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Parallax Scrolling in Web Development

Abstract

This paper introduces the definition of parallax scrolling and discusses its strengths and disadvantages compared to normal websites. Then it gives a basic instruction on how to create a website with parallax scrolling effect. It also discusses the problem encountered when parallax scrolling is applied on mobile devices and possible solutions.

Definition

Parallax scrolling is a technique in computer graphics and web design, where background images move by the camera slower than foreground images, creating an illusion of depth in a 2D scene and adding to the immersion. The technique grew out of the multi-plane camera technique used in traditional animation since the 1930s. Parallax scrolling was popularized in 2D computer graphics and video games by the arcade games Moon Patrol[1] and Jungle Hunt,[2] both released in 1982. Some parallax scrolling had earlier been used by the 1981 arcade game Jump Bug.[3][4]

In my comprehension, I think the easiest example to explain' is when you're driving down the street. You've got the mountains in the background, you've got the trees in the foreground. And as you look out your window, the trees seem to be moving a lot faster than the mountains in the background. And that perceived difference in speed' gives the landscape its depth. So a website with parallax scrolling helps create an illusion of depth.

Pros & Cons

Since parallax design helps create an illusion of depth, it gives websites a great opportunity to: attract viewers with page depth and animation. It could guide visitors through the site by telling an appealing story. And visitors usually find this kind of website cool and fun, so it could provoke curiosity to make page visits last longer by encouraging visitors to scroll through the entire page. After visiting the whole page, it might direct visitors to call to action. By combining attracting outlook and meaningful content, it could reenforce website credibility with innovative interactive viewing.

With all of these benefits of parallax site design, there are also several downsides to having a parallax site. Most of these problems stem from the fact that the majority of parallax websites only have a single long page which is extremely detrimental to the site's search engine optimization as well as load speed. Here are some of the negatives to using parallax scrolling design:

Search engine optimization has been compromised as websites with a single page allow only one set of meta information, one effective h1 tag, and one URL. Also a ton of images and other information on one page takes a long time to load, maybe causing frustrated visitors to leave the page before they even see it. Besides, it is not compatible with all mobile design. More specifically, most Android devices work fine but iOS has some problem with it. And this is discussed later in the paper. And there is no internal page linking throughout the website.

How to Create

So how to create a parallax scrolling effect?

It's rather simple. Inside html, use a container element and add a background image to the container with a specific height. Then use the background-attachment: fixed to create the actual parallax effect. The other background properties are used to center and scale the image perfectly.

```
<style>
.parallax {
    /* The image used */
    background-image: url("img_parallax.jpg");

    /* Set a specific height */
    height: 500px;

    /* Create the parallax scrolling effect */
    background-attachment: fixed;
    background-position: center;
    background-repeat: no-repeat;
    background-size: cover;
}
</style>

<!-- Container element -->
<div class="parallax"></div>
```

Work on Mobile Devices

Parallax scrolling faces a few problems on mobile devices, some bigger than others. Starting with the most obvious reason, since mobile devices usually have smaller screen sizes, default images used in a website with parallax effect targeting computers will often be too large in their smaller devices, both in aspects of dimensions and file size. And this can easily be addressed within CSS media query. We could add some CSS that supplants the original images with smaller versions in devices with less width like this:

```
@media screen and (max-device-width: 860px){

body{
background-image: url(deepsea_small.jpg);
}
```

After that is applied in a smaller tablet or smart phone, the browser will bypass using the original, too large images and adopt the smaller images specified above instead. That in itself leads to a much more optimized, efficient experience for mobile users.

As mentioned above, parallax scrolling works relatively pain free in Android devices, although a little unstable as Android stutters to a certain degree the execution of code defined inside any onscroll event to conserve battery life. In iOS devices like on a iPad or iPhone, this conservation effort is taken to new heights. In iOS devices, the onscroll event doesn't fire at all as the user scrolls, only at the end when the scrolling has ceased. Any queries or changes to the DOM you make as the user scrolls are queued and only launched all at once at the end of the scrolling. This makes for some seriously choppy parallax scrolling as you can see if you view the parallax page on an iPad/ iPhone.

As mentioned, parallax scrolling isn't impossible in iOS devices, just aggravating to implement and not without compromises. In a nutshell, since iOS queues DOM changes defined inside the onscroll event until the scrolling has ended before executing them, we need a more refined way to execute our parallax code. One solution is to implement a custom scroll mechanism instead of relying on the default scrollbar to scroll the page, so we can monitor precisely when scrolling has occurred and by how much each time. This can be done by first wrapping any parallax elements inside a DIV with overflow:hidden, then moving this DIV and elements inside it up and down as the user "scrolls" the page, using CSS3 transform for example. And to determine how much the user has scrolled without relying on the scrollbar, we use touch events instead.

Tips

There are several things to keep in mind when parallax scrolling is applied in a website.

We should not overdo it to make your site too complicated as then parallax effect would be a burden not attraction. And we'd better to use it to tell a visual story so as not to waste its cool look. Also parallax is famous for its depth illusion, so make it fun and engaging with depth using layering is a better way of exhibiting its strength.

Reference:

[1] *Chronology of the History of Video Games: Golden Age*

http://www.thocp.net/software/games/golden_age.htm

[2] *Jungle Hunt Was a Terrible Waste of Quarters*

http://retrovolve.com/jungle-hunt-was-a-terrible-waste-of-quarters

[3] https://books.google.com/books?id=lB4PAwAAQBAJ&pg=PA181#v=onepage&q&f=false

[4] *Parallax Scrolling Wikipedia*

https://books.google.com/books?id=lB4PAwAAQBAJ&pg=PA181#v=onepage&q&f=false