Visualization of Information and Its Application in Information Management

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Abstract

Information visualization is a method to present information or information in a non-traditional way, in interactive graphic forms. By using two- and three-dimensional color graphics and moving images. Such visualizations can depict the structure of information, and allow the user to completely guide it, and make modifications through graphical interactions. Information visualization is a branch of computer graphics and user interface that depends on interactive display or animated digital images by users to understand information. Information visualization is the use of interactive, sensitive display, usually illustrated, of abstract data to enhance human perception. One of the applications of visualization is geographic visualization, such as: geographic information system. Web-based illustration is one of the other important methods of illustration.

Original article

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Introduction

Information visualization is one of the activities that are used to provide better ways of displaying information. In this method, due to the high capacity of information transfer by image, it is tried to increase the power of understanding and learning of the user by displaying the information visually; In addition, a significant amount of information is presented in a compressed form, with a smaller volume, more efficiency, and in a visual format. Visualization of information is a field of interdisciplinary studies whose scientific researchers are about fifteen years old. The basis of its researches is based on this premise that basically receiving and understanding the concept of data is more effective in the visual way. Psychological studies show that the rate of our learning through the visual sense is about seventy-five percent, while hearing covers thirteen percent of our learning capacity. By the same amount,

1

learning through other senses is reduced. Based on this, the design of scientific methods in information visualization is very important for better understanding of phenomena. It can be stated that many times a picture is more valuable than hundreds of words. This feature makes it possible to present a large amount of concepts and vocabulary with the appropriate and effective use of images. Visualization is actually a standard for determining the degree of applicability, and the optimal transfer of information in the use of information retrieval tools.

Definitions and basics of information visualization

In the definition of information visualization, experts and experts in this field have explained its foundations, situation, goals, structure and functions from different aspects. A researcher states that visualization of information enables users to interpret a huge amount of information (1). The basis of the assumption that supports this issue is that the user's perceptive abilities can be used to understand the information. It is clear from his statement that human cognitive abilities have the ability to effectively use the imaging method and the ability to receive and understand information from pictorial symbols. Another researcher states that information visualization generally refers to considerations to cover the use of computers to create interaction, often in the form of animations, and includes representations of multiple variables in multiple linked formats, with the goal of further developing understanding. The user is the interaction of the components of a system or distribution (2). A researcher introduces two related basic aspects for the information visualization process: structural modeling and graphic display (3). Structural modeling means discovery, extraction and simplification under the cover of relationships. This type of relationship is a structure that includes the characteristics of a set of documents or other data groups. On the other hand, the meaning of graphic display is the change in the initial display of a structure within the graphic unit, so that it can be interacted and studied. Such as: Hierarchical structure that can be shown as a conic tree or a hyperbolic diagram. A researcher introduces the main basis of studies and the activity of information visualization in two leading, but separate areas: human-computer interaction, and storing and re-

trieving information in large databases (4). Some researchers define visualization as follows: visualization of information takes advantage of the perceptible abilities of human perception in recognizing the structures of visual presentation of abstract data, and provides the possibility of direct identification and understanding of data in order to obtain knowledge, to receive results and interact directly with data (5). Other researchers state that information visualization is one of the areas of computer science that is related to innovation in providing large amounts of information. This subject field has already been known for its potential and ongoing cooperation in large-scale projects, such as: Human Genome Project and Human Intelligence Project (6). Some studies also consider the goal of information visualization to provide compact graphic displays, in connection with the user interface, for the interactive management of a large part of information components (7).

Also, in relation to the functions of research illustration, he enumerates seven activities related to illustration as follows: general survey, magnification, smoothness, required details, dependence, description and extraction. He then classifies the types of visualization in seven categories, including: one-dimensional, two-dimensional, three-dimensional, multi-dimensional, temporal, hierarchical and network data (8). A researcher states that this classification may be difficult at times, because sometimes illustration includes two types of hierarchical and network structures, and the show may include some types of use of space [environment] (9).

On the other hand, illustration is closely related to some aspects of visual and cognitive display. The methods of pictorial representation and the foundations of human perception are closely related. Studying in specific areas that help illustration can help the overall process. Understanding the perceptual aspects, psychological foundations and the way we understand the surrounding environment, in addition to the studies that are conducted in related categories such as the field of human vision and its effects on the process of communication with the user interface, all can lead to fattening the topics of illustration.

Difficulty in explaining the exact boundaries of information visualization

The works presented in the field of information visualization are now used in a significant part of thematic domains in the literature, such as information retrieval, hypertext and web, digital libraries and human-computer interaction. The border between information visualization and related fields such as scientific visualization and simulation modeling is increasingly blurred (3). This has caused the creation of a broad thematic field in the discussions related to information illustration. In such a way that it is not so easy to explain the border between the basic foundations of this category. Of course, some subject areas have been more subject to attention and related researches, and conducting various studies that have dealt with different dimensions in this field, well expresses these different perceptions of illustration.

Among these, some of the concepts have been given more attention and are more related to information visualization. In such a way that the semantic relationship between them and illustration is very close and necessary. These concepts emphasize the aspects and cognitive abilities of humans, and try to provide a more appropriate understanding of illustration. It is clear that the meaning of each of them has different examples and meanings outside the study field of this field, but in the field of illustration research, they are used in close connection with it.

Four ideas: perception, concept, presentation and illustration are difficult without a meaningful reference from each to the other. They all have multiple definitions depending on the field of research. Computer science researchers emphasize visualization as a product or a technique, but researchers in other fields consider it as cognitive processing (9). These different perceptions have made it difficult to determine the limits of illustration and researchers have faced problems in explaining it accurately.

It can be stated that the definition of information visualization is difficult, because the variety, and to some extent the contradiction or confusion of the use of this term causes semantic difficulty. One of the reasons is the common use of the words data and information. Data visualization or data graphics includes scientific visualization and information visualization. Scientific illustration is mainly related to the phenomena that are the basis of the physical world. Related data collected about land, buildings, molecules or other subjects. Visualization of information in contrast to scientific visualization is related to the visualization of a huge amount of abstract matters (10). On the other hand, some efforts from the information visualization process have only considered aspects of graphic design and related fields, and also some works have dealt with the relationship between visualization and virtual environment. The inclusion of various topics from studies related to the recognition of colors and shapes, perceptual and cognitive foundations in visual understanding of information, to technical techniques and methods of illustration, and in other words, the design of artistic issues along with technical foundations, all on the breadth of the field of study and research in this scientific field. Refers. It should be added that each of the studies conducted in this field have dealt with specific aspects of this subject area, which in many cases do not have much correlation. Information visualization covers a wide range of studies related to the visual representation and display of information in many fields. Based on this, it is difficult to define a precise definition that comprehensively defines the boundaries of studies related to illustration.

The importance of information visualization process
The usefulness of visualization in relation to understanding information has its roots in creating the necessary conditions and background for explaining the status of data visualization strategy, user interface recognition, optimal computer graphic design, and information analysis. One of the important dimensions of illustration in the proper design of the information search page is in terms of respecting the topological balance of the markers and signs located in it. This category is discussed both in the discussion of artistic design and in the technical characteristics of the visual structure of the user interface. In addition to helping in better understanding and creating effective communication, illustration in displaying information also increases the value of information. This usefulness in the methods of representation and presentation of information has created a favorable space for the interaction of the generated information. The value of information always lies in its useful use. With the use of optimization methods in visual presentation of infor-

3

mation, the influence of its concepts increases. By using multiple visualization methods in databases or search pages, it is possible to help the useful information retrieval process. In this regard, we face an important question in this field, namely:

How can information visualization create added value? The answer is that with comprehensiveness: showing a very large data set and providing a compact overview; Meaning: patterns and methods that have been shown because they don't want to be defined in any other way; Colorful: pleasing to the eyes (11). It is clear that these three factors can be divided into other subfactors. For example, the category of colorfulness or attractiveness of the overall image is related to the effect of color, shape, symmetry, compositional space on the page, the field of human vision and their effects.

One of the important aspects in information processing is paying attention to information display formats and improving the quality level of their design and user-friendliness. By using optimal illustration methods, information can be transferred to the user in an effective and efficient way. Also, his ability to understand and understand information has increased, and for example: he is more willing to use an information site. We can make the information in graphic and visual formats, without reducing anything from its content. This activity increases the user's ability to accept information. In fact, by using visualization, we can transform the way we look at information, without reducing the value and validity of information.

In this sense, the way we look at information helps us to think more effectively and get better results. In other words, the slogan hidden in information visualization is the use of a way of looking (or insight) for thinking: it is clear that information visualization is important when we are faced with a large amount of information that we try to invent a specific format and analyze the information. Cast it in that mold and make a representation (12).

These useful templates appear in different ways. A variety of different methods in the field of visualization allow us to provide useful displays of information and non-visual data. Some of these methods in their structure and combination are considered as the basis of other types of imaging methods. Based on this, it can be stated that the representation of information in its

new composition, based on a visual framework, will cover a wide range of data.
They will cover extensive data.

Illustration methods and applications
In the use of computer software and programs, the methods of visual presentation of information are increasingly used. The guidance and management of large and vast information structures depends on the optimal use of possible illustration methods and techniques. These methods are many and have a high frequency. Each of them is better used in special fields. Here are some of the most commonly used methods:
The hierarchical method is one of the general applications used in the data structure. The organized structure of an archive system can be shown in a hierarchical way. The structure of the classification system is hierarchical, and the taxonomy of all animals is also of the same type. Hierarchical structure not only has an effective role in proving its correctness, but it is considered a suitable method to present a complex structure in a simple form. (3). One of the applications of hierarchical structure is in showing the relationship between the components of a website. In this method, by showing the relationship between each point and another point, it is depicted through the hyperbolic diagram of the plan and the overall scheme of connections. In this method, while providing the external layer of communication between the components, in the subsequent stages, the supply of the next layers and the links after that are also discussed. These communication maps allow better recognition of access points to different parts of the site. Also, a user's usage path is drawn for proper and optimal use of the website. Another advantage of this method is that the main movement cores for searching are known by the user and the user can easily identify the key and strategic points in the search process on the website. Insocket software is one of the suitable programs for displaying such a structure in the web environment. This software uses the hyperbolic diagram method to properly draw the relationships between the site's components.
Spatial analogy is another effective method in illustration. This method is used to interpret and explain information. Some of the effective illustration systems are based on this method. In the methods based on spatial

analogy, semantic similarity along with shape similarity in a three-dimensional environment can lead to useful presentations. We can see the obvious manifestation of this method in an image search engine called Amur. Amor retrieves images based on the keywords specified by the user. Keywords related to an image are determined by various discovery methods through the website that contains the image. The user can also find images that are visually similar in shape and color to the specified image. In addition, it can retrieve images that have a semantic similarity with a certain image. Semantic similarity is determined by keywords related to an image. Amor often retrieves a large volume of related images in response to a requested image. Its connection with a specific image based on the query may be based on criteria such as shape, color, semantic similarity valuation, in addition to its connection with the retrieved images according to the user's specific keywords (3).

Galaxy illustration is one of the other methods that leads to the presentation of visual information by presenting a huge amount of data in a limited space. The specific application of this method in astronomy is clearly known. The data presented in this method is displayed in a concise and compact way. A significant amount of stars is shown well through this method of illustration, considering the topological conditions and the position of fixation in space. One of the special features of this method is its very high ability to reduce huge amounts of information, specifically, information related to celestial bodies, numerous stars and planets in a small environment, which has the ability to study deeply and widely.

In the limited view we have, the restoration of real 3D formation from very distant space scenes is very challenging. The key to renovating a spiral galaxy mass based on 3D or 2D images is to find a visualization method that provides the ability to reproduce and perform a visual representation of the galaxy. In this method, we can observe the dust inside a galaxy, and the complex interactions of light and dust in its place. Also, we can determine the effect of scattering and destruction of galaxy components. Therefore, we need to find a suitable visualization model that simulates these effects in a practical way (13).

Also, galaxy visualization is the basis for the general concept of evidence-clustering. This concept is actually a general review of a complete set of documents. They contain evidence, which shows up as a galaxy of star clusters in the night sky. These stars are known as Star-Sand in the galaxy illustration method. Like other visualization systems, it uses spatial analogies, such as documents displayed by stars that are close to each other in the galaxy. It should be noted that these documents are shown in connection with various phenomena that are separated by long distances. This analogy is based on the fact that documents within each cluster are related to each other, and documents between different clusters have less dependence (3).

Generative co-reference analysis is one of the information visualization methods that is mostly focused on one-dimensional documents. In this method, the link between cited works is analyzed in an analytical way from the generators, and multiple references appear based on the drawing of the map. Different concepts and issues raised, for example in a conference, are shown based on the amount of communication and references made, and the relevance of each citation is based on the name of the originator and the citation related to the show. This illustration method is widely used in connection with documents and writings. Its general scheme can also be displayed as a scatter diagram consisting of different branches. At the same time, each branch also has sub-branches, which are connected through connection points. This method in illustration has a suitable application for drawing the connection between the main points in using the information provided by other creators, and it has a good display power.

The illustration of the spiral diagram also explains the status of information by displaying the data presented in the format and structure of circular lines and with a special round axis rotation. This chart has a relatively wide application. In the display of data related to this type of illustration, in some cases, by determining the correlation between some information components, this relationship is transferred to the user in an effective way. Also, the density of data and information presented, based on the main axis of the discussion, is well displayed and explains the concept. In addition to that, in providing information based on the degree of

connection between multiple parts of a collection, this method tries to properly explain this connection and the connection of different parts with each other.

The wall perspective model is one of the other types of visualization, which is used in visual monitoring of structured data. In this method, by providing a wide range of homogeneous information, taking into account the spatial or thematic situation in the field under study, information is displayed in a spatial structure and using multiple options on a multi-dimensional wall. In this way, by choosing each of the options and angles available in the display wall, you can see a close view of it. In addition, with each selection on the desired section, you can enter a new page that provides information related to the user's needs. For example, in an organization, this method can be used to display information about its employees. In fact, by placing the names of the employees based on the type of skill, expertise, department and part in which they work, occupational order, gender or other factors are classified, and after selecting the name of the employee with access to more information about him, the retrieval process The information of the employees can be done, and their complete information will be displayed.

The method of dynamic analysis is a method that by explaining several images, photos, drawings, maps, etc., in a common environment, it is displayed in a unified and integrated way. Users can examine these images in their work process and determine common fields of information. In addition, it can be used well to analyze the visual data provided by conducting a research. In this method, multiple data in the course of a certain process are displayed in written image formats and side by side, and the progress or completion of an action can be presented well. This method is effective in providing a picture of meteorological conditions and atmospheric conditions. The display of different parts of the earth in different time intervals or places, depicts a general picture of the weather condition. Meteorological forecasts usually express the weather condition well with visual presentations like this method.

Network illustration shows the connection between network nodes and shows the connection between network components. The nodes in the network are in constant communication with each other, and expressing the relationship in a non-descriptive manner cannot reveal its meaning well. In the Internet environment, where the network consists of a large number of information units, it is difficult to plan the existing connections between servers and terminals and their components in written form. In such cases, the visual representation of the connection between the network components will be very useful. Designing internet traffic and introducing the connection between different parts through illustration helps us to get to know its concept better. Some communications on the Internet and network environment are difficult to express non-visually due to the image nature of the information, and it is hardly possible. In addition, the flow of information in a network environment can also be displayed visually. The exchange of information between the nodes of the network and its environment in this way, and by drawing connecting links, clearly shows the state of information movement in the virtual space.

It should also be noted that the use of illustration is popular in many thematic fields and many thematic branches use it in presenting their information; In such a way that illustration is very important in various sciences such as astronomy, architecture, medicine and geography. In the following, as an important and outstanding example, we mention the use of illustration in geography, which is considered one of the advanced fields with high applicability in the field of illustration.

Geographical illustration

One of the major applications of visualization is related to geographic data; In such a way that geographical illustration is considered one of the obvious and well-known manifestations in the field of illustration. It can be stated that geographic illustration is one of the first actions of specialists in this field to express information visually. This kind of information basically has a suitable ability to be converted into an image. One of the most important types of imaging in geography is a map. Maps show geographic data in the language of pictures by drawing a specific geographic location, which is usually created on a smaller scale than the actual size. The use of signs and symbols, colors, highlighting, straight and curved lines, as well as some special data, provides an illustrated information record called a map. Maps can show relationships between information components in the best way. Although the use of map

is not only in geography and it is used in other subject areas as well, but its manifestation is more obvious in geography. Relationships between geographical points from various aspects are shown in the best way by drawing a map. In the Internet environment, showing its traffic status through a map is one of the effective ways to know these connections.

The web constitutes the majority of Internet traffic. There is a growing interest in recognizing geographic disruptions in web access patterns, especially in the area of e-commerce and commercial internet service providers. Geographic visualization of web traffic has been done by a research group at the National Center for Advanced Computing Applications [United States] (14). Visualization of web traffic in a virtual space is presented based on the location of the earth. In this way, we can see a general overview of the traffic of the web environment in different parts of the world. This visualization of information in a visual way can provide us with the necessary information. One of the merits of this method is providing integrated and comprehensive information, which conveys the necessary information to the user in an objective and comprehensible way by drawing a related diagram. This activity is used to gain knowledge about the available facilities and the general situation of web traffic, for useful and practical planning. Crescents and bars are two common methods of visualizing data in space. Crescents are more generally used to represent point-to-point communication traffic, for example illustrating the topography of a simultaneous messaging backbone (15). This method specifies the simultaneous sending of data from one source to multiple receivers. Manzner's illustration method is associated with presenting the image of the earth, which is prepared with natural geographical features and using satellite photos. He has depicted the information related to the mentioned spine by drawing crescents and connections between the desired points.

Another application of geographic visualization is the geographic information system, which is widely used in various professional fields today.

The geographic information system has the ability to master, store, analyze and display related geographic information, which is actually [based on] known data based on location. A geographic information system is a technology that can be used for scientific research, resource management, and development planning. For example, this system allows crisis planners to easily perform calculations related to the reaction during natural events and incidents; or it can help to find wetlands that need protection from pollution (16).

Basically, this system is designed to create, store, analyze and manage spatial data and related specifications. In an explicit sense, it includes a computer system that has the ability to integrate, store, edit, analyze, share and display geographically related information; In a general sense, this system is a tool that allows the user to create interactive queries, analyze spatial information, and edit data (17). In this system, by providing accurate maps of the geographic data situation, various activities are managed in professional fields, such as: transportation, or meteorology. This information analyzes the geographical situation in a region by using advanced visualization techniques. It can be stated that the use of multiple visualization methods for geographic data provides the possibility of optimal use of them and makes them practical and useful.

Web-based illustration

The methods, techniques and methods of illustration, in general, have led to the creation of suitable conditions for the emergence of web-oriented illustration. Today, illustration in the web environment is widely used, and its use in the information sites available in the web environment is one of the effective uses of this technique. The way of using an information site is related to the way of designing and using the image facilities used in it. In information sites, the use of appropriate information visualization methods significantly affects the process of searching for information by the user. Failure to observe key and important points in the way of information visualization is also reflected in information retrieval, so that the user's desire to use the information site decreases. In addition to that, the user's understanding of the efficiency and how to use the user interface also faces the same problem. It is very important to use illustration facilities in the way of designing and viewing the site, using the signs and indicators on the search page, and especially the way the user is watching the site's search page. This category is highly dependent on the movement of pointers within the small space of the search page, and the relationship that the user establishes with the information site for

exploration. The use of existing technologies in the structure of illustration of information sites in the web environment leads to its optimal improvement. Some researchers have conducted studies in the field of information visualization in the web environment, and have tried to introduce some of their research findings as useful solutions in this field.

In his research, a researcher introduces Internet-based spatial-spatial information services as an important technological trend, which is guided by information technology innovations and spatial-spatial communications (18). He states that in order to reach this service, one of the main challenges is related to the effective capacity of using the spatial data set through the limited network bandwidth. He, who has been active in the field of geographic services network, introduces the main purpose of this network's activity, development by the laboratory of spatial-spatial information and communication technology at York University. The geographic service network is an advanced spatial-spatial information system based on the Internet, which has the ability to shape two-dimensional and three-dimensional spatial-spatial processing. This system also has the capacity to move all types of original spatial data under the title of vector. The focus of research is focused on the application of image flow technology. In addition, several advanced data management techniques have been considered to improve visualization, transmission and access to large image data sets. The research also covers the investigation of some problems related to the integration of new global users of the geographic service network, a technology for buying and selling high resolution images in the Internet environment.

A researcher, while examining common problems in the field of illustration, provides possible solutions to solve the problems of illustration of large information spaces (19). As a part of the answer to the illustration problems, he proposes the hypermedia database illustration model. The benefits obtained from the evidence show that, in an ecological way, well-designed virtual 3D environments can provide the cognitive power to process large information sets; and help guide and retrieve information to build a hypermedia database visualization system. He states that the design of user interface programs for the hypermedia database visualization system is the basis for the hypermedia database model.

In his research, a researcher deals with the sharing of real-time information among the project partners of this project, in increasing the power to influence the technology of web services and software(20). Such an approach provides a better clarity of information in this project, and brings the usefulness of the developed resources. In his study, he presents a primary model system that automates interaction in information changes, and advances it in a process of using computer-aided technology and web services. Web services technology, which depends on the creation and emergence of standards, can be used to build and integrate multiple applications. Visualization in this research includes two major activities: First, the methodology of integration of the service agent and web software, so that the virtual structure of the production chain can have a flexible and dynamic formation. The use of this system framework is the primary model that has been developed for the process of advancement and automation, as well as to facilitate the sharing of real-time information in its structure. The second part deals with the risk assessment method that is formed to describe the subjective and uncertain judgment of the use of selection theory [in relation to visualization]. These steps lead to the development and improvement of illustration conditions.

The main focus is on development research (21), along with testing and proving the aspects of using the latest potential technology based on web-based 3D graphics, which supports capacities that can improve effectiveness and convenience in web-based engineering education, and education have technology The characteristics and technical method used in this research has brought significant progress in the web-based environment for education in engineering and technology, as an introduction to the multimedia audio-visual format based on 3D technology. To show the effect on 3D multimedia technology, imaging of developed environments is considered. Also, achieving the complete goals of this research is presented in two environments. The first environment is focused on technical education, and the second environment, which is called three-dimensional dynamic system, has emphasized on engineering education. This research has provided

a basis for the development of visualization of theatrical environments, especially 3D dynamic systems. This system has developed an interactive web-based educational program, which has integrated various capacities of Internet technologies.

The studies that have been carried out on the subject of web-orbit illustration are more focused on technological aspects. This type of technical work in illustration is done with the proper use of special tools that have the ability to present a huge amount of information available on the web in a visual way. Spatial-spatial information technology based on the Internet is one of the effective facilities for creating a visual structure of information, especially in the part related to geographic data. Based on its special technology, these services transmit data with great power, considering the optimal capacity of using spatial data through high-speed communication channels. Designing 3D virtual environments, along with creating a suitable interactive space for users, increases their cognitive power; and it provides a wide range of information for use, and guidance towards the retrieval of information related to the user's needs. Visual methods of presenting information in this type of information technology are among the new techniques for information illustration. One of the significant and important issues raised in web-based illustration is the use of image flow technology. This technology is considered in connection with the information that is transmitted through the network in large dimensions. The importance of imaging in the web environment lies in creating a suitable platform for the integrity of image data transmission, as well as consistency in the ways users use imaging facilities in the network. As much as the degree of applicability of visualization in the web environment increases, the power of understanding information increases to the same extent. Among other effective factors in web-based visualization, we should mention the hypermedia database. In such a database, information is provided based on a combination of text, sound, image, photo, graphic, film, picture and other types of information formats for communication between different topics by the user, for optimal use of the available information. In this, the image format of information is of special importance. The collection of applied technologies and tools used in web-

circuit illustration leads to the creation of favorable conditions for the use of illustration abilities. Relying on existing technologies and based on important components in the design and presentation of useful visualization systems, as a useful strategy, some of the effective factors and components in the design of visualization on the sites available in the web environment can be introduced as follows:

- The limited and specific space of the user interface that is used in the search;
- The direction of the user's view on the page that is explored;
- Selection of markers and signs used in the user interface and their degree of flexibility;
- The movement of pictorial marks inside the exploration page and the status of their position change;
- The method of using 3D moving images inside the page and the connection of these elements with the structure of the presented information;
- User's visual interaction with the user interface from the aspect of recognizing and understanding the images on the main page of the search;
- Visual design of the link indicators on the main search page, with the same coordinates on the retrieved pages linked through the link that appears afterwards;
- The method of presenting information in terms of the use of graphic aspects, color, symmetry, balance of lines, geometric shapes, and their combination.
- Observing the location and topographical condition of the components on the search page in relation to the length and width, dimension, width, height and overall field of view of the search page;
- Suitability between the types of information provided, with the markers and illustration method done on the site;
- Type and specifications of guide symbols, user-friendliness, comprehensibility, and the ability to communicate properly to understand the subject to the audience.

Studying and examining the situation of the mentioned cases in total leads to explaining the situation of information sites, and then compiling a specific program to solve the problems caused by illustration in the optimal use of such sites. Adhering to the correct methods and

techniques of illustration in information sites can provide a suitable basis for upgrading and improving the conditions of using information.

Conclusion

Visualization of information is a dynamic and practical process that has a great effect in increasing the power of understanding and receiving information. This activity is used based on various presentation methods to increase the amount of learning and benefit from information. Also, a large amount of information is effectively displayed in a visual format. The provided definitions of information visualization show that there is no single consensus of this technique among experts. This has led to difficulty in explaining the meaning and limits of illustration. The main and important bases of study in the illustration process are user interface design, computer graphics, human-computer interaction, information analysis, cognitive theories, and artistic design. Nowadays, much attention is paid to the importance of this beneficial process in scientific activities, and efforts are made to use appropriate visualization methods in many researches. Currently, the methods of illustration are wide and varied. Some of the methods have specialized use in specific subject areas, and some of them are applicable in different subjects and scientific fields. The efforts made in connection with all these methods are to be able to provide optimal, appropriate and beneficial information to users. Illustration has proven its use in various fields. One of these fields, which has been very important and popular, is geographical illustration. This type of illustration with the ability to convert geographic information into visual formats has led to the expansion and development of geography knowledge. In addition, it has created a suitable background for monitoring activities based on geographic structure, such as: transportation, traffic monitoring, or meteorological studies. Web-based visualization, which is receiving a lot of attention today, is based on visualization technologies that are more widely used in the network environment. Spatial-spatial information technology based on the Internet is one of those categories that has the ability to convert huge amounts of information into a visual format. The design of 3D virtual environments, the use of image

streaming technology and the hypermedia database help web-circuit illustration. Illustration has been widely used in research and scientific activities, and it is predicted that in the future, there will be a movement towards illustration in the direction of science production. It should be stated that its influential use has been shown in most sciences and techniques, and the desire to use illustration techniques and methods in scientific and research activities will increase. The visual strategy of using information is one of the categories that deserves serious attention in the field of library and information studies.

Ethical consideration

Ethical issues (such as plagiarism, conscious satisfaction, misleading, making and or forging data, publishing or sending to two places, redundancy and etc.) have been fully considered by the writers.

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