in this paper can be seen in Table 3. To apply the AHP method, 105 comparisons were made. The consistency Ratio CR is 8.5%, the principal eigenvalue is 16.896, and eigenvector solution is resulted from 7 iterations, delta = 5.6E-9.

Table 2. Resulting weights for the criteria based on your pairwise comparisons

Evaluation Heuristics	Priority	Rank	(+)	(-)
1 Assistive hardware support	19.3%	1	11.7%	11.7%
2 Accessibility standard / guidelines support	11.4%	2	5.3%	5.3%
3 Navigation support	10.5%	3	4.0%	4.0%
4 Disabilities profiles support	9.9%	4	5.8%	5.8%
5 Content adjustment	8.6%	5	2.7%	2.7%
6 Colour adjustment	8.6%	5	2.7%	2.7%
7 Orientation adjustment	8.6%	5	2.7%	2.7%
8 Multiplatform support	6.8%	8	3.7%	3.7%
9 Effects settings	4.3%	9	2.9%	2.9%
10 UI metaphors	3.7%	10	2.5%	2.5%
11 Readability of UI	1.9%	11	0.9%	0.9%
12 Mobile version	1.9%	12	1.3%	1.3%
13 Help documentation	1.8%	13	1.0%	1.0%
14 Settings reset	1.5%	14	0.7%	0.7%
15 Performance	1.4%	15	0.8%	0.8%

Source: Own Elaboration

Table 3 shows the determined weight of the evaluation criteria, which is used to set the priority of each of them, on the basis of which the evaluation points should be calculated. We can suggest the following formula for assessment the accessibility features of the AI-powered tools:

$$\frac{\sum_{i=1}^{n} x_i}{\max(l)-\min(l)} * 100 - \bar{x}, \text{ where:} \quad (1)$$

$$x = w * l \quad (2)$$

w – weight equal to AHP priority divided on 100
l – features' support level defined in Table 4.
The mean $\bar{x}$ of a formula (1) is calculated as follows:

$$\bar{x} = {\sum_{i=1}^{n} x_i}/{n} \quad (3)$$

Support levels are related to the ability to customize the tool according to the user's preferences. The basic level is about supporting limited functionality without any options for further user modification. For heuristic#1 (Table 3), this is support for only one assistive technology, such as a screen reader for example. Heuristic #2 (Table 3), this is upholding key recommendations from accessibility standards and guides, such as

Table 3. Features‘ Support Levels

Level	Points	Description
None	0	Do not support this feature
Basic	1	Basic - e.g., static button and/or keyboard shortcut
Middle	2	Middle - e.g., predefined values
High	3	High - e.g., user-defined values

Source: Own Elaboration

Level A from the WCAG. For heuristic#3 (Table 3), basic support is only for keyboard shortcuts for working with the menus. For heuristics 4 to 9, 13, and 14 (Table 3) is the provision of only one button to change the tool setting, with no additional options for adjusting the values.

3. Results and Discussion

To test the above-proposed approach for evaluating AI-powered accessibility tools, we selected accessiBe, AllAccessible and UserWay. To conduct tests with these tools, we

Table 5. Comparison of AI-Powered Accessibility Tools Assessments

№	Heuristic	AHP priority	accessiBe		AllAccessible		UserWay	
			Level	Points	Level	Points	Level	Points
1	Accessibility standard / guidelines support	0,114	2	0,23	3	0,34	2	0,23
2	Performance	0,014	3	0,04	2	0,03	2	0,03
3	Readability of UI	0,019	3	0,06	3	0,06	3	0,06
4	Navigation support	0,105	3	0,32	3	0,32	3	0,32
5	Assistive hardware support	0,193	3	0,58	3	0,58	3	0,58
6	Help documentation	0,018	3	0,05	3	0,05	3	0,05
7	UI metaphors	0,037	3	0,11	3	0,11	3	0,11
8	Settings reset	0,015	3	0,05	3	0,05	3	0,05
9	Mobile version	0,019	3	0,06	3	0,06	3	0,06
10	Disabilities profiles support	0,099	3	0,30	3	0,30	2,4	0,24
11	Content adjustment	0,086	2,25	0,19	2,25	0,19	1,5	0,13
12	Colour adjustment	0,086	2	0,17	2	0,17	1	0,09
13	Orientation adjustment	0,086	3	0,26	2	0,17	1	0,09
14	Effects settings	0,043	2	0,09	2	0,09	2	0,09
15	Multiplatform support	0,068	3	0,20	3	0,20	3	0,20
	Total Points			**89,75**		**90,22**		**76,55**

Source: Own Elaboration

use websites built with WordPress and static ones. They integrate with the platform through plugins and JavaScript code. Website 1 is running on WordPress (Version 5.7.8), and Website 2 is a static one – developed with HTML and CSS. The tests are conducted in February 2023.

The results of applying our proposed method are summarized in Table 5.

All three tools have comprehensive accessibility support, compliant with WCAG international accessibility guidelines. accessiBe and AllAccessible scores are similar - less than 1 point difference. accessiBe and UserWay work at level AA of WCAG 2.1, while AllAccessible works at both AAA and Section 508 Ai Compliance. AccessiBe loading and overall performance is best compared to the other two tools which take 1.5-2 seconds. to load when the websites are opened.

All three tools support navigation with different hardware – mouse, keyboard, assistive technologies. They use standard icons (UI metaphors) for the buttons, so that if there is a problem with the perception of the labels, the users can orient themselves to the purpose of the functionalities by their graphic correspondences. They also provide accessibility profiles that adapt websites to the needs of people with different disabilities - sensory, cognitive, motor, speech disabilities, as recommended in the standards and guidelines summarized in Table 1. Customization of the colour scheme used for fonts and text formatting is also provided.

The integration of the compared tools with the websites is through JavaScript code, as well as through plugins for WordPress, HubSpot, Wix, Weebly, Volusion, Shopify, Magento and a number of other well-known content management systems (WEB, a; WEB, b; WEB, c).

When testing through the WAVE website – wave.webaim.org, changes to AI-based accessibility tools are not reflected. Therefore, WAVE was used as an extension for Google Chrome (Version 110.0.5481.105, 64-bit) and Mozilla Firefox (Version 110.0, 64-bit) to conduct real-time testing after enabling the investigated tools. There are no differences in results between the two browsers.

Table 6 summarizes the results of the tests performed on the two websites before enabling the accessibility tools.

Table 6. Summary of WCAG Testing with WAVE Before Applying AI-based Tools

Issues	Website 1	Website 2
Errors	2	0
Contrast Errors	0	0
Alerts	12	262

Source: Own Elaboration

Table 7 summarizes the results of the tests performed on the two websites with WAVE after enabling the accessibility tools. Visually impaired and blind accessibility profiles are enabled for all three.

Table 7. Summary of WCAG Testing with WAVE After Applying AI-based Tools

AI-based Tool	Issues	Website 1	Website 2
accessiBe	Errors	0	0
	Contrast Errors	0	0
	Alerts	5	247
AllAccessible	Errors	2	0
	Contrast Errors	0	0
	Alerts	7	262
UserWay	Errors	2	0
	Contrast Errors	0	0
	Alerts	7	20

Source: Own Elaboration

Test results with WAVE show that initially identified errors (Table 6) decrease after accessibility profiles are enabled. Fixed errors are missing or uninformative page title, empty heading, suspicious link text, missing first level heading.

A common disadvantage of using AI-based accessibility tools is the fact that accessibility errors are fixed at the moment of activation of the functionalities, i.e., for the current session. They are not permanently removed, which should be the job of web developers.

Conclusion

The problems of people with disabilities worldwide have long been popularized and improvements are being made in the technologies they use in every direction. They must be given a chance to access public resources so that they can achieve independence and self-reliance, which will be a condition for achieving their better professional realization and their full inclusion in modern dynamic life. That is why various assistive technologies are at their disposal, including those powered by artificial intelligence.

The researched AI-based assistants for improving website accessibility support different accessibility profiles borrowed from international standards and guidelines. This ensures access to web content by people with various disabilities.

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