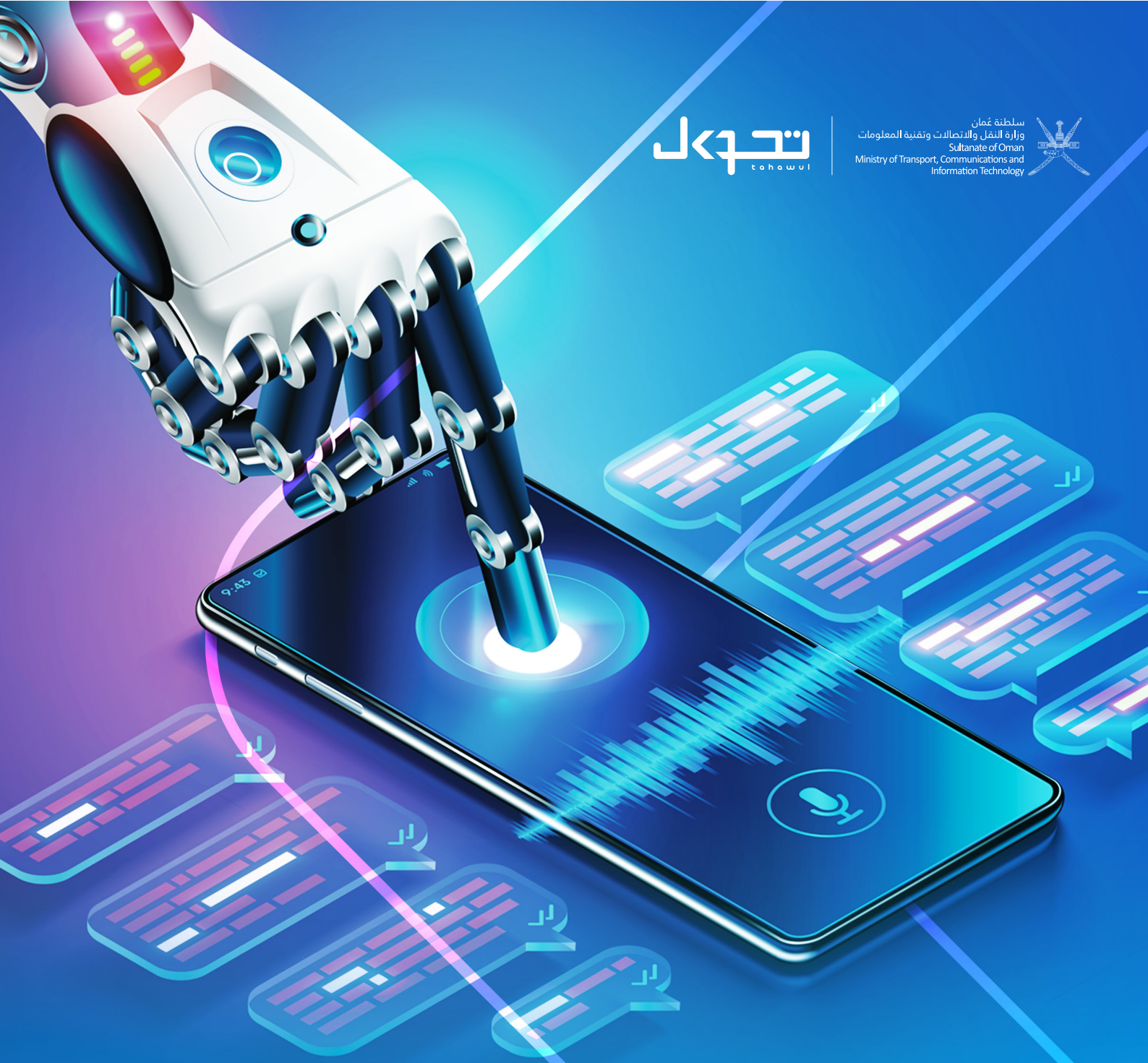

تحول
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سلطنة عُمان
وزارة النقل والاتصالات وتقنية المعلومات
Sultanate of Oman
Ministry of Transport, Communications and Information Technology

Digital Accessibility Guideline

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Contents of the Guideline

Glossary of Terms

(Guidelines)	A reference that reviews a set of guidelines and principles governing a particular task or process, based on the latest research, analysis, and best practices in the field, to ensure quality, consistency, and the successful achievement of targeted goals.
(Accessibility)	The ability of people with disabilities and the elderly to access and benefit from information and communication technology-based services and products to the same extent as those without disabilities.
(People with Disabilities)	People with a deficiency in one or more of their sensory, physical, or mental abilities, due to a congenital, hereditary, or medical condition, or resulting from an accident, to a degree that limits their natural abilities compared to those of their age group, and who consequently require care and rehabilitation.
(e-Inclusion)	Equal access to information and communication technology and digital literacy, to ensure equal opportunities for acquiring knowledge, accessing digital infrastructure, and participating fully in the digital world.
(User)	Every user and beneficiary of mobile applications.
(e-Services)	Services that are developed, delivered, and managed using information and communication technology, as opposed to traditional paper-based services.
(Assistive Technologies)	The tools, devices, and technical systems designed to enhance the capabilities of people with disabilities and support them in performing daily tasks independently, such as screen readers, specialized keyboards, speech-to-text applications, and similar technologies.
(Screen Reader)	A programme or device designed to convert text displayed on electronic screens into audio to assist people with visual impairments to access content on websites and mobile applications.

About the Guideline: Definition, Objectives, and Target Users

Introduction

In a world that increasingly values brevity and speed, reliance on technology has grown significantly. Digital platforms, such as mobile applications and websites, have become the most convenient and accessible options for obtaining services and completing related procedures.

Access to services is a fundamental right for all beneficiaries. Therefore, ensuring these services are available to everyone, including persons with disabilities and the elderly, regardless of their ability to use technology, is a necessity. In this context, the need emerged for a practical guideline to help developers of mobile applications and websites comply with digital accessibility standards. These standards reflect global best practices designed to create seamless browsing experiences and ensure that services are accessible, responsive to user expectations, and aligned with their needs.

This guideline was thus developed as a compass for developers, directing them to key recommendations for achieving digital accessibility in the websites and mobile applications they develop. It also provides guidance on accessibility testing, ensuring that digital services remain inclusive and available to all users, regardless of their goals or physical or sensory abilities.

The guideline was authored under the supervision of a visually impaired expert specialising in digital accessibility, software development, and testing. Its development was driven by an actual need and informed by a thorough understanding of the challenges faced by individuals with visual impairments. The goal is to empower developers to adopt inclusive, advanced practices that serve all users without exception.

Who is this guide intended for?

This guideline is intended for:

1. **Mobile application and website development teams and supervisors in both the public and private sectors, including:**
   - Project Managers
   - Software Developers
   - User Experience Designers
   - Digital Content Writers
   - User Interface Designers
   - Quality Engineers
   - Digital Accessibility Specialists
2. **Clients - application owners - who contract with development individuals or companies.**
3. **Senior management and decision-makers.**
4. **Stakeholders interested in digital accessibility for persons with disabilities.**

What does the guide provide?

With the rapid advancement of technology and the proliferation of software, numerous capabilities and solutions have emerged to help application developers address digital accessibility gaps. These gaps can limit the ability of users with disabilities to access services independently and complete procedures or expose them to the risk of fraud when relying on third parties to carry out services.

To this end, this guideline presents the most important instructions for achieving digital accessibility in mobile applications, and explains the mechanism for measuring accessibility levels, with the aim of:

1. Enhancing digital accessibility in mobile applications and websites, particularly for users with disabilities, by applying digital accessibility guidelines and evaluating the effectiveness with which applications adhere to them
2. Establishing applications and websites based on digital accessibility principles from the initial development stages, to avoid the cost of later modifications during advanced development stages or after launch
3. Promoting the principle of digital inclusion in products in general and in government solutions, applications, and websites in particular
4. Contributing to the integration of people with disabilities and ensuring their ability to obtain information and complete services independently, efficiently, and securely.
5. Implementing leading global practices in digital accessibility and usability to ensure that the Sultanate of Oman remains aligned with the latest technical advancements that support user-centricity and facilitate seamless interaction with available technologies

Chapter One:
General Guidelines for Achieving Digital Accessibility in Mobile Applications

A Set of Enabling Guidelines for Application Developers

This section of the guide provides guidelines to help you implement the principles of digital accessibility in the mobile applications you are developing, making them compatible with assistive technologies designed to facilitate the use of mobile phones and other electronic devices by people with disabilities.

Following these guidelines during the development phase will increase the application's reach and accessibility to a broader range of users with varying capabilities, while also enhancing the application's or brand's reputation and increasing user confidence. Furthermore, it will reduce the chances of a group of users feeling excluded and lower the costs of implementing improvements that can be easily addressed during the development stage.

1.Provide Alternative Text for Non-Text Content

Include alternative text for visual content such as images, diagrams, illustrations, and videos. The alternative text should accurately and concisely describe the visual elements and their context in written form. This is essential to ensure that visually impaired users, who rely on screen readers, can understand visual content that screen readers cannot interpret.

2.Diversify Media Formats

Use a variety of media formats in your application, including text, images, audio, and video clips. This allows users to choose the format that best suits their needs, ensuring accessibility is not limited to a single format. For instance, images alone are insufficient for screen reader users unless accompanied by alternative text, and audio content may not be accessible to users with hearing impairments unless supported by captions or visual cues

3.Use Additional Indicators Beyond Colour

Avoid relying solely on colour to convey information, as assistive technologies used by some individuals with disabilities do not recognise colour cues. For example, instead of using red to indicate required fields, use an asterisk (*) alongside colour. Similarly, when alerting a user about an incorrect password entry, provide a written message below the field indicating the error.

4.Provide Written Instructions and Alerts

Deliver information and indicate errors using clear written text, so that it is accessible to users of assistive technologies. For instance, if a form requires specific fields to contain only letters or numbers, this should be explicitly written. If a user fails to meet any of the instructions, they should be alerted with a clear textual message.

5.Name Fields Clearly

Add clear and descriptive labels to form fields so that users of assistive technologies, such as screen readers, can easily identify and navigate them. For example, precede the username field with the label “Username” and the password field with “Password”.

6.Consider Touch Button Size and Placement

Ensure buttons are appropriately sized and well-positioned to allow users with motor impairments to locate and tap them easily. Provide adequate spacing between interactive elements to prevent accidental taps. For example, when using sliders or placing multiple buttons in the same area, avoid placing them too close together to reduce the risk of accidental taps.

7.Implement Simple Gestures or Alternative Actions

Incorporate intuitive gestures to help visually impaired users interact with the application using their fingers or hands, rather than tapping directly on buttons. Standard gestures such as swiping up or down to scroll or long-pressing to copy text should be supported. If custom gestures are introduced, ensure they are compatible with screen readers or provide alternative actions to achieve the same outcome.

8.Include Quick Access Features

Enable quick actions that allow users to access essential functions without having to navigate the entire interface. This may include presenting a quick actions menu via swipe gestures with options such as reply, forward, copy, or delete.

9.Build on Built-in System Components

Leverage built-in system components and functionalities wherever possible to ensure compatibility with assistive technologies and deliver a seamless, familiar experience for users. For instance, use the existing calendar template or text input fields instead of custom-built alternatives that may not be compatible with screen readers.

10.Use the System's Virtual Keyboard

Opt for the virtual keyboard provided by the operating system rather than designing a custom keyboard, as this ensures compatibility with screen readers and allows users to input data accurately and navigate the application with ease.

11. Enable Text Enlargement Features

Incorporate functionality that allows users to enlarge on-screen text and rely on the system's built-in magnification tools to maintain compatibility with assistive technologies. This enables users with visual impairments or low vision to read and interact with the application content comfortably without data loss.

12. Use Clear and Direct Language

Present information using straightforward language, avoiding long sentences and technical jargon that may be difficult for general users to understand. Prioritise user-centred design and provide content that is comprehensible and helps users complete tasks with ease and efficiency.

13. Design a User-Friendly Interface

Create a user interface (UI) that is intuitive, smooth, and high-quality, avoiding excessive animations and overwhelming color schemes. Use high-contrast colours, legible font styles, and logical navigation structures. Ensure tab options and navigation paths are simple and predictable.

Digital Accessibility Testing in Mobile Applications

Testing Steps and Tools

Accessibility testing is a crucial final step before launching an application to ensure it is inclusive and suitable for all intended users. This phase verifies the app's compliance with digital accessibility guidelines through two key steps:

Automated Testing

Automated testing is performed on applications to verify their digital accessibility using specialised tools embedded in operating systems. This testing is the first step that helps developers detect and resolve common accessibility issues early during the development phase. Automated tools examine the application's interface and interactive elements, such as buttons, input fields, and menus, to ensure they comply with digital accessibility standards and are suitable for users with disabilities.

Accessibility Scanner

Google's primary tool for assessing accessibility in Android applications, integrated within the Android Studio development environment. It enables developers to perform comprehensive accessibility checks, offering suggestions and recommendations for improvement. It is also available as a standalone application for Android smartphones and tablets, offering a simple and user-friendly interface for both developers and non-specialist users.

Accessibility Inspector

Apple's official tool for testing accessibility in iOS applications, integrated within the Xcode development environment. It allows developers to run extensive accessibility checks and identify potential barriers for users with different types of disabilities. The tool also provides actionable guidance for resolving these issues.

While the use of built-in development tools is standard practice, developers may also benefit from external tools in later testing stages. For example:

axe-core

An open-source tool that supports accessibility testing for both web and mobile applications across multiple operating systems. It forms part of a broader suite that enables comprehensive testing, particularly for web applications built with HTML and deployed across different browsers.

Such tools provide in-depth analysis and generate detailed reports on usability and accessibility, aiming to enhance the experience for users with disabilities and ensure universal access.

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User Testing

This involves engaging a selected group of users with various disabilities to test the application, evaluate its responsiveness, and assess how it interacts with their assistive technologies. Developers invite real users to try the application and identify any challenges they encounter. This process allows developers to gain first-hand insight into the real-world accessibility experience and evaluate the effectiveness of user interaction with the application, and to better align with user expectations, ensuring maximum benefit and usability.

Chapter Two:
Guidelines for Achieving Digital Accessibility on Websites

Key Principles for Web Developers

This chapter outlines a set of recommended guidelines for ensuring digital accessibility on websites, designed to enable an inclusive and user-friendly browsing experience for all users, including those with disabilities. The guidance is based on the Web Content Accessibility Guidelines (WCAG) developed by the World Wide Web Consortium (W3C), with particular emphasis on meeting Level AA requirements in line with the National Digital Accessibility Policy.

1.Diversify Media on The Page

Incorporate a variety of media formats on your website, including text, images, videos, and audio. This enhances the inclusivity of your site for individuals with visual, auditory, and cognitive impairments. For instance, text alone may be insufficient for screen reader users unless accompanied by alternative text for visual elements; similarly, images alone may not be helpful for those with visual or cognitive disabilities. Audio content, on its own, may also be inaccessible to users with hearing impairments unless supported by transcripts or visual indicators.

2.Provide Alternative Text for Non-Text Content

Write concise and accurate alternative text to describe non-text elements such as images and illustrations. Ensure that the alternative text is accurate and concise, clearly describing the content of the elements and providing appropriate context. This helps users with visual impairments understand the content when using screen readers, which convert written text into speech. As screen readers cannot interpret images, alternative text is crucial for enabling full access to website content for this user group.

3.Offer Descriptive Content for Visual and Audio Media

Provide alternative descriptive content for visual and audio materials to ensure a comprehensive experience for all users, particularly those with visual or hearing impairments. For video content, include captions that describe spoken dialogue and sound effects or offer sign language interpretation. Include audio descriptions to convey visual information to blind users, replacing background music with descriptive narration. For audio content, supply written transcripts or sign language translations. This ensures all media content is accessible, regardless of the user's abilities.

4.Enable Multiple Sensory Features

Present content through multiple sensory channels to ensure it is accessible to all users, including those with visual or auditory impairments, by offering alternative sensory formats. For example, users with visual impairments may not perceive colour and rely instead on auditory cues. Therefore, avoid using green alone to indicate success; instead, include a textual message conveying the same meaning for screen reader users. Likewise, users with hearing impairments may miss audio alerts, so visual cues or text-based messages should be provided as alternatives.

5.Use More than Just Colour to Convey Information

Avoid relying solely on colour to alert users or convey information. Users with colour blindness may struggle to distinguish between colours, and blind users using screen readers cannot perceive colours at all. To mitigate this, use visual indicators such as an asterisk (*), audio alerts, or explanatory text (e.g., “Please complete this field”) in addition to colour coding, such as red highlighting.

6.Use Semantic Structure for Page Content

Organise website content in a logical and sequential manner that aligns with user expectations. Structure your content using primary, secondary, and tertiary headings in a clear hierarchy via HTML tags, rather than relying on visual formatting, such as enlarging the font size to indicate headings. The same applies to lists and tables, which should use appropriate semantic elements rather than plain text. This helps screen readers interpret the content structure and improves navigation for their users.

7.Use Accurate Page Titles

Assign each webpage a clear and descriptive title that communicates its purpose and content, facilitating easier navigation. Page titles are particularly important for screen reader users, as they rely on them to identify and navigate between pages efficiently.

8.Facilitate Smooth Website Navigation

Enable your users to navigate between pages and sections smoothly using various methods. This is essential for users with visual or motor impairments who depend on assistive tools to navigate the website. Useful features include main navigation menus, a site map for overall structure, a search bar for quick content retrieval, skip buttons to bypass sections, and full keyboard navigation functionality that removes reliance on a mouse.

9.Support Keyboard Navigation

Ensure your website supports full keyboard navigation so that all users, including those with visual or motor disabilities, can access and interact with the site without a mouse. Users must be able to reach all content and use all features using only a keyboard.

10. Use Clear and Informative Link Text

Write clear, descriptive hyperlink text that provides users with a precise idea of the destination page, rather than using vague phrases like "Click Here." This is especially important for screen reader users, who often review all links on a page out of context. Therefore, link text should be meaningful on its own to make it accessible for users.

11. Assist with Form Completion

Provide clear instructions to help users complete form fields correctly, particularly those using assistive technologies. Include guidance next to each field, such as "Password must contain at least ʌ characters". When errors occur, display explanatory messages that describe the problem and how to resolve it. Mark mandatory fields with asterisks (*) or explanatory text to highlight their importance and ensure all fields are clearly labelled to indicate the required input.

12. Respect Users' Time Requirements

Allow users to control time limits on your site, providing them with sufficient flexibility to complete tasks at their own pace. This is particularly important for users with motor or cognitive impairments, as well as those using screen readers, who may require additional time. For example, if a form is time-limited, offer the option to extend the session or automatically save previously entered data. If no time limit is needed, it is best to remove it altogether.

13. Minimise Flashing and Moving Content

Avoid or limit the use of rapidly changing or moving elements such as carousels, ads or scrolling text. If such content is necessary, provide user controls to manage it. Flashing or animated elements can distract users, reduce focus, and interfere with assistive technology. Where motion is used, ensure it only activates upon user interaction and does not exceed three flashes per second to prevent adverse effects.

14. Specify the Page's Primary Language in Code

Define the primary language of your webpage (e.g., Arabic or English) within the HTML code. This enables screen readers to pronounce and interpret content accurately for users with visual impairments. Without this specification, the content may be misinterpreted or read incorrectly.

15. Set Page Direction Appropriately

Allow users to control the direction in which page content is displayed, whether horizontally or vertically. The content must remain accessible and functional in both orientations, without losing information or disabling features. This is especially important for users with motor impairments who may find it difficult to interact with a device that requires a single fixed direction. Responsive design is recommended to ensure content adapts seamlessly to different screen orientations across devices.

16.Enable Text Scaling without Loss of Content or Functionality

Design your website to allow users to zoom in by up to 200% using browser tools or device settings without losing any content, disrupting functionality or distorting the layout. Ensure text and page elements resize fluidly without horizontal scrolling. This supports a comfortable experience for users with visual impairments who may require larger text sizes for reading.

17.Ensure Visual Contrast

Verify that there is sufficient contrast between text and interactive elements (such as buttons) and the background. This helps users with low vision or color blindness read text and interact with content more easily. Use contrasting colors and avoid using similar shades. Additionally, provide a dark mode or night reading option on your website to enhance readability in low-light conditions.

18.Provide Volume Control Features

Ensure that users have an easy and clear method to control or mute the volume on pages that contain audiovisual content, particularly those that play automatically when the page is opened. If audio starts automatically and continues for more than three seconds, it is essential to provide a way to control the volume to avoid interference with screen reader audio or to prevent disturbing users who are sensitive to sounds and noise. This can be achieved by using clear and familiar buttons for play/pause and setting default configurations so that audio does not automatically start upon opening the page. Additionally, ensure that the volume control features are compatible with various devices and browsers to guarantee accessibility for all users.

Digital Accessibility Testing in Websites

Testing Steps and Tools

It is essential to ensure the accessibility of a website before launching it to users to guarantee its compliance with the recommended web content accessibility principles. This can be achieved through two key steps that allow developers to identify issues that may prevent people with disabilities from accessing and interacting with the site effectively. These are as follows:

Automated Testing

This test is the initial step in assessing the accessibility of your website and is conducted using automated tools designed to measure compliance with web content accessibility principles and to identify common issues, such as missing alternative text and inadequate contrast ratios. Although these tools provide a good indication of how well the site adheres to accessibility guidelines, they do not detect all problems, particularly those related to human interaction. Therefore, automated testing should be followed by manual testing.

Below are some automated tools you can use for conducting the test:

Wave

A free tool that can be added to Chrome and Firefox browsers, allowing users to analyse web pages and directly identify issues on the page.

Lighthouse

An open-source tool from Google that can be run from the developer tools in the Chrome browser to analyse website performance, including accessibility.

Accessibility Insights

An open-source tool from Microsoft, available as an extension for Chrome and Edge browsers. It provides an easy way to test websites and offers guidance on how to fix identified issues.

Siteimprove

A comprehensive tool for website analysis, including accessibility evaluation as part of the analysis results.

NVDA

A free screen reader that works on Windows systems, enabling developers to test site compatibility with screen readers.

Color Contrast Analyser

An open-source tool that can be added to a browser to measure contrast ratios between text and background as well as contrast in documents and images.

2

Manual Testing

Manual testing is a crucial final step in evaluating website accessibility. This is carried out by specialists or actual users with disabilities to assess the ease of navigation and interaction with the site. This test involves a hands-on experience of the site to assess human interaction and identify aspects that cannot be verified with automated tools, such as the accuracy of alternative text, keyboard navigability between site elements and pages, and the ease of completing forms and fields.

By combining both automated and manual testing, a comprehensive and accurate assessment of the website's accessibility can be achieved, ensuring an inclusive experience that meets the needs of all users.

Related Publications

1. National Digital Accessibility Policy 2022
2. Mobile Accessibility at W3C
3. Web Content Accessibility Guidelines (WCAG) 2.1
4. Apple Accessibility for Developers
5. Android Build Accessible Apps
6. Development of Government Applications on Mobile and Smart Devices 2023
7. Design Standards for Government Websites and E-Services Interfaces 2023

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