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Responsive web design: Future of web technology

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Abstract
The use of Personal Digital Assistants (Smart Phones/ Tablets) is rapidly increasing day by day and the users use more data on these types of devices instead of desktops computers and laptops. Due to rapid use of these devices the web developers has a challenge to develop such a technology which is compatible for all platforms. The traditional ways of web development cannot be satisfied the current scenario of mobile and the web users. So in future some new aspects are adopted by the web developers to resolve the issues of compatibility. The future of web designing might be RESS (Responsive Server Side Components). It contains the features of customized web design approach that combines both the trendy way of serving content with the unborn technology. It is possible with the responsive web design, a single website which will be accessed from mobile phone/tablet/laptops with different screen resolutions. In this article we limelight on the possibility of future web technology which will be more user friendly and compatible with the smart phones/ tablets and laptops.

Keywords: Responsive web design (RWD), top platforms and web content layout

1. Introduction

Today is the era of information and communication technology. Several technologies are used in the area of electronic and computer technology. Web technology is one of them. Due to popularity of the web, everyone access the web contents at their residence/office to do number of tasks online by PC, Tablet, Laptop and Mobile. From last two decades fully dynamic and interactive websites were created by the web developers. Accessing of these websites over the internet on their desktop computers, laptops, tablets and mobile phones etc. But there is drawback whenever web content is accessed on desktop computer it will not open as it on the mobile phone because of different screen resolutions and different screen widths. In this modern era everyone wants to browse web contents easily and quickly using smart phones because they were very intelligent personal digital assistants. But these devices have different screen resolutions and different screen widths. Hence the need for adapting the layout of the web content for different screen dimensions and resolutions Due to this reason websites developed by the web designers should be compatible with all platforms. When user enters a website he wants navigate through the website quickly with minimum effort. It is mandatory for the web designers have to design such websites which rendering the same contents in different screen sizes and different screen resolutions. Website should be so versatile that it can be used on a mobile phone or on a huge sized LCD screen.

Fig 1

Responsive web design (RWD) is one of the most recent trends in web designing; it is way to make a single website which is compatible with all types of hand held and portable devices. The term RWD was coined by Ethan Marcotte in 2010 on his website *"A book apart"*. The goal of responsive web design is to make a web page look equally good regardless of the screen size of a device. Before the introduction of responsive web design, web designers and developers created most websites by following the principles of pixel-perfect web design. Pixel-perfect web design treats a web page like a page from a magazine. In this approach, the mock-up of a web page is first created in Photoshop, and then a developer recreates that design to fit a web browser. The goal of pixel-perfect web design is to make a web page resemble the original mock-up as much as possible. But a web page is not printed on a piece of paper but viewed in a web browser. Unlike paper, a web browser is a dynamic medium. It allows a user to re-size the browser window itself, and users can also change the size of the font as well. And when this happens, web pages created with pixel-perfect web design principles often break. If a web page was optimized for a 1024 × 768 pixel screen size, for example, that web page will look quite wrong in a smaller or bigger screen [1].

It will be very good approach in future to design websites in such a way the users viewing any website with minimum scrolling and zooming to seek desired contents over internet across wide variety of portable devices. The purpose of RWD is to provide the user an easy access to various kinds of websites and applications without much of trouble. Responsive website creation requires using a proportion-based grid, flexible images and CSS3 media queries. The proportion-based grid is often called "Fluid grid". The concept of responsive web design must be made available to each and

every user. Top ten (10) platforms for responsive web design are:

- Foundation
- Gumby2
- Bootstrap
- Semantic UI Kit
- Ink
- Gridset
- Invision
- Export Kit
- Uxpin
- Export Kit

The basic technical features of RWD are The Fluid Grid, The Fluid Images and Media Queries.

1. **Flexible Grid-based Layout:** RWD is the process of arranging the layout in a way that all the contents are presented in a user-readable way in any kind of device or screen dimension. Most designers will choose a fluid grid layout since it's easier to handle grid based layouts in different kind of desktop & hand held devices. Preparing a web design, fluid will be our design or layout and shear stress will be the screen size or user device. The dimensions of all elements should be given in relative units, i.e. in percents (%), whereas fixed units like pixels should be avoided. Components in fluid designs are going to flow and adapt to the user environment regardless of what is the screen size.
   In flexible grids we define a maximum layout size for the design. The grid is divided into a specific number of columns to keep the layout clean and easy to handle. Then we design each element with proportional widths and heights in percentage instead of pixel based dimensions. So whenever the screen size is changed, elements will adjust their widths and heights by the specified proportions to its parent container [2].
   Relative type sizes can be calculated with this simple formula:

   Target ÷ Context = Result

   We already know our target pixel width for our blog: that's 900px, as defined in our mockup. What we want is to describe that width in relative terms, as a percentage of .blog's containing element. Since .blog is nested within the #page element, we've got our context—namely, 960 pixels, the width of #page as it was designed in the mockup.
   So let's divide our target width for .blog (900) by its context (960):

   900 ÷ 960 = 0.9375

   I'll admit. But by moving the decimal over two places we're left with 93.75%, a percentage we can drop directly into our CSS:

```
.blog
    {
    margin: 0 auto 53px;
    width: 93.75%; /* 900px / 960px */
    }
```

   So with our formula in hand, let's turn back to that 24px headline. Assuming that our base font-size: 100% on the body element equates to 16px. So if we need to express our h1's target font size (24px) relative to its context (16px), we get:

   24 ÷ 16 = 1.5

   And there we are: 24px is 1.5 times greater than 16px, so our font-size is 1.5em:

```
h1
  {
   font-size: 1.5em; /* 24px / 16px */
   font-style: italic;
   font-weight: normal;
  }
```

   Our headline's size perfectly matches the size specified in our computer [3].

2 **Fluid Images and Media:** Images displayed in responsive website at good resolution for the target device. RWD changes image width & height according to device resolution. Modern browsers have evolved to the point where they resize the images proportionally: as the flexible container resizes itself, shrinking or enlarging the image, the image's aspect ratio remains intact.
   We have cracked the problem of flexible images and media with max-width property.

```
img  {
     max-width: 100%;
     }
```

   This property supported by the IE 7 or above not by the lower versions of internet explorer. Max-width: 100% instructs our images to never exceed the width of their containers, width: 100% forces our images to always match the width of their containing elements. With the max-width: 100% fix in place (and aided by our width: 100% and AlphaImageLoader patches), image is resizing beautifully across our target browsers. Regardless of the size of the browser window, our image scales harmoniously along with the proportions of our flexible grid. By using the sizing Method property to scale, we can use our AlphaImageLoader object to create the illusion of a flexible image [4].

3. **Media Queries:** Media queries plays very important role when you want to apply CSS styles depending on a device's general type, specific characteristics (such as the width of the browser viewport, or environment. With the huge variety of internet-connected devices available today, media query is a vital tool for building websites and apps that are robust enough to work on whatever hardware your users have. Designer must use HTML and CSS Media queries to assign different style sheets depending on browser window size. It is used to tailor a website up to a specific range of output devices without changing the content itself. The Media types are: all, braille, embossed, handheld, print, projection, screen, speech, tty, and tv.
   Media Queries is a technique for identifying not only types of media, but for actually inspecting the physical characteristics of the devices and browsers that render our content.

@ media screen and (min-width: 1024px)

```
{
body    {
        font-size: 100%
        }
 }
```

Every media query has two components:

1. Each query still begins with a media type (screen), drawn from the CSS2.1 specifications.
2. Immediately after comes the query itself, wrapped in parentheses: (min-width: 1024px). And our query can, in turn, be split into two components: the name of a feature (min-width) and a corresponding value (1024px).

Think of a media query like a test for your browser. When a browser reads your stylesheet, the screen and (min-width: 1024px) query checks two conditions: first, if it belongs to the screen media type; and if it does, if the browser's viewport is at least 1024 pixels wide. If the browser matches both of those criteria, then the styles enclosed within the query are rendered; if not, the browser happily disregards the styles and continues [5].

With the advancement in information and computer technology the use of devices which access the web content immensely risen. Today everyone view any website on their Smartphone than laptop or desktop computer. The amount of people using these desktop resolutions has been decreasing since 2009 and has been replaced by higher resolution screens [6]. Viewing the web content on mobiles often require scrolling and zooming to read on smaller screens very poor and bad experience. So it is very irritating job to scrolling up and down textual and graphical data and zooming the contents of web pages.

Advantages of Responsive Web Design

1. A library does not have to maintain and update more than one set of content.
2. There is no need for additional promotion of the library's mobile website, since whenever a library patron accesses the library website on a mobile device, the website automatically adjusts its layout to be mobile-friendly. This is a great plus considering that libraries often experience difficulty in promoting their mobile offerings such as downloadable e-books, tablets for borrowing, and a mobile website.

A Few Problems with Responsive Web Design

While responsive web design has some great advantages, it does not by itself guarantee a satisfactory mobile experience. We have seen several examples of responsive websites so far.

1. The text in the responsive websites appears in a legible size is a relief. However, this excitement soon wears off when we discover that poorly-designed responsive websites can be just as cumbersome to use as nonresponsive websites.
2. The restricted space on a small screen requires us to rethink what the most important items are on a page and how the rest of the content can be presented in a streamlined and uncluttered way. If you have bloated content and your desktop website is already too dense and cluttered, this issue must be addressed before making your website responsive
3. Another potential problem with responsive web design is that it usually does not give users an option to go back to the look of the full desktop website. For those who are familiar with the existing library website and know exactly where to go to get the information they want, the automatic change in the website layout on a small-screen device can be disorienting and confusing. Until they get used to the new mobile layout, they are likely to prefer the familiar layout, even though they have to pinch, zoom, and pan to get to where they want to be [7].

Conclusion

Vast use of smart phones and mobile applications, enterprise developers in many companies are looking to contribute to the mobile revolution. This revolution is influencing many companies to shift towards a "Mobile First, Desktop Second" strategy for their business. Switching from desktop to mobile requires developers to refocus on these technologies not completely away from desktop application development, but certainly with an inclination towards mobile [8]. In the upcoming days Smartphone's/ Tablets and other hand held devices will be launched in the market with different screen dimensions and resolutions. Responsive web design will be very beneficial for these kinds of devices. It is advanced approach in the field of web technology. So in upcoming days web developers will design the web layouts using RWD technology which will be best proven and remove incompatibility issues of various screen resolutions. In this research paper top ten platforms are mentioned in which web developers creating the websites. It will be very good approach in future while websites will be made through RWD. Users faces less difficulty to access the websites or applications. RWD is compatible even for the new released devices as only small updation (width of the browser) needs to be updated are required. Thus the Responsive web designing are future proof and scalable.

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