Yellow color in the user interface as an attention management tool

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Abstract. Color is an important design element. Due to the peculiarities of its nature, one color is perceived by different people very subjectively and is capable of evoking a wide range of emotions. Color perception depends on a number of reasons, including personal preference and cultural background, but yellow is arguably one of the most versatile colors. The article discusses the features of the influence of yellow on a person, as well as features, examples and suggestions for its use in interface design.

Keywords: graphic design, yellow color, interface design, graphical user interface, color theory, design.

Color is the property of material objects to emit and reflect light waves of a certain part of the spectrum. Human perception of color is very subjective and depends not only on physiological and cultural characteristics, but also on past experience, psychological state and personal preferences. At the same time, color is a very fast non-verbal way of conveying information. Since color can influence a person's behavior, desires and emotions, the study and application of color theory is an important aspect of a designer's work. In interface design, color is used to influence perception and control user behavior, and to increase the convenience and speed of communication. When designing an interface design, it is important to take into account the target audience of the product, including due to the cultural characteristics of color perception, since in different countries one color can have diametrically opposite meanings.

Yellow is the lightest and brightest color, and in almost all cultures it is associated with sun and gold. In ancient China, only members of the Imperial family had the right to wear yellow clothes. Yellow was a symbol of land and fertility, and had strong cultural and historical significance. On the other hand, among some peoples of Asia and in Egypt, yellow is the color of mourning and sorrow, and in India it is identified with trade, luck and deals. In Japan, it is the color of grace and grace. In Western culture, yellow is gender neutral and has conflicting

meanings - it can mean both light, happiness, gold, knowledge and wisdom, as well as betrayal, duplicity and jealousy.

Around the world, yellow began to be used to attract attention and warn of the need for caution by the middle of the XX century. Despite the fact that different countries had their own prerequisites for the use of exactly yellow as a signal color, at the moment almost every person, regardless of country of residence, perceives yellow in this particular context. For example, a yellow traffic light warns the driver to start or stop driving. Tellingly, in the days before the widespread use of electricity for a warning signal, a signal light was used, which, due to its nature, has both a red, "dangerous" hue, and yellow - clearly distinguishable in the dark at long distances.

The physiology of the perception of yellow gives an understanding of its choice as a signal. When the reflected light hits the eye, color vision receptors send signals to the brain. Light waves of different lengths stimulate certain combinations of receptors, which allows a person to distinguish colors. The receptors responsible for red and green colors are especially sensitive to light. This process is well illustrated by the work of RGB matrices, where each cell, pixel, consists of three colored elements - red, green and blue. It is the work of the red and green elements that transfers the yellow color to the screen, which can be seen when examining the monitor or TV screen under a magnifying glass.

Any color is a wave of a certain length. Since yellow is not a pure spectral color, but, as indicated above, consists of two types of waves, the number of signals supplied to the brain is twice as large. Due to this feature, yellow reduces the sensitivity of receptors to blue and violet colors, so yellow appears to be the brightest color in the spectrum. Thus, the combination of the brightest color and the complete absence of reflected light - yellow and black colors, respectively, ensures maximum readability of the text at any time of the day, it does not matter which color is the background.

At the moment, yellow is used everywhere as a signal color:

- yellow traffic light
- protective tape
- road markings
- warning signs
- warning cones on wet floors
- construction equipment and many tools, as well as helmets
- school buses
- tanks with water on dangerous sections of the road
- checkers taxi

• reflective vests of builders, police officers, rescuers and other employees of various services

• signal lights on large vehicles or vehicles carrying dangerous goods

In 1939, at a conference at Columbia University (USA), in addition to other national standards, based on research, yellow was adopted as the standard for school buses. Since then, this standard has not changed, as it has proven its reliability in practice - according to the National Highway Traffic Safety Administration (NHTSA), yellow school buses are 70% safer than other vehicles. Subsequently, thanks to good statistics, the use of yellow for painting school buses was adopted in many countries.

Also in the United States, yellow markings are applied on dangerous sections of the road to restrict oncoming traffic flows, notifying drivers of a possible danger when driving into the oncoming lane. The local police are actively using the yellow restrictive tape, which warns about the ban on passage to the territory limited by it. Even for residents of other countries, these features are well known thanks to cinema and other elements of pop culture, and the famous New York yellow taxi even instilled certain associations in a Russian person, and therefore it is not surprising that the country's largest company providing transportation services uses in its design is exactly yellow.

In Russia, since 2014, amendments to GOST have been introduced to improve safety at pedestrian crossings. Thus, the "zebra" from gray and white to yellow and white, and on some sections of the road blue and white pedestrian crossing signs acquired a yellow frame. Also, on dangerous sections of roads, you can often find yellow barrels of water that protect against collisions with various static objects, and at public transport stops, a zigzag yellow line indicates a parking ban.

Quite often, yellow is used in the design of a trademark or the entire corporate identity. Thus, the yellow letter "M" makes the McDonald's logo one of the most recognizable trademarks in the world. Among the world famous companies that use the color yellow are DHL, Burger King, Chupa-Chups, IKEA, Amazon, Nikon, Chevrolet, CAT, Shell, DeWalt, MGM, 20th Century FOX, National Geographic, Rockstar Games, Star Wars, Capcom, LEGO, Warner Brothers (until 2019). In Russia, Euroset, Beeline, Yandex.Taxi and STS actively use yellow in both corporate style and advertising.

It is quite easy for people's associations and habits to move from real life to a virtual environment. On sites, in applications and interfaces of various software, yellow is used mainly to denote auxiliary elements with which interaction is possible, such as buttons, interactive notifications, important applications and interface elements. Despite the fact that the yellow color has a signaling effect, in contrast to the alarming red, warning of a serious danger, it rather

gently stimulates the psyche to important, but not critical actions, since it is perceived by a person as something positive, warm, light. For example, to rate applications, developers use assessment methods that are familiar in everyday life, which are understandable to every user. Often, a five-point grading system is used for this, with yellow or gold stars instead of a scale or numbers. Over the two decades of widespread active use of computer and mobile technologies, this method of scoring has become a kind of standard in this area. And various points and bonuses can often be found in the form of yellow (gold) coins, which often encourage the user to use the application more actively.

Interaction color is one of the tools for managing user behavior; it should be clear and reasoned throughout the interface. For a user to easily identify a call to action, it must have sufficient contrast and visual weight in relation to other interface elements. The effectiveness of interaction color is determined not by brightness and saturation, but by the speed of user identification and ease of communication. Yellow is a good choice for interaction color, especially on dark backgrounds, but it is important to include it wisely in the color palette.

Since the development of VR and AR products is closely related to the gaming industry, many elements are borrowed from one area to another. Quite often in games you can find familiar elements of everyday life that perform essentially the same functions as in reality. For example, in many products, yellow is used for navigation in the form of markings, handrails, restrictive tape, signs and signs. A person sees these objects regularly, which means that the brain will quickly perceive and process the signal that these objects give.

In video games, yellow indicates the ability to interact with an object, and therefore handles, levers, screws, ropes, and other lifting mechanisms are painted in it. Boxes with supplies and working devices are marked in yellow, various prompts, you can even find yellow signs that are placed on a wet floor to force the user to be more attentive and careful or choose a different path. In some products, the user has the ability to leave important notes and mark the path with yellow paint or flags.

As in real life, when using different applications, people develop certain habits. Experienced users know that an element colored yellow can almost always be interacted with, and a yellow non-interactive object most likely indicates something important or interesting. The yellow arrow in the navigator does not raise any questions - thanks to it, the user knows which way to take the path, and the image of a gold coin will warn about a fee or indicate a high cost of the service.

Since augmented reality interacts with the space surrounding a person, and most products are aimed at facilitating any tasks or helping the user, the designer's task is to integrate one visual environment into another as comfortably as possible for the user. To do this, he needs to

maintain a balance and not overload the space with visual noise, and make visible interactive objects understandable and familiar.

Let's take a navigation app as an example. In Russia, most of the popular "navigators" have a yellow directional arrow, and on city streets yellow signs along the roads indicate the distance to large popular objects such as shopping and cultural centers, administrative buildings, etc. When developing an application for navigation in augmented reality with a character-guide, it will be wise to make the character or its elements exactly yellow, since such an object will evoke associations familiar to the brain, which will simplify the use of the application. A positive, "warm" character has more opportunities to inspire confidence and confidence in the user in the correctness of the chosen path and keep attention, while potentially dangerous areas and elements should be highlighted in red to quickly warn the user about the danger.

However, do not overload the visual space with yellow, otherwise it will simply cease to perform its main function. If a yellow object that requires attention is permanently present on the screen, secondary interface elements must be temporarily hidden from the user or made neutral, not shouting about their importance. Visible secondary objects are best done in a neutral blue spectrum, which will emphasize the main object, and not argue with it for the user's attention.

When designing an interface for AR products, it is necessary to take into account the changeability of the time of day, so the color scheme should be selected taking into account the use of the application both during the day and at night. If this condition cannot be met, "light" and "dark" themes are developed for the application for the correct operation of the application in different lighting conditions. Virtual objects should not dazzle the user or get lost against the real background.

Designing the visual environment for VR products can use proven techniques from everyday life and video games. If the application implies interactive objects in its space, to simplify the learning process, it is necessary to use intuitive signals, for example, yellow pointers, while in the presence of a flat interface it is better to abandon bright colors in it, which will distract the user from the main goal - immersion in the virtual environment.

When designing a graphical user interface, it is important to remember that yellow is not the only accent color, but its different shades and combinations with other colors can cause conflicting emotions. To achieve the best result, the designer must understand the basics of color theory, as yellow is an effective but complex tool for managing attention. Overuse of accents and poor color combinations can greatly spoil the impression even of a product that is well-developed in the technical part. For a comfortable interaction with the interface of each user, it is necessary to take into account the physiological characteristics of different people, designing a design that is clear and readable. To do this, you can use color palettes taking into account

contrast ratios and filters for color blind, or provide the user with a choice of colors. It is undesirable to use color as the only means of communication with the user and transferring information to him.

References

1 Johannes Itten. The art of color [Text] / J. Itten; transl. from Germ. L. Monakhova. - [13-th ed] - M.: Aronov, 2020. - 96 P.

2 Ethan Marcott. Responsive Web Design [Text] / I. Marcotte; transl. from Eng. Pavel Mironov. - [1-st ed] - M.: Mann, Ivanov and Ferber, 2012. - 176 P.: BukAp

3 Sivolobov N.M. Problems and directions of development of transportation of schoolchildren in rural areas / N.M. Sivolobov, S.A. Shiryaev, V.A. Gudkov, A.A. Rayushkina // Scientific works SWorld, 2012 – № 4.

4 GOST R 52872-2012. Internet resources. Accessibility requirements for visually impaired people. Instead of GOST R 52872-2007; intr. 2014-01-01. - M.: Standartinform, 2014.