

# Accessibility Testing of Digital Cultural Heritage

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**Abstract.** In the paper we discuss the problem of building a web site that is accessible to the people with different disabilities. We show some basic guidelines that should be followed by the web site developers in order to complete this task. Also, some special web content accessibility testing tools are presented. Finally, we make special attention to accessibility of some of the most popular digital cultural heritage web archives.

**Keywords:** Accessibility, Digital Cultural Heritage, Europeana.

## 1 Introduction

The Web Content Accessibility Guidelines (WCAG) 2.1 is an official specification for development of more accessible Web content (Web Content Accessibility Guidelines (WCAG) 2.1, 2020). If we follow these guidelines our web resources will be more accessible to users with disabilities (Georgieva-Tsaneva & Subev, 2018).

These days cultural heritage is tightly coupled with digital technologies (Bogdanova, Todorov, & Noev, 2017), (Bogdanova, Todorov, & Noev, 2010), (Kremers, 2019), (Noev, Bogdanova, Todorov & Sabev, 2019). Users have a lot of new opportunities to use cultural materials and the institutions to produce new content for research and education.

There are a lot of specially developed web portals that offers digital cultural heritage content (British Museum, 2020), (Europeana, 2020), (Harvard Art Museums, 2020), (New York Public Library Digital Collections, 2020), (Rijksmuseum – Het museum van Nederland - te Amsterdam, 2020). In our research we make an overview of the accessibility provided by the web portals of two of the biggest digital libraries Europeana (Europeana, 2020) and New York public library (NYPL) (New York Public Library Digital Collections, 2020). We also use some of the most popular accessibility testing software applications in order to check the web content in these two archives.

## 2 Website Accessibility

According to W3C WCAG 2.1 Guidelines, a website must be perceivable, operable, understandable and robust to be accessible for disabled users (including visually impaired users).

**Perceivable:** Users of the web site should be able to comprehend it in any circumstances. For example, people with visual disabilities might not be able to see an image. That is why alt tag should be used to describe the image content.

**Operable:** Easy to use user interface. For example, to keyboard usage to work with the website.

**Understandable:** All included materials and user interface should be straightforward to all users. For example, the text must be readable and comprehensible.

**Robust:** Content should be well structured and valid to all browsers.

One of the most important parts of the design of any web site are the colour scheme and contrast. They are important for the mood and attention of the site visitors. For the colour design of blind users is important to have high contrast between foreground and background elements. Developer also should create text elements that are readable on grey scale.

## 3 Accessibility of Digital Cultural Heritages

Europeana is an archive with digitized cultural heritage contents. In recent years a Most of the popular cultural institutions share their digitized materials to Europeana. It contains millions of cultural heritage items from cultural institutions all over Europe.

The New York Public Library is one of the largest public libraries in the world. It stores unique cultural heritage artefacts.

### 3.1 Color Oracle

Color Oracle simulates colour blindness problems and presents in real time what people with common colour vision impairments will see (Color Oracle, 2020).

It acts as a full screen colour filter and work over the top of the tested software. Eight percent of all males are affected by colour vision impairment. That is why it is important to make all content readable to this audience too.

With this software, the designer can check if the web page is accessible to users with some popular visual disabilities like deuteranopia, protanopia and tritanopia. Also, luminance preserving grayscale version can be simulated.

On Fig. 1 and Fig 2 are shown some test applied with Color Oracle to Europeana and NYPL web archives.

Both web archives that we check looks to have compatible interfaces even though some of the image archives are with low quality in different test modes of Color Oracle.

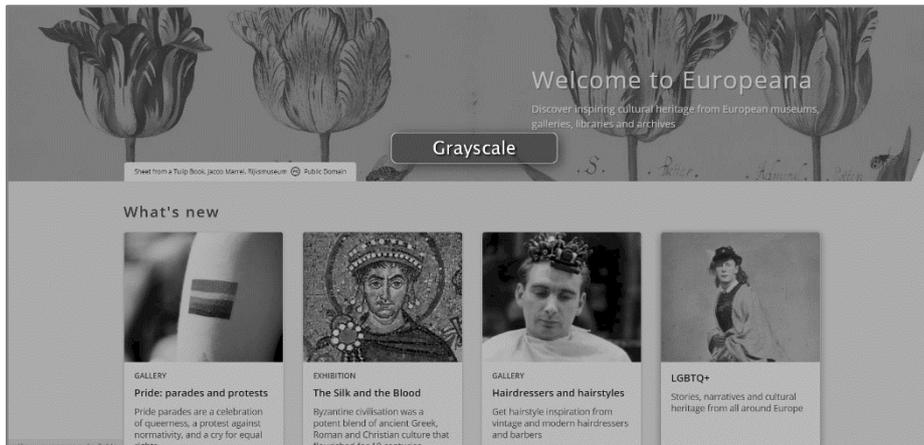


Fig. 1. Europeana grayscale filter applied.

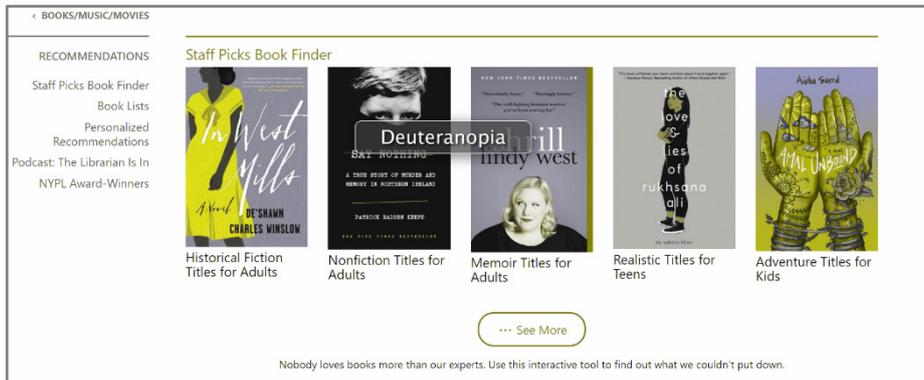


Fig. 2. NYPL deuteranopia filter applied.

### 3.2 AChecker

AChecker is a tool for testing web applications and produce a report according to W3C WCAG Guidelines (IDI Web Accessibility Checker : Web Accessibility Checker, 2020).

It reports three groups of problems:

- **Known problems:** These are issues that have been identified with certainty as accessibility problems. They should be mandatory fixed;
- **Likely problems:** These are issues that have been identified as probable problems, but a final developer decision is needed. It is very likely to have to modify the page to fix these problems;
- **Potential problems:** These are issues that AChecker cannot identify and a developer decision is needed. The page may be need modifications for these problems, but in many cases the developer should only confirm that the problem described is not present.

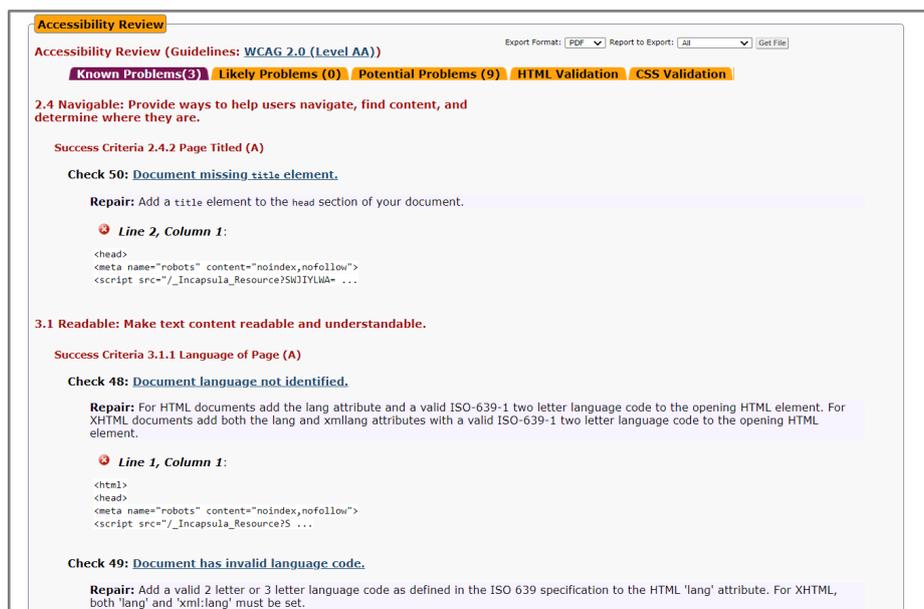


Fig. 3. NYPL problems reported by AChecker.

On Fig. 3 is shown the report from AChecker after testing NYPL archive. As you can see all known problems are grouped according to the criteria in Web Content Accessibility Guideline (WCAG). Most of them are for missing important HTML elements (like title) or attributes (like language). It is described why these problems are important for the page accessibility. Also, there are fragments of code where the problems are identified, and possible solutions are proposed. There are tabs with likely problems and potential problems with similar structure.

### 3.3 WAVE

WAVE is an online compatibility testing software that helps developers to prepare more accessible web content to people with disabilities (WAVE Web Accessibility Evaluation Tool, 2020). WAVE can report a lot of accessibility and Web Content Accessibility Guideline (WCAG) errors. It can be also installed as web browser extension. In that way testing is performed runs entirely inside the browser and, no private information is sent.

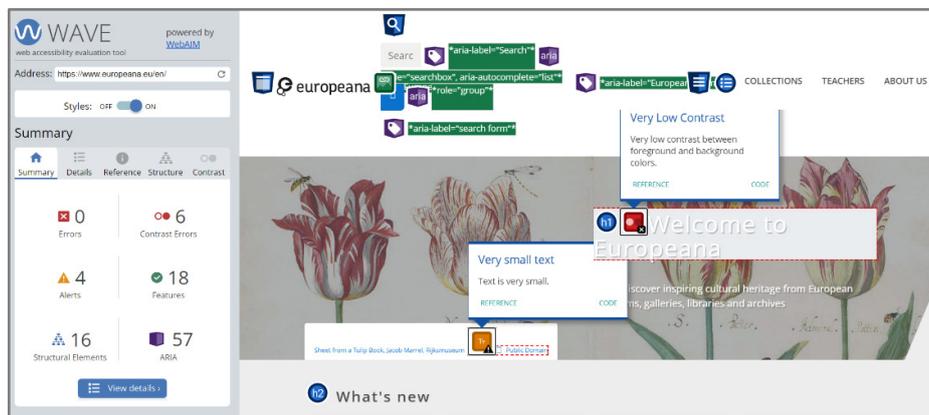


Fig. 4. Europeanana problems reported by WAVE.

On Fig. 4 is shown the report prepared by WAVE for accessibility of Europeanana index page. On the left side is the summary of testing where we can see that there are no code errors but there are six contrast problems. In the main part of the screen we can see all these problems marked directly over the page design. If we click on the text problem at the bottom of the screen, we can see that it is reported as a very small sized text. Also, if we click on the welcome header, we will face the issue with the very low contrast between the foreground and the background colours.

## 4 Conclusions

In the paper is performed an overview of some popular cultural heritage archives and their accessibility issues. Presented are tools for accessibility testing of web applications. We can conclude that despite some reported problems inspected archives have good accessibility to visually impaired users. In the future we will continue to examine other archives for their accessibility.

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