HiLL PUBLISHING

Advances in Computer and Communication, 2025, 6(3), 107-111
https://www.hillpublisher.com/journals/acc/
ISSN Online: 2767-2875

Application of Human-computer Interaction Technology Based on Information Visualization in Visual Communication Design

Fang Nan

Parsons School of Design, The New School, New York, NY 10011, USA.

How to cite this paper: Fang Nan. (2025) Application of Human-computer Interaction Technology Based on Information Visualization in Visual Communication Design. *Advances in Computer and Communication*, 6(3), 107-111.
DOI: 10.26855/acc.2025.07.002

Received: May 31, 2025
Accepted: June 30, 2025
Published: July 31, 2025

***Corresponding author:** Fang Nan, Parsons School of Design, The New School, New York, NY 10011, USA.

Abstract

In the field of visual communication design, human-computer interaction technology is an indispensable component. As a link between applications and works, its application greatly changes the way information is obtained, processed, and presented, making visual communication design no longer limited to two-dimensional space, but expanding towards three-dimensional or even multi-dimensional space. In addition, with the support of information visualization, complex data is transformed into intuitive and understandable visual forms, creating vivid visual effects, endowing visual works with rich connotations, attracting users to actively interact with design works, effectively improving information transmission efficiency and enhancing design interactivity, allowing users to imprint information in their minds through deep participation, and effectively meeting the growing and increasingly personalized information needs of users. This article first analyzes the application value of human-computer interaction technology in visual communication design. Secondly, based on information visualization, it deeply explores the application strategies of human-computer interaction technology in visual communication design from several aspects, in order to provide new design ideas for designers and contribute to the innovation and development of the field of visual communication design.

Keywords

Information visualization; Human-computer interaction technology; Visual Communication Design

In the information age of explosive growth, with the increase of channels for people to obtain information, people not only demand higher efficiency in information acquisition, but also tend to choose interactive and highly interactive visual content, and stay on such content for a longer time. In the field of visual communication, the organic combination of human-computer interaction technology and information visualization design can transform complex data into intuitive and easy to understand graphic images, which helps enrich the expression form of works, endow works with interactivity and comprehensibility, effectively attract audience attention, and enable them to quickly obtain key information, thereby obtaining a good experience.

1. The Application Value of Human-Computer Interaction Technology in Visual Communication Design

1.1 Enhance user experience and satisfaction

In the era of information explosion, people are inevitably trapped in a dilemma of choice when faced with a dazzling array of products, and the success of products largely depends on user experience and satisfaction. A good product

must not only have excellent performance and quality, but also provide users with a pleasant and convenient experience to improve their satisfaction and loyalty, and further enhance their stickiness. In visual communication design, human-computer interaction technology is a bridge connecting products and users, and its role is becoming increasingly significant. Traditional visual communication design usually adopts a one-way information transmission method, where users can only passively receive the information conveyed by the work. The application of human-computer interaction technology has greatly improved this phenomenon. This technology emphasizes bidirectional interaction, that is, users can interact with works in real-time through operations such as clicking, zooming, and dragging [1]. This process not only increases user engagement but, more importantly, provides users with the opportunity to continuously explore and discover works, thereby gaining an immersive experience and effectively extending their stay time. In addition, when designers apply human-computer interaction technology for visual communication design, they usually optimize the interface design and operation process based on users' usage habits and cognitive habits, highlight the usability of the product, ensure that users can easily understand the interface information, efficiently use the system or product to complete specific tasks, and provide users with a good user experience, gradually increasing user satisfaction.

1.2 Enrich the forms of visual communication design

In the field of visual communication design, the reasonable application of human-computer interaction technology greatly expands the innovation space of design and provides infinite possibilities for design. In the past, visual communication design was mainly limited to static two-dimensional spaces, but with the support of human-computer interaction technology, this traditional design pattern has been completely broken. Visual communication design has begun to expand to three-dimensional and even multidimensional spaces. Designers use multimedia means such as dynamic images and interactive interfaces to create dynamic three-dimensional visual effects, attracting users to actively interact with design works and making dynamic display possible. Taking VR and AR as examples, designers can use these two technologies to create a three-dimensional virtual space. Users only need to wear specific devices such as AR glasses and VR helmets to enter the virtual world and interact with works, experiencing an unprecedented sense of interaction and immersion, and obtaining comprehensive sensory stimulation of hearing, auditory, and tactile senses [2]. In addition, human-computer interaction technology can be combined with big data and the Internet of Things to visually present various types of data, such as weather changes, stock market trends, traffic conditions, etc., in dynamic charts, animated interfaces, interactive interfaces, etc. Users can interpret the hidden information and trends through the data, and they can also filter, sort, and zoom in on the interactive interface to interact with reality and obtain personalized content display. In this way, it greatly improves the efficiency and accuracy of data transmission and can also assist users in making decisions.

1.3 Optimize the overall effectiveness of information transmission

In today's society, with the rapid development of information technology, information transmission has become an important way for people to connect with each other and the world. But in today's explosive growth of information and diversified transmission channels, how to ensure the accurate and efficient transmission of information to the target audience is an urgent problem that needs to be solved. As an important branch of information science, human-computer interaction technology provides a new approach to optimizing the effectiveness of information transmission. Human-computer interaction technology has the functions of human cognitive behavior, visual habits, and interaction methods. In the process of visual communication design, designers can use human-computer interaction technology to lay out interfaces reasonably, incorporate dynamic effects, add interactive elements, and replace complex expressions with concise and clear charts or language [3]. In this way, users' visual attention can be accurately captured, allowing them to quickly locate the content of interest, significantly improving the directness and efficiency of information transmission, and reducing the time wasted caused by blind screening and searching. In addition, the application of interpersonal interaction technology also has the advantage of enhancing information memory, rooted in the fact that this technology takes interactive experience as the core element, such as clicking, dragging, zooming, and other operations, which are essentially the process of user information interaction. This process often requires users to think, make decisions, and take actions, which helps to deepen their understanding of information, closely connect information with users' personal experiences, emotional attitudes, values, etc., and enable users to remember information for a long time.

2. The Application Strategy of Human-Computer Interaction Technology Based on Information Visualization in Visual Communication Design

2.1 Data visualization design

Effective and accurate transmission of information is the core of visual communication design. However, in the face of massive data, traditional forms such as text and tables are obviously unable to meet the needs. These forms cannot reflect the connections and changes between data well, and are also prone to boring and confusing feelings when used, thereby increasing the difficulty of understanding [4]. Based on this, for the visual communication design of massive data, designers need to first convert the massive data into visual elements such as charts, graphics, animations, etc., to intuitively present the connections and changes between the data, in order to increase the readability of the data. Taking a bar chart as an example, it is a commonly used data visualization tool that mainly utilizes columns of different heights, suitable for intuitively comparing different categories of data, displaying absolute values of data, and statically displaying time series trends. Relying on a high-performance chart library, users can use human-computer interaction technology to interact in real-time with visualized data through clicking, dragging, and other operations, explore and analyze data according to their own needs, and thus obtain a good user experience. Taking the stock market monitoring platform as an example, in order to enable users to grasp real-time and accurate stock market data, the platform uses human-computer interaction technology to dynamically display key information such as the latest stock prices, price fluctuations, turnover, and turnover rates. Users can obtain detailed information about a data point in the chart by clicking on it. You can also click on the stock code to obtain the company profile, financial reports, news announcements, etc., corresponding to the stock. Of course, users can also drag and drop on the chart to adjust the time range and display ratio, making it easier to observe the trend changes of stock prices in detail. For investors, this data visualization design facilitates their convenient monitoring of stock market data, fully grasping market dynamics, and making wise and reasonable investment decisions.

2.2 Dynamic display of information

In modern society, influenced by economic development, people's pace of life is becoming faster, and their ways of obtaining information are becoming more diverse, leading to a significant increase in expectations for visual content. Traditional static images and textual descriptions obviously cannot fully meet the content needs of the audience [5]. They usually prefer interactive and highly interactive visual content. Therefore, in visual communication design, especially for works such as advertisements and promotional videos, dynamic information display has become a mainstream trend. In practical design, designers can transform abstract processes, complex data, and lengthy stories into easily understandable graphics, animations, and videos through clever design and clever use of visual elements. Through color matching and contrast, shape combination and arrangement, object movement and rotation, and other design techniques, the readability and comprehensibility of information can be further improved, giving it stronger dissemination power and bringing users a rich visual experience. Taking short video platforms as an example, designers can use information visualization design to create interesting short videos of complex information such as product introductions, travel guides, and popular science knowledge. They can also integrate human-computer interaction technology into short videos, making it easier for users to watch deeply through interactive operations. For example, for product introduction short videos, if users are particularly interested in a certain feature of the product, they can observe each step and precautions of the feature demonstration carefully through slow play or pause operations; Some short videos in the tourism strategy category will apply whole territory shooting technology. Users only need to slide the screen according to the icon or press a specific button to interact with dynamic information in real time, freely switch viewing angles, immerse themselves in scenic spots, explore the beauty of the scenery with fingertips, and appreciate the magnificent scenery from multiple angles.

2.3 Visual emotional design

Visual emotional design mainly utilizes visual communication elements such as color, shape, texture, as well as visual metaphors, dynamic effects, and other means to transform dry data and complex information into captivating stories, thereby establishing emotional connections between users and products, allowing users to efficiently obtain information while providing satisfaction and pleasure at the emotional level [6]. Taking the BBC Climate Change Project

as an example, in order to raise public awareness of climate change and firmly establish crisis awareness, the project uses graphics, images, and data to visually present key data such as global climate change, glacier melting, and sea level rise, profoundly revealing the current state of climate change. In this project, the designers gradually transformed the blue color representing calmness and tranquility, and the red color representing a warning of danger, using clever color changes to showcase the trend of climate change and reflect the increasing risks of climate change. This allows viewers to feel the threat of climate change to human survival under a strong visual impact, thus triggering their emotional resonance and profound thinking. In the display of glacier melting, the designers applied animation forms to realistically show the process of iceberg melting and the various natural disaster scenes that may be triggered, bringing viewers an immersive experience and truly feeling the adverse effects of climate change on the earth. The clever application of animation elements not only enhances the visual effect of the work but also inspires viewers to have a sense of awe and love for nature, guiding them to actively take action to protect nature in the future with emotional power. In the Apple Watch activity circle, traces of information visualization design can also be seen. In order to improve users' living habits and promote healthy behavior, designers have adopted a closed-loop visual reward mechanism. The circle will be updated in real time according to the user's exercise progress until the exercise task is completed and the circle is completely closed. For users, seeing a circular ring naturally generates the impulse to close it (move), and real-time updates of the ring are essentially instant feedback, allowing users to immediately feel that their efforts have been recognized, thereby enhancing their confidence and internal motivation for movement.

2.4 Immersive Experience Design

In the context of rapid development of modern science and technology, human-computer interaction technology is becoming increasingly widely used in the field of visual communication design and has become an indispensable technical means. Especially in exhibition and display scenes, how to bring immersive and interactive experiences to visitors has always been a topic of in-depth research for designers. The traditional display method is mainly a combination of static graphics and text, which lacks interactivity and cannot achieve an immersive experience. However, the application of human-computer interaction technology fully compensates for the above shortcomings [7]. In the process of visual communication design, designers first visualize information and data, converting them into graphics, charts, and animations to make them easier to understand. Secondly, actively introducing advanced technologies such as 3D modeling and texture mapping, combined with specific display content, to create a realistic virtual scene or object for vividly and intuitively presenting key information. Finally, visitors can wear VR devices and hold professional controllers to immerse themselves in a virtual environment. By touching virtual objects, operating virtual interfaces, and participating in virtual games, real-time human-machine interaction can be achieved, and information can be efficiently and accurately obtained during this process, resulting in an immersive experience. Taking the Yangzhou China Grand Canal Museum as an example, the "Boats on the Canal" exhibition hall in the venue combines interactive screens with augmented reality technology to reshape the bustling scene of ancient canals. Visitors can learn about the detailed structure, production tools, and historical evolution of different types of boats through the touch interactive screen. Moreover, the screen supports multi-touch, allowing for accurate and quick responses even when multiple viewers operate simultaneously. Augmented reality technology requires viewers to scan the markers on their mobile devices, and then they can see the boat model on their mobile devices [8]. Visitors can freely rotate, zoom in, zoom out, or click specified buttons to put the boat into a simulated navigation state, making it easier for visitors to observe from multiple angles. With the support of human-computer interaction technology and multimedia technology, the exhibition space can come to life, the exhibition can come to life, and visitors can experience the important role of boats in ancient transportation and cultural exchange firsthand.

3. Conclusion

In summary, influenced by the rapid development of technology, the application of human-computer interaction technology in the field of visual communication is becoming increasingly widespread. It not only enriches the forms of visual communication design but also enhances user experience and satisfaction, further optimizing the overall effect of information transmission, making visual works more intuitive and understandable, and endowing them with stronger attractiveness. Designers should deeply recognize the application value of human-computer interaction technology. In the process of visual communication design, based on the type of work and the conveyed content, and from the perspective of information visualization, they should reasonably apply human-computer interaction

technology, strive to create excellent visual experiences for users, and maximize the application value of human-computer interaction technology. While improving the quality of the work, they should continuously expand their appeal and influence.

References

[1] Wang B. Image and Insight: Application of Information Visualization in Visual Communication Design. Tomorrow's Fashion. 2025;(1):74-6.

[2] Li Y, Wu Z. Application of Human Computer Interaction Technology Based on Information Visualization in Visual Communication Design. Automation and Instrumentation. 2024;(2):182-6.

[3] Wu Q. A Human Computer Interactive Communication System for Kanto Culture Based on Visual Communication Technology. Information and Computer (Theoretical Edition). 2023;35(14):130-2.

[4] Liu A, Fan H. Research on the Application of Information Visualization in the Field of Visual Communication Design. Shanghai Packaging. 2023;(7):37-9.

[5] Wang R. Research on Dynamic Graphic Design and Visual Communication Based on Human-Computer Interaction. Youth Years. 2023;(Z1):151-3.

[6] Luan L. Visual Information Visualization and Communication Simulation of Image and Graphic Fusion. Computer Simulation. 2021;38(10):424-8.

[7] You Z. Research on Visual Communication Method of Human Computer Interaction Interface Based on Analytic Hierarchy Process. Journal of Zhoukou Normal University. 2019;36(5):95-9.

[8] Yang S. Application of Multimodal Interaction Technology in Digital Experience Design. Integrated Circuit Applications. 2024;41(12):32-3.