# Research and Application of Icon Fonts in Web Front-end Technology

## Long Zhang

Xi'an Eurasia University, Shaanxi Xi'an 710065, China.

dir_zl@qq.com

**Abstract.** Aiming at the problem of extensive use of bitmaps as icons in mobile applications (such as zooming problems, page opening speed, etc.), this article takes the front-end design of the Eurasian driving school website as an example, and introduces the use of font icons such as Awesome and GlyphiconsFont. The so-called font icon is actually a fontized icon instead of a picture, so it can be used as a font to reference, set the size, color, etc. of the icon, just change the font size and color, especially in mobile or responsive pages. more obvious.

**Keywords:** Icon font; web front-end; mobile application.

## 1. Introduction

Various icons are often used in web front-end design. Usually, icons on web pages are mainly implemented using JPG, PNG and other images. Special UI design is required, and there are many inconveniences in using them. Trouble, on the one hand, if you want to change some icons, you need to find the designer to redesign, and then re-add, the process is very unfriendly; the more prominent problem is that with the popularity of mobile applications, more application scenarios are on the mobile side. Realized, then the drawbacks of the image icons on these front-end applications are more obvious, such as image scaling problems, image download speed and other issues, these issues will directly affect the quality of the product and the user experience.

The icon font can solve the above problems very conveniently, and it is very simple to use. Because the font is used instead of the picture, it can be referenced as a font, and changing the size, color, etc. of the icon only requires changing the font size and color.

## 2. Related Concepts

### 2.1 Icon Font.

What is an icon font? As the name suggests, it is a typeface, but this font does not display specific texts, but various icons, just like using the usual fonts, you can set the font color, size, etc., very convenient and flexible[1], than the bit The icon icon is more suitable for all kinds of mobile application front-end pages (such as responsive layout pages, etc.).

Using icon fonts has the following advantages over bitmap icons for traditional web pages:
1) Easily define the icon's color, size, shadow and any style that can be styled with CSS
2) Faster loading speed
3) Using vector fonts, lossless scaling
4) Prevent icons from being blocked by the browser

### 2.2 Responsive Layout.

Responsive layout is a concept put forward by Ethan Marcotte in May 2010. In short, a website can be compatible with multiple terminals—rather than making a specific version for each terminal. This concept was born to solve mobile Internet browsing.

The responsive layout can provide a more comfortable interface and a better user experience for users of different terminals, and with the popularity of large-screen mobile devices, it is not unreasonable to use the "big trend". One solution that emerged as a result was the Bootstrap framework.

## 2.3 Bootstrap Framework.

The Bootstrap framework is currently the most popular front-end framework and is freely available for download by Twitter. Bootstrap is a CSS/HTML framework based on HTML, CSS, and JavaScript. Bootstrap has been very popular since its launch, providing great convenience for mobile front-end development [2].

The Glyphicons font icon is included in the components of the Bootstrap framework.

# 3. Use of Icon Fonts

Icon fonts are a special type of web font (Web Font). It is to make the icon into a font, package it in a font file, use CSS's @fontface attribute to load the font file in the webpage, and then call the Unicode character encoding of the icon in the font file by the content property to display it in the webpage.

## 3.1 Font File Format and @font-face Attribute

In the Windows system, you can usually see the font files that come with Windows under the Windows\Fonts folder of the system disk. These font files include the well-known Song, Black, and Microsoft Yahoo. Most of them are files in the TTF (TrueTypeFont) format. This is the font file format jointly developed by Apple and Microsoft. With the popularity of Windows, it has become the most commonly used font file. However, due to the inconsistent support of the font format of the browser, in order to improve the compatibility of the webpage, it is usually necessary to prepare several font formats for the browser to select, generally including TTF, EOT, WOFF, SVG basic formats, and fonts can be used between them. The format conversion tool performs format conversion. Using the @font-face property of CSS, you can load these different format font files into the browser for the browser to select and display [1].

## 3.2 Apply Font-awesome Icon Font

1) Download the font file package from the official font-awesome website (http://www.fontawesome.com.cn/), and extract the folders such as "css" and "font" after decompression. The structure should look like Figure 1,
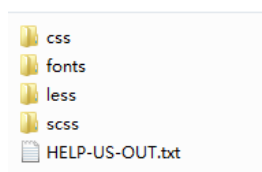


Fig. 1 Font-awesome font directory structure

2) To use the Font Awesome icon, add the following line to the head section of the HTML page:
```
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet" href="https://cdn.staticfile.org/font-awesome/4.7.0/css/font-awesome.css">
```
or:
```
<link href="fontawesome-4.7.0/css/font-awesome.min.css" rel="stylesheet" />
```
3) Each different icon has its own name. If you want to use which icon you need to know the name of the icon, you can go to the website to view it, as shown in Figure 2:
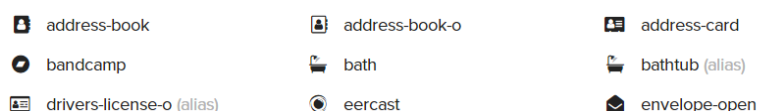


Fig. 2 font-awesome icon

Font Awesome is designed for inline elements (usually using a shorter <i> tag with more precise semantics), such as: <i class="fa fa-camera-retro"></i> fa-camera- Retro, as shown in Figure 3:



Fig. 3 font-awesome example

### 3.3 Set Icon Size

If you want to set a different icon size, use fa-lg (33% increment), fa-2x, fa-3x, fa-4x, or fa-5x, the code is as follows, the effect is shown in Figure 4:
<i class="fa fa-camera-retro fa-lg"></i> fa-lg
<i class="fa fa-camera-retro fa-2x"></i> fa-2x
<i class="fa fa-camera-retro fa-3x"></i> fa-3x



Fig. 4 set icon size

### 3.4 Setting the Icon Color

If you want to change the icon color, you can add an inline style based on the settings you just made. If you want to set it to a red icon, the code is:
<i class="fa fa-car"></i>
<i class="fa fa-car fa-3x "></i>
<i class="fa fa-car fa-5x " style="color:red;"></i>
The effect is shown in Figure 5. The third car icon is shown in red:



Fig. 5 color settings

### 3.5 Dynamic Icons

Use fa-spin to rotate any icon, or use fa-pulse to rotate it in 8 directions. Especially suitable for fa-spinner, fa-refresh, and fa-cog, code show as below:
<i class="fa fa-spinner fa-spin fa-3x fa-fw"></i>
<i class="fa fa-circle-o-notch fa-spin fa-3x fa-fw"></i>
<i class="fa fa-refresh fa-spin fa-3x fa-fw"></i>
<i class="fa fa-cog fa-spin fa-3x fa-fw"></i>
<i class="fa fa-spinner fa-pulse fa-3x fa-fw"></i>
The effect is shown in Figure 6, but the dynamic can only be seen on the web page, such as http://www.fontawesome.com.cn/examples/[3],



Fig. 6 Dynamic rotation of the icon

### 3.6 Combine the Use of the Bootstrap Framework

The font-awesome icon font can be used seamlessly with the Bootstrap framework. Of course, you can also use the GlyphiconsFont icon font in the Bootstrap component.

In this example, the Eurasian driving school website adopts this method. The relevant code is introduced in the head as follows:

```
<meta name="viewport" content="width=device-width, initial-scale=1">
<link href="/public/bootstrap/css/bootstrap.min.css" rel="stylesheet">
<link href="/public/bootstrap/css/font-awesome.min.css" rel="stylesheet">
<link href="/public/bootstrap/css/font-awesome-animation.min.css" rel="stylesheet">
<script src="https://cdn.bootcss.com/jquery/1.12.4/jquery.min.js"></script>
<script src="/public/bootstrap/js/bootstrap.min.js"></script>
```

The final effect is shown in Figure 7, Part of the code is as follows:

```
<div class="row    ">
        <div class="col-md-1 col-sm-3 col-xs-6 divheight">
<a href="#"><i class=" fa-calendar faa-slow faa-shake animated-hover fa-3x"></i></a><br />
        <a href="#"> Curriculum Center </a></div>
        <div class="col-md-1 col-sm-3 col-xs-6 divheight">
<a href="#"><i class=" fa-group faa-slow faa-shake animated-hover fa-3x"></i></a><br />
<a href="#"> Service team </a></div>
</div>
```



Fig. 7 font icon application example

## 4.  Conclusion

This paper introduces the use of the font icon and the specific application. In order to compare the effect of the two different ways of the ordinary bitmap icon and the font icon on the loading speed of the webpage, two webpages with the same style but different implementation modes are specially produced: one type of use the font icon, the other uses a bitmap icon. Through the comparison of the loading speed of the webpage, as shown in Table 1, it is obvious that the webpage using the icon font is on average 94.7ms faster than the traditional webpage using the bitmap, which is about 1.77 times of the former. And during the loading process of the webpage, there are several images in the webpage that are sent several HTTP requests to load the images, and using the icon font, only one request is required. For large websites, this increase in speed is considerable, and the improvement in user experience is obvious.

Table 1. Comparison of loading speed

| Test | Font icon page loading speed (ms) | Bitmap page loading speed (ms) |
|---|---|---|
| 1 | 133 | 228 |
| 2 | 116 | 243 |
| 3 | 142 | 231 |
| 4 | 137 | 219 |
| 5 | 174 | 268 |
| 6 | 139 | 252 |
| 7 | 123 | 223 |
| 8 | 144 | 247 |
| 9 | 126 | 245 |
| 10 | 157 | 226 |
| Average | 139.1 | 238.2 |

## Acknowledgments

## References

[1]. Yang Zaixing. The application of icon fonts in web page production [J]. Computer programming skills and maintenance. 2015.3: 85-87.

[2]. Zhang Long. Research and application of cross-platform responsive front-end framework technology [J]. Electronic Design Engineering. 2018. (22): 6-9.

[3]. Information on: http://www.fontawesome.com.cn/.