

Color Research of Automotive Web Pages

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Abstract:

Today, the rapid development of China's Internet technology has made the deep integration of traditional industries and digitalization, and the integration of traditional industries and online economy has become an important driving force for China's economic growth. In China, under the background of today's Internet era, people's aesthetic for car web pages is increasingly diversified. Web design, driven by "Internet thinking", vigorously advocates the design concept of "user-centered", and reasonable color matching of car web pages has become a necessary part of meeting users' needs.

Keywords:

Automotive Web, Color Research, User Demand

1. Introduction

First of all, the car web page is different from other types of web pages, as a collection of shopping, consulting and service in one of the intelligent platform, in the product classification and search functions of the design is more complex, first of all, the product classification of the car web page needs diversification; Secondly, in terms of search engines and screening criteria, automotive web pages also need to provide more comprehensive, accurate and personalized services and functions. Therefore, the application of color collocation needs to be both unified and prominent.

Web color design is a new field of color application. It not only has the universal law of color knowledge, but also has the uniqueness different from the traditional plane color application. The mainstream basic theory of color is divided into three primary colors and three elements of color, and the three primary colors of color usually value the three optical primary colors: red, green and blue. The three elements of color refer to the three characteristics of color: hue, brightness and purity [1].

This research obtains the color elements that users care about when using the website through interviews, calculates the specific rankings of these color elements according to the data obtained from the website, analyzes the ranking of the website and the color elements. Finally, the author obtains the color elements that affect the ranking of the website from the data analysis, and obtains the color elements favored by users.

2. Materials and Methods

2.1. Research method

2.1.1. User interview method

As one of the main methods of empirical research in modern sociology, the interview method originated from the social reform movement in the West at the end of the 19th century. As a common user research method, it can understand the needs and attitudes of users through in-depth communication with users, so as to provide valuable information for product design and improvement. As far as web design is concerned, accurate and comprehensive insight into user needs is the premise of designing web pages, especially in the color application, designers are prone to insufficient investigation of users, and then understand the target user with inertial thinking, resulting in designers in the web color design and user needs do not match the problem.

2.1.2. One-way ANOVA

One way ANOVA analysis is a statistical method proposed by British statistician R.A.Fisher in 1923. It is a statistical method used to compare the average value between two or more groups, mainly used to study the influence of an independent variable (also known as a factor) on the dependent variable.

2.2. Research Process

The author's research process on the color needs of users using automobile web pages is as follows: First, the opinions and color needs of users using automobile web pages are collected through user interviews; The second is to screen the color elements that users care about through the collected color data; Third, in the ranking website statistics of the top 50 automobile website color elements collocation, objective analysis of the automobile website color elements and the relationship between the ranking, analysis of the actual page color preferences of users; Finally, the author draws some conclusions through the results of data analysis.

3. Results and Discussion

3.1. The connotation of web color

Physics shows that color is a phenomenon in which natural light travels into the eye through electromagnetic waves and stimulates the visual system to distinguish radiant energy with a specific wavelength [2]. Each color corresponds to a wavelength of visible light. Web color refers to the color as a visual attribute through the computer digital language recording, transmission and display on the digital terminal equipment, to achieve the purpose of information transmission [3].

Compared with the colors of architecture, products or artistic paintings, web colors have unique attributes and characteristics. Web page color is transmitted in the form of digital media and displayed on digital devices, which is different from the presentation of physical object color. Due to the special form of communication and the use of the environment, the color of the web page has a unique interactive, and can provide more users with relevant information. In the visual presentation of the web page, color is an important element of information communication, designed to help the information be better communicated to the user.

3.1.1. The psychological properties of web color

Research on color psychology shows that colors with different hues, lightness and purity can give people different feelings and emotions [4]. The color of the web page is transmitted through the computer monitor, which can also trigger different emotional responses from the viewer. Web design can express different levels of psychological response through color.

Psychologists have done many experiments on this, they found that in the red and yellow environment, people's appetite will increase, such as fast food McDonald's, KFC decoration is mostly red and yellow, the purpose is to increase the appetite of customers so that they quickly enter the meal and leave the restaurant to free up seats for customers behind. In a green environment, the pulse will slow down and people's mood will be more comfortable.

Since the mid-19th century, psychology has shifted from philosophy to science, and many color theories have made clear to us the influence of color on human psychology through scientific experimental data [5]. Cold color and warm color are based on the psychological illusion of the physical classification of color, for the physical impression of color, roughly by the cold and warm two colors produced. Figure 1 is the website of an email marketing service provider, where warm colors give people a warm, warm feeling.

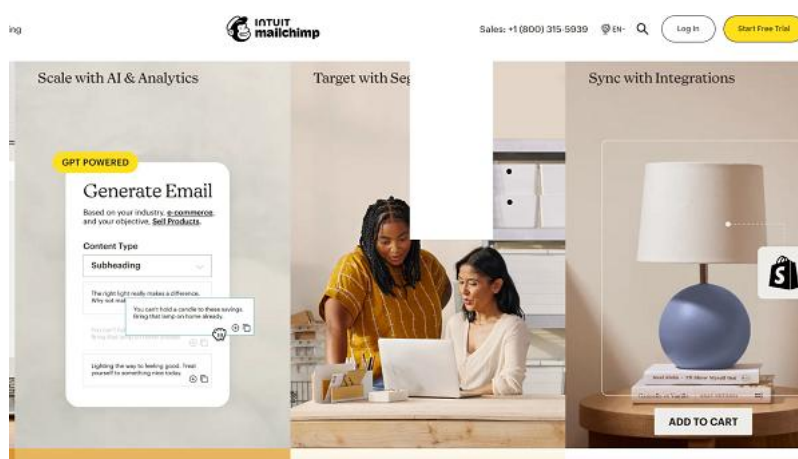


Figure 1. Warm colors Color matching websites bring warmth.

Figure 2 is an online interactive media platform, and the collocation of cool colors gives people a cold and indifferent feeling.

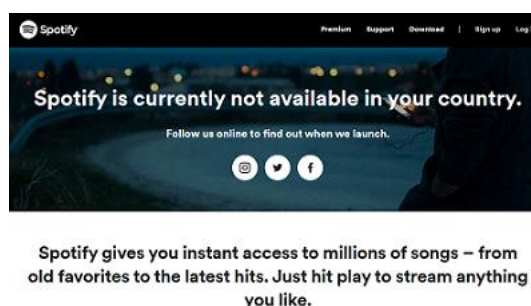


Figure 2. Cool colors combine colors to create a cold feeling.

The above warm and cold feeling does not come from the physical real temperature, but is unconsciously linked to the psychological feeling after our eyes see some colors.

In general, people need both warm colors and cool colors in daily life, and the same is true in the performance of color.

3.1.2. Application principles of color in web design

Today, the color design of the web page is tracable, designers should try to consider the aesthetic needs of users under the premise of science and objective, comprehensive consideration of the color collocation of the website, taking into account the overall and local harmony and unity, so as to design both in line with user needs and unique web visual effects. Specifically, it mainly includes three basic design principles [6].

(1) Develop your own web style

In the current Internet era, a variety of different styles of websites abound, how to stand out in the same type of websites, so that users can remember a deep second visit, a distinctive website style is essential. Color is an important condition for the formation of a distinctive style [7]. Designers must first accurately grasp the user's color needs, to take into account the needs of users on the basis of bold breakthrough, from the local small range of the web page to insert some strong contrast color, to achieve overall harmony, but also to local prominent artistic effect, such processing not only grasp the overall situation of user needs, but also increase the unique characteristics of their own web page, the formation of their own web page unique style.

(2) Page color and theme harmony

Many studies have shown that different people see different colors in the human eye, and the visual experience will be different, one is because of the different psychological feelings, and the other is because the color of each person's retina will be different, which leads to different emotional experiences of different users. The breakthrough and innovation of color application in web design is based on the consistency of main color and web theme. Web page color and theme harmony and unity help to express the idea of the website.

(3) Web color should have continuity

Once the theme of the website and the main color of the page are determined, generally do not change a wide range, but in order to maintain the competitiveness of the enterprise, the purity and brightness of the web color should be adjusted from time to time in a small range, or increase the form of color output to enhance continuity.

3.1.3. The basic method of web color design

Choose a good color suitable for the nature of the website, in order to successfully launch excellent web design works.

(1) The use of monochrome in web pages

Although the website design should avoid using a single color, so as not to produce a monotonous feeling, but by adjusting the saturation and transparency of the color can also produce changes, so that the website can avoid monotony. In addition, black is also a special color, if used properly, reasonable design, often produce a very strong artistic effect.

(2) The use of adjacent colors in web pages

Adjacent colors are colors that are adjacent to each other on the color ring, such as green and blue, and red and yellow are adjacent to each other. The use of adjacent color design can make the web page avoid color clutter, easy to achieve the harmony and unity of the page.

(3) The use of contrasting colors in web pages

Contrasting colors can highlight the focus, resulting in a strong visual effect, through the rational use of contrasting colors can make the website distinctive and prominent. In the design, a color is generally used as the main color, and the contrasting color as the ornament can play the role of finishing touch.

(4) The use of background colors in web pages

The background color is generally a plain and elegant color, avoiding the use of complex patterns and high purity of the picture as the background color, while the background color should be strongly contrasted with the color of the text.

(5) The number of colors in the page

The color of the website is not the more the better, generally controlled within four colors, by adjusting the various attributes of the color to produce changes.

3.2. Preliminary extraction of user requirements

3.2.1. Interview format and results

This one-to-one interview includes face-to-face interview, telephone interview, wechat interview, etc. A total of 7 people were interviewed, ranging in age from 25 to 50 years old. All of the 7 people interviewed have used automotive websites and come from different regions. This one-to-one interview includes face-to-face interview, telephone interview, wechat interview, etc. A total of 7 people were interviewed, ranging in age from 25 to 50 years old. All of the 7 people interviewed have used automotive websites and come from different regions. Since the focus of this article is on color requirements, non-color requirements items are not listed. The information of respondents is shown in Table 1.

Table 1. Basic information of interviewee.

Serial number	Name	Gender	Age	Educational level	Occupation	Place of abode
one	Ms.Du	girl	twenty-seven	undergraduate	salesman	Chengdu
two	Ms.Liu	girl	forty-seven	Junior college	civil servant	Chongqing
three	Mr.Zhao	male	thirty-two	undergraduate	company employee	Dazhou
four	Mr.Wang	male	twenty-five	master	student	Chengdu
five	Mr.Li	male	thirty-six	master	teacher	Shenzhen
six	Ms.Wu	girl	twenty-eight	undergraduate	company employee	Zhengzhou
seven	Ms.Huang	girl	forty-five	Senior high school	company employee	Luzhou

3.2.2 Interview results

Through interviews with the above 7 interviewees, the initial color needs are summarized as follow Table 2:

Table 2. *The basic color needs of users using automotive websites.*

Serial number	requirement
one	The color of the web page is made up of several colors
two	The overall lightness of the web page and the color matching problem of different lightness
three	Web page theme color matching color
four	Web overall tone

3.3. Web color analysis based on user needs

3.3.1. Collection of data

According to the user interviews in the previous chapter, the author obtained the approximate range of users' color needs for automobile websites. However, due to the limited number of interviews, the sample was not large enough to fully represent the opinions of the majority of users, and the color needs were not refined. Therefore, the author will be in the industry ranking website "webmaster's home" statistics of the top 50 automotive websites, and collect color demand data obtained from interviews in these websites.

The ranking of webmaster home scoring system consists of the number of user links, page views, keyword rankings, website content construction, page level (1-10 points); Wang Zhineng pointed out in "Web Design and User experience" that if the website's information architecture, navigation system, and color matching design can meet the user's taste, it can increase the number of visits and clicks of users. Therefore, the webmaster's scoring system can reflect the user's satisfaction with the website to a certain extent, which includes the color factor, because color is an important part of web design.

By analyzing the collected color data and the ranking of the web page itself, the author analyzes which color combinations or color applications are favored by users from an objective perspective and thus improves the ranking of the web page to a certain extent.

Table 3. *Statistics of 50 automotive websites and rankings.*

Website ranking	site name	Website ranking	site name
1	Autohome	26	Invincible electric network
2	Pacific auto net	27	NetEase Automobile
3	Car owner guide	28	Car network Jianghu network
4	Aika Automobile	29	okeycarcom
5	Pacific auto network car Quotes	30	First car market
6	Truck house	31	Ehi Car Rental
7	Bitauto	32	Automobile consumption network
8	Auto times	33	O Kong Da luxury car Plaza
9	Car owner home	34	The World Car network
10	Used car home	35	Leche net
11	Online car market	36	Sina Automobile
12	Phoenix Automobile	37	Xiaopeng Automobile
13	Taoche net	38	Auto information network
14	58automobile	39	New car rating website
15	Automobile quality net	40	China Car Rental

16	Melon seed used car network	41	Global electric vehicle network
17	Newmo net	42	Bull car network
18	First car network	43	China truck network
19	Huaxia used car	44	Off-road e family
20	Global auto network	45	Jaguar China official website
21	A cat car network	46	Aika car selection center
22	First electric network	47	Uxin used car
23	Car sharing network	48	China Electric Vehicle Network
24	Commercial vehicle network	49	Sohu Auto
25	Auto parts people network	50	Car 300

The author finished the statistics of the website and the next step to start the data analysis.

3.3.2. The establishment of color requirements

(1) Number of color matches on web pages

The author sorted out the color data of 50 automobile websites and found that they were composed of 2-4 groups of color collocation, among which 28 websites used 2 colors, 18 websites used 3 colors, and 4 websites used 4 colors. After data unification, the data were brought into SPSS for data analysis. "*" indicates that the P-value of the one-way variance test is less than 0.05 and there is a significant difference between multiple data.

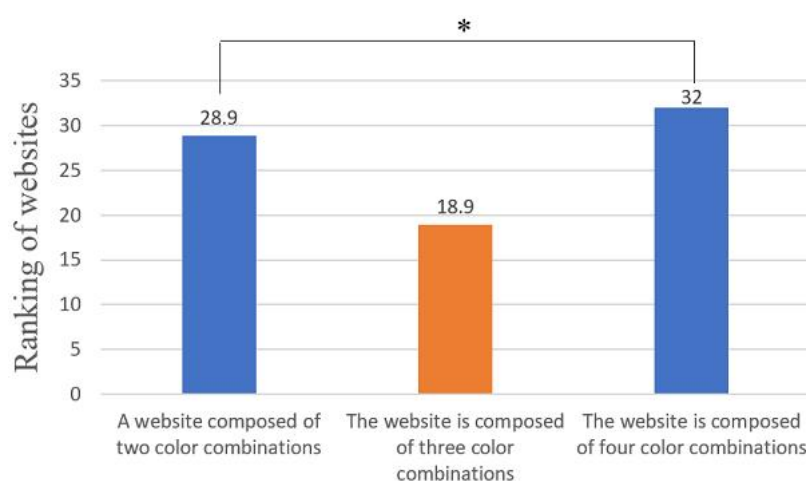


Figure 3. Average graph of different number of color matching page rankings.

There is a significant difference in the ranking of web pages with different amount of color matching ($p=0.045<0.05$), as can be seen from Figure 3, websites with three colors have the highest ranking, with an average ranking of 18.9, and websites with three colors are more closely related to user needs.

(2) Different shades of color collocation

Through sorting out the color matching data of 50 automobile websites, it is found that there are 9 websites using long tones, 30 medium tones and 11 short tones. After the data is unified, it is brought into SPSS for data analysis. An "*" indicates a p less than 0.05 for a one-way variance test and a significant difference between multiple data points.

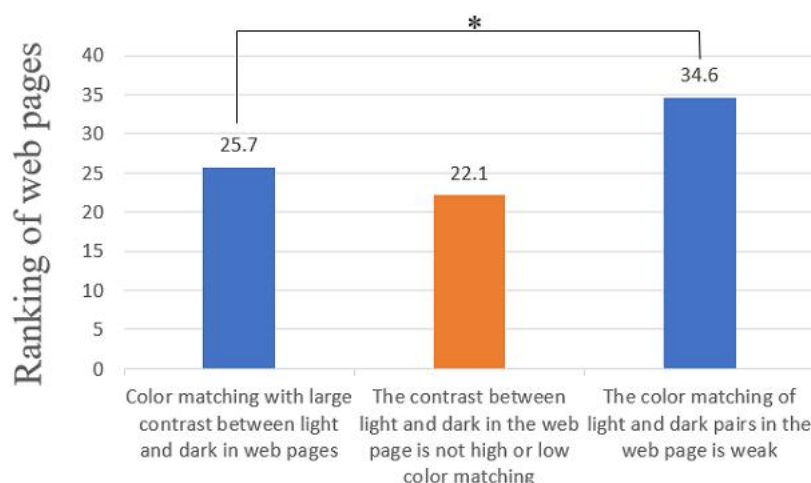


Figure 4. Average graph of different brightness page rankings.

There is significant difference in the ranking of web pages by different shades of color ($p=0.048 < 0.05$), as shown in Figure 4, websites that use medium color in web pages rank the highest, with an average ranking of 22.1.

(3) Different types of matching color analysis

Through sorting out the color matching data of 50 automobile websites, it is found that there are 8 websites using the adjacent colors of the same color gamut of the main color, 25 websites using the complementary colors of the main color, 11 websites using similar colors of the different color gamut of the main color, and 6 other types of matching color positions. After the data is unified, it is brought into SPSS for data analysis. "*" indicates that p of one-way variance test is less than 0.05 and there are significant differences among multiple data.

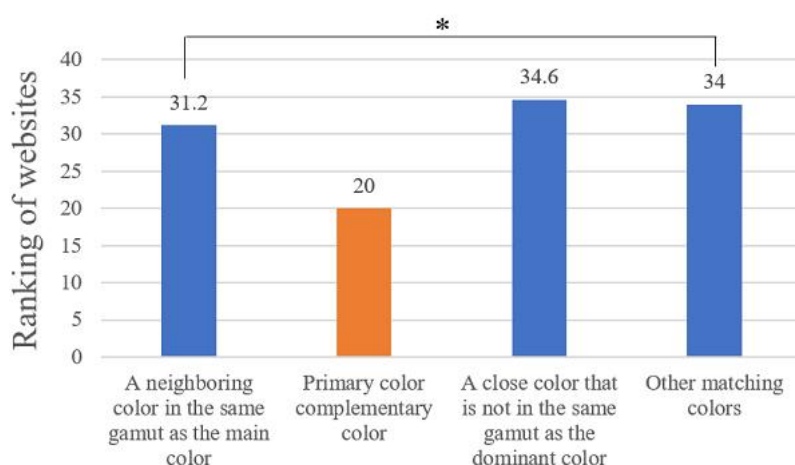


Figure 5. The average ranking chart of different types of main color matching page rankings.

The main color of web page has significant difference in page ranking by different types of matching color ($p=0.027 > 0.05$), as shown in Figure 5, sites that use dominant complementary colors rank highest, with an average ranking of 20.

4. Discussion

It can be seen from Figure 3 that the website with three colors has a higher ranking, which reflects that users prefer websites with three colors; From Figure 4, it can be seen that the overall hue of the web page with medium tone is ranked higher,

reflecting that users prefer medium tone tones; It can be seen from Figure 5 that the complementary color of the main color in the web page is more favored by users. Through reading literature and the author's own experience in designing web pages, the main color of the web page should be determined according to the theme, style and other factors of the web page, because the theme, style and color of the web page are coherent and psychologically suggestive.

5. Conclusions

Under the background of the rapid development of the Internet era, we are in an era of fierce competition, information explosion and advocating individuality. The previous monotonous design method can not meet the needs of the development of The Times, many web designers have begun to refuse to follow the trend and blindly follow and began to face the user directly, considering the actual needs of users to use the website, the significance of this article lies in this. The color used by the web page is closely related to the theme and style of the web page, and designers need more comprehensive research and consideration in order to design a web page that better meets the needs of users.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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