

# Web Page Usability Evaluation

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## 1. Introduction

With the increase use of web pages as interface to data and information on the Internet and the Intranet, the usability of these web pages became essential. We consider the web page one of the tools that users need to interact with daily. Since there exist many definitions of *Usability* we will adopt the definition of usability as a measure of the quality of a users' relationship with their tools. Any tool should allow the user to accomplish tasks in the best way possible and by that it could be considered "usable."

The above definition extends to be applied on computers, software and even web pages. There are several benefits of making a usable web page. Some of these benefits are:

- **Reducing learning time:**  
How fast can users who have never visited this web page before learn how to use it sufficiently well to accomplish basic tasks? Would they need any assistance from outer parties to teach them how to browse the page?
- **Reducing the number of mistakes made:**  
How often do users make mistakes while browsing the web page, how serious are these mistakes, and how do users recover from them?
- **Shortening the time needed to accomplish tasks:**  
Once an experienced user has learned to browse the web page, how fast can he or she accomplish tasks? This is

essential to improve the productivity of a certain user.

- **Making the usage of the web page easier to remember:**  
If a user has used the web page before, can he or she remember enough to use it effectively the next time or does the user have to start over again learning everything?
- **Improving people's satisfaction with the web page:**  
How much do the users like using the web page? Would they keep on using it?

## 2. Web Page Usability

In web development, usability is concerned with the parts of a web page viewable to the user (the visitor of the page). They must be usable in order to gain the user satisfaction with the page and by that, increasing the probability of repeating the visits and accomplishing the tasks targeted by the developer. This will certainly help achieving the goal of the website. Making a web page usable does not necessarily mean a beautiful web page. A web page could be beautiful yet not usable. The benefits of usability could be seen from three points of view:

1. **Users' Point of View:** Usability is important because it can make the difference between performing a task accurately and completely or not, and enjoying the process or being frustrated.
2. **Developer's Point of View:** Usability is important because it can mean the

difference between the success and failure of a website.

3. Management point of view: Sites with poor usability can reduce the profits expected to a level worse than without the site.

In all cases, lack of usability can cost time and effort, and can greatly determine the success or failure of a Site. Given a choice, people will tend to visit sites that are more usable.

Four main issues can be measured when evaluating web usability. They are:

### **Scannability:**

Reading from computer screens is about 25% slower than reading from paper. Even users who don't know this human factors research usually say that they feel uncomfortable when reading online text. As a result, people don't want to read a lot of text from computer screens. It's not only a matter of reading speed but also a matter of feeling good.

Because it is uncomfortable to read text on computer screens and because the online experience seems to hold some amount of impatience, users tend not to read streams of text fully. Instead, users scan text and pick out keywords, sentences, and paragraphs of interest while skipping over those parts of the text they care less about. This is usually known as **Scanning**. A web page having the feature of **scannability** is required to give the user what they need: faster reading. The following are some features that make a web page more scannable:

1. Paragraphs should have fewer words.
2. Tables should be used to express ideas.
3. Lists are preferred whenever possible.
4. The document should be structured using headings.
5. Avoid writing all in capital letters.
6. Avoid writing all in bold.

### **Design:**

The target of any web page is the users' attention. If one wants to reach that target,

the page made must be designed in a way that is usable in order to gain the users' satisfaction and loyalty. In other words, the users should be "happy" with it. This means they can **understand** how the page works, not get confused with its functions and how to use it, and most important, they can view it in a way that is comfortable to their eyes. The following are features related to the design of a web page:

1. Using white background and black text.
2. Using alternative text for images.
3. Title of the page must be included.
4. No blinking text shall be used.
5. Avoid writing all in underlined format.
6. Avoid writing in font sizes that are too small to read.
7. Avoid applying too many empty lines (breaks).
8. Avoid changing the default font type.
9. Avoid using too many horizontal lines.
10. Avoid applying too many marquees.
11. Avoid using red as font color.
12. Avoid using radiant background colors.
13. Avoid using similar foreground and background colors.

### **Navigation:**

Navigation is also considered a key issue when talking about web usability. Good navigation means that a user would know what is the destination and how to get there. If a user gets lost or cannot reach the goal, again the site will lose its purpose. So navigation should be taken care of by considering the following measures:

1. Applying text links.
2. Avoid making the page orphan (with no links).
3. Avoid opening new windows.
4. Avoid making redirection.
5. Using standard link colors.
6. Avoid using image-only links.

### **Performance:**

Download speed is critical to any Internet connection. The users do not like to wait for long times just for a certain page to load. This means that if a page is not loaded quickly, they will simply leave. For that

reason, the following measures related to download speed should be considered:

1. Using thumbnails for images.
2. Using text and not only images to construct pages.
3. Avoid using too many frames.

Based on the above features a tool was designed that will help the developers to evaluate the usability of the web pages. The tool design and implementation are presented in the next section.

### 3. Tool Design

We designed a tool that helps the developers in evaluating their web pages. This tool will simply scan the source of the web page and apply some rules extracted from the features listed in the previous section. The WPUA ‘Web Page Usability Analyzer’ performs its action by parsing the HTML source code of a web page and then analyzing the measures previously mentioned. We will introduce HTML briefly before looking at the design of the tool.

#### HTML Background

Each web page is simply a text file written according to the rules of HTML. We can use the two phrases “Web Page” and “HTML File” interchangeably. This section will explain some basics of the HTML Language.

#### Definition of HTML

HyperText Markup Language (HTML) is the standard text-formatting language since 1989 for documents on the Internet. HTML is a subset of a language called Standard Generalized Markup Language (SGML), which is a system for encoding and formatting documents, either for output to a computer screen or to paper.

#### Hypertext

A way of presenting information in which text, multimedia, and actions become linked together in a complex, non-sequential group of associations that permit the user to browse through related topics, regardless of the presented order of the topics.

#### Markup

Markup (*also known as tags*) is everything in an HTML file that is not shown to the user. It is encoded information that directs the format of the document on the screen. Tags are written between the less than “<” and greater than “>” signs. All the text that is written after the tag is affected by the rule set by that tag. That effect goes on until the tag is closed, usually by the less than “<”, slash “/”, the tag itself, and the greater than sign “>”.

#### HTML file

HTML files are *text* files starting with <HTML> tag and containing two types of content:

- Content that is meant to be shown on the screen.
- Markup or tags that affects the content.

Note that tags in the HTML file are not case sensitive. The program that displays the HTML file with the effects of its is called **browser**.

#### HTML File Structure

The HTML file consists of two parts, a head and a body. The head contains the page title among other meta-data. The body contains the rest of the page’s contents.

The tags are written in a way so that the most recent tag is always closed before its predecessor. In other words, the tags are nested as follows:

```
<tag1> <tag2> some text </tag2> </tag1>
```

#### Applying Web Usability Measures on HTML Files

Applying the usability measures to the HTML tags is not straightforward. So in order to detect how a web page is following the measures mentioned above a set of rules were constructed based on the features and measures. Each of the rules was assigned a number of points based on its importance. The following is a list of these rules:

## Applying Scannability Measures

1. Paragraphs should have fewer words: every paragraph between `<p>` tag and `</p>` in the page is parsed with a counter that saves the number of words in the paragraph. If it exceeds the limit of 20 words then the grade of this rule will not be given. The weight of this rule is 4 points.
2. Tables: the program looks for the table tag `<table>`. If it is found, the page will get the grade of this rule. The weight of this rule is 3 points.
3. Lists: the program looks for any of the list tags `<OL>` objective list or `<DL>` descriptive list. If any was found, the grade of this rule will be given. The weight of this rule is 2 points.
4. Headings: the program looks for the heading tags `<H1>`, `<H2>`, `<H3>`, `<H4>`, `<H5>`, `<H6>` for headings from size 1 to 6 where 6 is the smallest. If any was found then the grade of the rule will be given. The weight of this rule is 2 points.
5. Avoid using all capital: the page is parsed to find out the amount of all capital words and non-capital words. If all - not some and not most - words in the page are capital then the grade of this rule will not be given. The weight of this rule is 2 points.
6. Avoid using all bold: the page is parsed to find out the amount of all bold words any word between bold tag `<b>` and `</b>`, and the amount of non-bold words. If all - not some and not most - words in the page are bold then the grade of this rule will not be given. The weight of this rule is 2 points.

## Applying Design Measures:

1. White background and black text: the program checks the body tag `<Body>` to get the background and text color attributes and take its values, if the value of background is white - `bgcolor="white"` or `bgcolor="#ffffff"` – and the value of text color is black - `text="black"` or `text="#000000"` – the grade of this rule

will be given. The weight of this rule is 2 points.

2. Using alternative text for images: each image in the page `<img>` is tested to see whether or not it has the ALT attribute so the user can see a tag with that text. For example ``. The program counts how many images have the attribute and how many don't and divides the grade of this rule according to that. The weight of this rule is 6 points.
3. Title: the program looks for the title tag `<Title>`, then search for any text between title tag `<title>` and `</title>`. If there is text any then the grade of this rule will be given. The weight of this rule is 3 points.
4. No blinking text shall be used: the program looks for the blinking text tag `<Blink>`, then search for any text between blink tag `<blink >` and `</blink >`. If there is then the grade of this rule will not be given. The weight of this rule is 5 points.
5. Avoid writing all in underlined: the page is parsed to find out the amount of all underlined words any word between underlined tag `<u>` and `</u>`, and the amount of non-underlined words. If all - not some and not most - words in the page are underlined then the grade of this rule will not be given. The weight of this rule is 2 points.
6. Avoid writing in font sizes that are too small to read: the program looks for the font tag `<font>` and if it is found then it checks if it has the size attribute `<font size="3">`, and if the size is less than 3 (the default) then the grade will not be given. The weight of this rule is 5 points.
7. Avoid applying too many line breaks: the program looks for the break (new line) tag which is `<BR>` that should not be applied more than 4 consecutive times, and also the paragraph tag `<p>` if it is applied more than 3 times in the form of `<p></p>` then the grade will not be given. The weight of this rule is 4 points.
8. Avoid changing the default font type: the program looks for the font tag `<font>` and if it is found then it checks if it has the

type attribute `<font face = "Arial">` for example, and if it exists then the grade will not be given. The weight of this rule is 3 points.

9. Avoid using too many horizontal lines: the program looks for the horizontal line tag `<HR>` and if there are more than 3 found the grade will not be given. The weight of this rule is 3 points.
10. Not applying too many marquees: the program looks for the marquee tag `<marquee>` and if more than 1 are found the grade will not be given. The weight of this rule is 5 points.
11. Avoid using red as font color: the program includes a color tester that checks this rule and other rules related to color by analyzing the user's input. The weight of this rule is 3 points.
12. Avoid using radiant background colors: checked by the color tester. The weight of this rule is 3 points.
13. Avoid using similar foreground and background color: checked by color tester. The weight of this rule is 6 points.

## Applying Navigation Measures

1. Applying text links: the program looks for the link tag `<a href>` and if its followed by text between `< a href >` and `</a>` then a grade is given. The weight of this rule is 3 points.
2. Avoid making the page orphan: the program scan the page and search about `<a href >` tags, at least one link `<a href>` should be found for the grade to be given. The weight of this rule is 3 points.
3. Avoid opening a new window: a new window is opened by adding the target attribute to the link tag `<a href="www.page.com" target="_blank">` for example and the program searches the target attribute in every link tag `<a href >`, and if it is found the grade will not be given. The weight of this rule is 5 points.
4. Avoid making redirection: there is a code for redirecting the page which is `<meta http-equiv="refresh" content="10;url=www.page.com">` for

example. The weight of this rule is 2 points.

5. Using standard link colors: the program searches for body tag `<body>` and gets the link/vlink/alink attributes then checks to see whether their values are different from the default values or not, the default values of the link/vlink/alink attributes is shown in the following tag `<body link="#008000" vlink="#0000FF" alink="#FFFF00">`. Also if the values of the link/vlink/alink attributes are written in text the program will take care of this case. If values have been changed from the default, grade will not be given. If the body tag `<body>` does not have link/vlink/alink attributes the program will give the grade for this page because the tag use the default link colors. The weight of this rule is 2 points.
6. Avoid using image-only links: the program searches for link tags `<a href>` and determine whether it is text link or image link, then counts the text links and images links and save the two counters in record. After it finishes counting the program will not give the grade for this rule if counter of image links more than zero and text links equals to zero. The weight of this rule is 1 point.

## Applying Performance Measures:

1. Using thumbnails: a page is checked to see if there is an image link (`<a href>` followed by `<img>`) to an image (which is a file of formats \*.bmp, \*.jpg, \*.gif) and if so the grade will be given. The weight of this rule is 4 points.
2. Using text and not only images: the program searches for any text in the page, if one or more words are found (which is not a tag) then the grade will be given. The weight of this rule is 4 points.
3. Avoid using too many horizontal frames: The program searches for `<frameset rows>` tag, and then gets the attribute value – rows -. If the

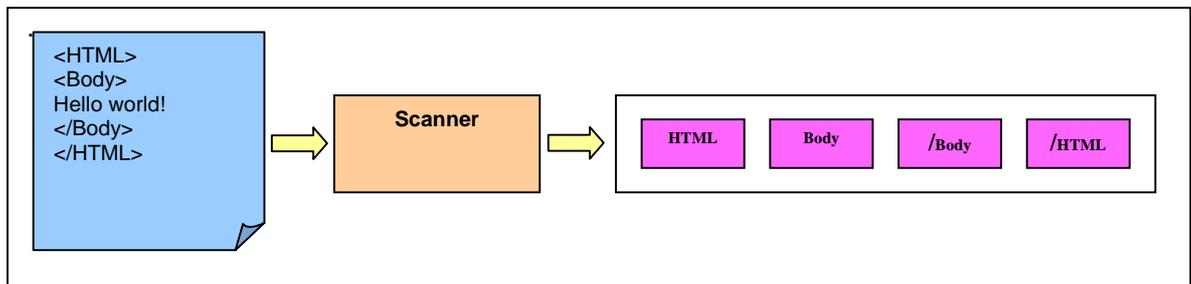


Figure 1: Scanning.

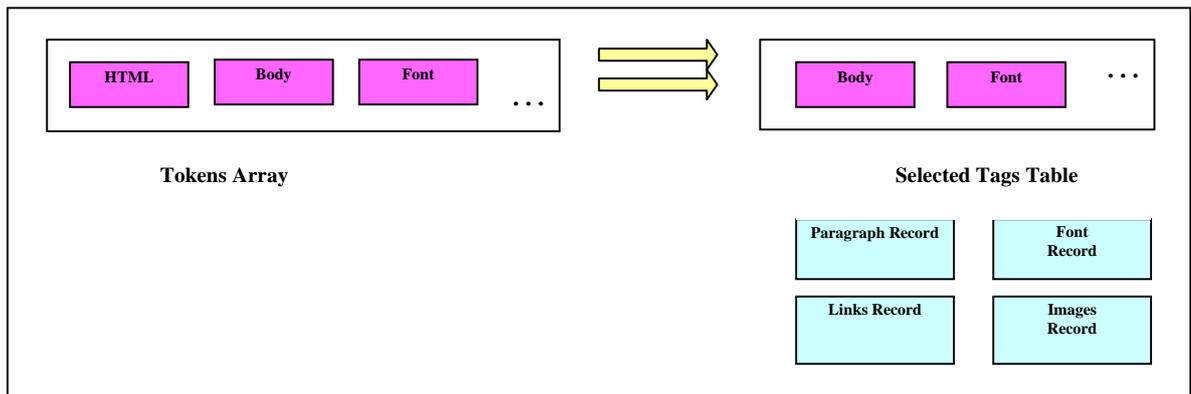


Figure 2: Parsing.

attribute value gives more than 2 horizontal frames the grade will not be given. The weight of this rule is 4 points.

4. Avoid using too many vertical frames: The program is searches for <frameset cols> tag, and then gets the attribute value – cols -. If the attribute value gives more than 2 vertical frames the grade will not be given. The weight of this rule is 4 points.

## 4. Tool Implementation

In this section the implementation of the WPUA tool is discussed. Three main parts of this tool follows:

### Scanner

The Scanner reads the text source code of an HTML file to extract some tokens from it. A token starts with the less than symbol “<” and ends with the larger than symbol “>”. As in Figure 1, the scanner stores the tokens in a token table to be analyzed later.

### Parser

In the second phase, the parser reads the tokens from the token table as an input and selects the tags that are related to the web usability measures as mentioned in the earlier sections. The selected tokens are then copied to Selected Tags Table (STT). Then from the attributes of those tags extra information are extracted. For example, from the font tag, the size and type of font information are extracted. Then, those attributes are stored in one of the four types of records:

Paragraph Record: for information regarding capital, bold and underlined text.

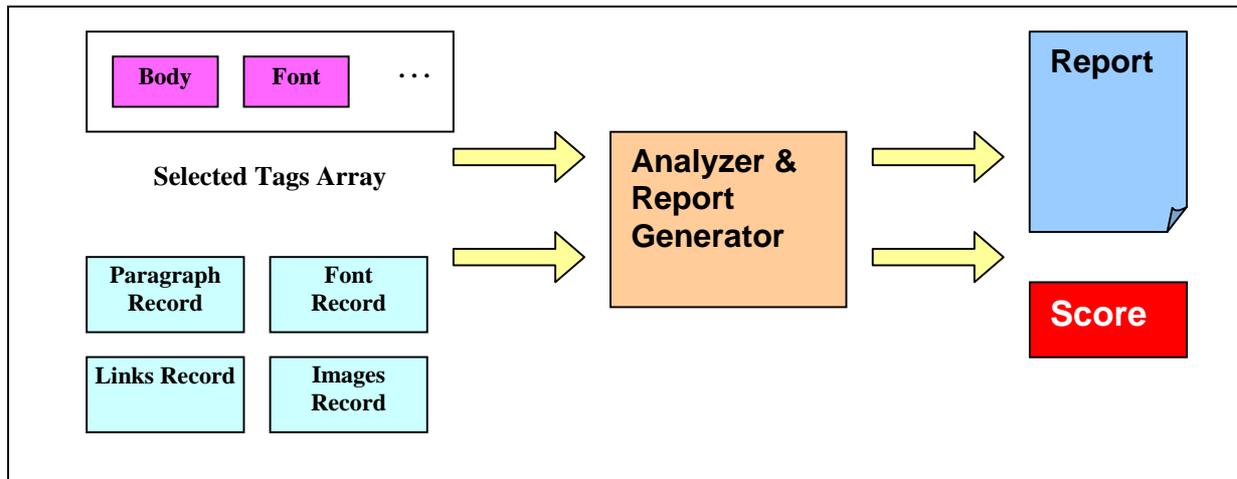
Font Record: for information regarding font type and size

Links Record: for information regarding text and image links and the target attribute.

Images Record: for information regarding the ALT attribute.

### Analyzer

The analyzer, as in Figure 3, checks whether the page follows the web usability measures



**Figure 3:** Analyzer & Report Generator.

or not. For each rule the STT is examined, and if the page follows the rule then the points assigned to this rule will be added to total score of the page. After examining all the rules a report is generated containing total score of the page and a list of the rules that the page did not follow.

## 5. Conclusion & Future Work

In this paper we presented a tool to analyze the usability of web pages. The work was based on features that can be extracted from the HTML files. The Related tags were extracted with necessary information. The final result is a report with a total score of the usability of the web page and a report pointing the usability weaknesses of the web page.

We have tested the main page of some famous websites using the WPUA tool. Yahoo! scored 76, Amazon was able to score 79 while Google's score was 85.

The work was limited to web pages only; future work will target a more complicated structure that is web site. To analyze the usability of web site more complex rules need to be setup to capture the structure of the web site and the links between pages. One of the big issues is how to decide the

limits of the web site since many web pages has links to other external web sites.

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