

# An Overview into Principles of Accessibility: A Focus on Paired

## Introduction:

The world is witnessing an immense digital transformation powered with the latest in technology. For this, leveraging automation and AI have concurrently grown in the pursuit of adopting an economical, efficient, expedient and comprehensive test strategy. This has been seen in every domain including the niche of accessibility testing. This paper explores the significance of accessibility testing with an amalgamated and novel approach of paired testing, wherein an abled and a differently abled engineer work together to identify and fix bugs in an application. It gives an inclusive insight into the domain and its operations. It also comprises the opportunities and roadblocks faced during the process, especially when test automation is performed in a standalone approach within accessibility testing.

This paper addresses the need of a balanced approach within accessibility testing. This essentially points to the need of conducting a testing effort which retains the core requirement of human intervention. For gaining maximum test coverage, test automation may be viable for speedier results, but for extremely reliable and effective results, a real user should be involved as well. When it comes to accessibility testing specifically, the onus falls on the real users itself who can give a true picture of accessible web content. Without them, the effort would go in vain. But how is this achieved? This is the key question that is answered in this paper. Threatening payloads on drones including IoT hacking devices, microphones and spying cameras could breach the security of an organization.

## Standards and Guidelines for Accessibility

Before delving into a balanced approach towards accessibility testing, an overview of the general set of standards and guidelines becomes important to mention. These include:

- **Americans with Disabilities Act (ADA)**- Laid down in 1990, this Act forbids any type of discrimination metted out to people with special needs within employment, commercial facilities, telecommunications, public accommodations, transportation, and State and local governments, including the U.S. Congress. It is an umbrella law which takes into account the need of accessibility in an all inclusive manner.
- **Section 508**- This is an amendment to the Rehabilitation Act of 1973, which brings forth the law of inclusivity; to include differently abled people within the digital domain as well as the physical domain by penning down a set of guidelines for procurement of a product or service by the Federal Government. For the purpose of digital inclusivity, the guidelines laid down are the Web Content Accessibility Guidelines (WCAG).



- **Web Content Accessibility Guidelines-** These guidelines, as a subset of Section 508, outline areas of disabilities that are covered to make content on the web more accessible. These include cognitive, learning, motor, neurological, physical, visual and hearing disabilities, etc. The guidelines are fairly updated however, aren't exhaustive as with time, more areas are factored in. Thus, the latest guidelines are WCAG 2.1 and WCAG 2.2, of which the draft version has been released and the complete set is to be released around November 2021.

Conformance to these guidelines can be achieved in three levels which are:

- Level A- minimum level of accessibility compliance
- Level AA- optimal level of accessibility compliance; encompasses the standard and common issues faced
- Level AAA- highest level of accessibility compliance

As an extension to WCAG 2.0, WCAG 2.1, imbued new features and success criteria for the web content to be P.O.U.R., i.e., Perceivable, Operable, Understandable and Robust. With WCAG 2.2, the success criteria will be further altered and optimized.

As observed, these guidelines are primarily aligned with the laws curated and implemented in the U.S. However, the importance of adherence to such laws and guidelines goes beyond boundaries. These need to be incorporated in every sector, in every country, irrespective of its mandatory requirement or not. For India per se, Section 42 of the Rights of Persons with Disabilities Act, 2016, elucidates the requirement by the Government to provide content in an accessible format, be it print, audio, or electronic. The extent of its implementation may be an issue to be dwelt upon later, but the essence of these laws firstly needs to be absorbed, regardless of their existence of the same or not.

## Automation in Accessibility

When it comes to automation in accessibility testing, a significant shift has been witnessed in increasing automation processes for accessibility testing. A number of tools simultaneously, help achieve comprehensive test coverage, focusing on areas of web accessibility for differently abled users, be it for users with visual impairment- low vision, colour blindness, partial or complete blindness, hearing impairment, cognitive disabilities, dyslexia, or neurological impairments. To name a few tools within test automation:

- **aXe-** As an open-source tool, aXe is an extensive toolkit for testing web content for eliminating accessibility defects at the code level and is aligned with WCAG seamlessly.
- **Wave-** Similarly, Wave is another open-source tool available as a suite to check for accessibility and WCAG errors.
- **Accessibility Scanner-** This tool is available for the Android platform, helping to scan the screen for any inaccessible content including content labeling, colour contrast- low or high, clickable items, etc.
- **Accessibility Inspector-** For iOS devices, this tool helps in identifying and auditing accessibility issues while also providing voice-overs for icons within the application.



The usherance of AI and ML in accessibility has proved wonders in terms of increasing efficiency and bringing a paradigm change itself. While test automation is important for a facile approach, it can only cover so much, in terms of producing reliable and true results. In the case of aXe per se, the notion of logicity isn't covered as the attention falls only on the code level changes. The aspects of logicity and intuition are areas which cannot be replaced. Thus, automation definitely adds on to accessibility testing but it should just be seen as that- an addition, and not a replacement for manual testing as a human-centric approach is extremely intrinsic to accessibility testing.

## Assistive Technologies

Alongside tools, Assistive Technologies (ATs) help while conducting a thorough test coverage - these are technologies regularly used by the end users themselves in accessing solutions. To understand a few:

- **VoiceOver-** An in-built iOS screen reader, VoiceOver helps users with visual impairment in receiving information via voice
- **TalkBack-** Similarly, TalkBack is Google's screen reader for Android devices, helping people with low vision, partial or complete blindness.
- **JAWS-** JAWS or Job Access With Speech, is a paid screen reader that helps users in receiving Braille and speech output for web content.
- **NVDA-** Non-visual Desktop Access is an open-source screen reader that serves as an assistive technology for people with visual impairment.

Along with screen readers, screen magnifiers, speech dictation software (Dragon), etc., can be used as well to conduct accessibility testing for different needs. The importance of ATs needs to be acknowledged by organisations, to deliver an impeccable user experience.

## Accessibility is Complementary to Usability

This is a very important aspect to consider while curating a test strategy for accessibility testing. Accessibility and usability move laterally. As automation gains momentum, this aspect needs to be recalled time and again, especially when it comes to accessibility, that usability is the main focus at the end of the day. Delivering content which cannot be used properly is unhelpful and unprofitable. The usability of any application lies in the hand of real users and when it comes to accessibility, the users are differently abled. Thus, if they themselves aren't involved in the process, the whole point of making an application accessible goes in vain.

Test automation, as said, can go miles in achieving faster results but reliable results can only be achieved when a real user tests the application. The aspect of usability will only be covered fully when real pain points are brought forward by the actual users. And this is an area, which can never be automated. This does not go onto say that only a manual approach should be the way forward. An amalgamated approach would bring in better as well as faster results, for which a paired-testing approach can be seen as a pathway.



## Our Novel Paired-Testing Approach

A paired-testing approach essentially is a collaborative effort by an abled and a differently abled engineer. This strategy not just helps in producing reliable results and a thorough test coverage but is a lot more than that.

- **The Process**

In terms of the process, for example, a sighted and a non-sighted engineer integrate their efforts in testing whether the content is accessible or not. Even within this, if a user has low vision, the areas to be covered will vary than that of users with partial vision impairment or complete blindness. The test would thus be on areas such as colour contrast, font size, etc.

Similarly, there are different parts of testing which are undertaken for different needs of individuals with special needs. For example, keyboard testing is done for people with motor disabilities, wherein using the mouse is avoided; screen readers are utilized and colour contrast tools are effectively put to use for visually impaired users, etc. Our paired-testing approach offers a novel pathway of identifying and eliminating accessibility defects to the maximum.

- **Going Beyond the Test Coverage**

Beyond the perspective of just being a technical process to produce reliable data, this unique approach transcends to a whole journey undertaken by a Subject Matter Expert (SME) and a real user who is differently abled. As a collaborative effort, it is a two-sided journey which involves an inherent understanding of not just the domain but of the team you're working with. Passion, compassion and patience would be the perfect words to describe the emotions that should ideally be present in the team.

Since a paired-testing effort involves its own obstacles, especially in terms of understanding what the other person is trying to put across, such challenges can only be overcome when there is a whole-hearted participation from the SME as well as the real user who put an effort to be on the same page. In terms of familiarity with the tools or ATs being used, such as the voice in screen readers or only using the keyboard and not the mouse while keyboard testing, are other areas where a collaborative effort goes miles.

Thus, a paired-testing approach offers an exological impairments). Our novelty speaks volumes of an expedient approach which is humanly extremely high-yielding test coverage by taking into account an array of challenges that are faced by individuals with special needs, which again vary (visual, auditory, learning, cognitive or neur-centric. This definitely does not go onto say that our testing practices aren't at par with the latest in technology today wherein automation is cardinal. As accessibility champions, our developers and testers move ahead with the changing times in search of better and more feasible solutions.



## Benefits of a human-centric approach

With automation testing possessing its own advantages, the benefits reaped out of a human-centric approach, specifically a paired-testing approach, are more enhanced and inclusive:

- **Comprehensive test coverage-** A paired-testing approach offers an expanded area of coverage, as it takes into account the faults that can be omitted while automation testing.
- **Real usability-** As mentioned, the aspect of true usability can only be achieved if real users test the application- which is something that a paired-testing approach offers extensively.
- **Aligned mindsets-** Needless to say how this approach presents the advantage of an aligned mindset between the SME and the differently abled user, who adapt to each other's needs and work as a team.
- **Sensitization-** An added virtue of this approach is also better sensitization. Awareness about accessibility and the need to have an inclusive drive in the domain of software testing as well, is extremely relevant.

## Conclusion

Thus, while automation and AI have offered an effective and economical way of testing, the need to balance a human-centric approach in accessibility testing per se, is immensely significant. For this, the novel paired-testing comes into the picture as the key to the roadblocks faced in an automated testing effort. This approach not just helps in bringing out the latent bugs missed during automation testing but also user-centric results that help in catering to the target audience who are differently-abled. QA InfoTech prides itself in being a pioneer of such a concerted effort which helps in a seamless product delivery to end users. Our diversity within the organisation of differently abled engineers helps in not just an inclusive test coverage but also in spreading awareness about accessibility and the need of real users to have a say in the products customized and catered for them.



## About QA

At QA InfoTech we specialize in providing independent software testing and unbiased software quality assurance services to product companies, ranging from the Fortune 500 to start-ups. Established in 2003, with less than five testing experts, QA InfoTech has grown leaps and bounds with its Four QA Centers of Excellence globally; located in the hub of IT activity in India in Noida and Bangalore and our affiliate QA InfoTech Inc. in Michigan and Bentonville, USA.

- 1400+ QA engineers and domain experts
- An ISO 9001:2015, CMMi Level 3, ISO 20000-1:2011 and ISO 27001:2013 compliant company
- Thought Leaders in E2E testing, specifically in Test Automation, Performance Testing, Localization and Accessibility Testing

In 2017, QA InfoTech has been ranked in the top 100 places to work for in India. We are amongst the top 50 Best IT & ITeS Companies To Work For in 2012, 2014, 2015 & 16 in India. For more details, please refer [to our blog on this event](#).

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