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IDENTIFICATION OF THE MAIN PARAMETERS OF INFLUENCE ON THE CREATION OF QUALITY AR-TECHNOLOGY AND THEIR INTERACTIONS

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Research on Augmented Reality (AR) technology is important for several reasons related to its potential to transform various aspects of our lives and activities. As stated in the article, augmented reality is a new technology that helps add some interactive content to the real world which, in turn, helps to better understand the side and expand information about the subject we are contemplating. Augmented reality is implemented in various areas of our life, and the field of art and everything related to it does not stand aside. From the study of literary sources, one can see that this technology is quite young and still quite unexplored. The article presents the conducted research and survey of respondents regarding the parameters that influence the creation of high-quality augmented reality technology for works of art. A number of ways of using this technology in art and exhibition activities are given. The group of experts identified, at their discretion, the parameters that are important for the creation and selection of augmented reality technology. Such parameters as: content, technical requirements, software, location and tracking are classified as important parameters. Among the less important, but worthy of attention, the option of interactivity and metadata is highlighted. In addition to the influence of these parameters on the creation and selection of high-quality augmented reality technology, the article also considers the peculiarities of the influence of each parameter on each other. The specified features and requirements for these parameters and what one needs to pay attention to. The studies conducted confirm the hope that different parameters of influence can interact with each other, determining the technology, budget, artists and requirements that allow creating augmented reality for artistic works. In addition, the research of augmented reality technology is an important step in the development of innovations, the implementation of new technologies in various areas of society, including art. The implementation of this technology will provide an opportunity to obtain economic benefits, contribute to the social and cultural development of the population, as well as the expansion of scientific knowledge. These technologies can change our everyday life, especially during various quarantines and military operations.

Keywords: augmented reality, art, parameters, technologies, content, software, technical requirements, location, tracking.

Formulation of the problem. Today, more than ever before, we feel the strong influence of information, knowledge and technology on our lives. They allow us to

shop without leaving home; open deposits, transfer money, pay taxes; conduct business negotiations from anywhere in the world; always be in touch with family and friends; learn remotely; make virtual trips to the world's most famous museums; conduct experiments in virtual laboratories of well-known universities; ask questions and get answers from Cambridge and Harvard professors, etc. Technologies are deeply embedded in our everyday life, attract our attention and change our worldview [1].

In the conditions of rapid development of science, technology and technology, the sphere of our life is also undergoing significant changes. One of the keys to the hearts of generation Z, the children we teach and who were born in the era of digital transformation, is the use of modern devices and gadgets, including mobile phones, in the educational process [2]. We are faced with the task of getting the "digital generation" interested in learning various subjects and keeping their attention.

Analysis of recent research and publications. The latest research shows that the educational software market was worth $2.3 billion in 2018 and will double by 2025. This indicates the active implementation and use of software in all spheres of education. In kindergartens, schools and universities around the world, numerous technologies are used to provide interactive learning for children [3].

Such interactive tools include virtual and augmented reality technologies. First, let's consider what these technologies are and what is the difference between them. Technologies of augmented reality (Augmented Reality, AR [4]) allow you to project digital information (images, video, text, graphics) outside the screens of devices and combine virtual objects with the real environment. The Pokemon GO game, popular a few years ago, is a vivid example of AR technologies. Virtual reality (VR) with the help of a 360-degree image transports a person to an artificial world where the environment is completely changed. You can familiarize yourself with augmented reality using only a smartphone, but you will need a special helmet or glasses to immerse yourself in the virtual space.

These immersive learning methods can become a major tool in education and revolutionize the education of both schoolchildren and students. Teachers can use virtual and augmented reality for students to interact with various objects in three-dimensional space. For example, when studying the solar system, children can not only look at the illustrations in the textbook, but also really immerse themselves in outer space thanks to the virtual reality helmet. Imagine your child flying between planets, learning their secrets.

Virtual and augmented reality have a wide range of applications for organizing various events, such as demo programs, guest games, company presentations, job fairs, sports events, etc. AR technologies can provide participants with a unique experience, as well as the ability to interact with each other, despite the quarantine. AR-based job fairs (Pot Noodle Virtual Careers Fair) were developed by Aircards in collaboration with GradBay [5].

Recently, augmented reality has become a trend in the world of technology. Augmented reality (AR) is a technology that supplements the real world with digital objects using various gadgets. At this stage of development, it is still a raw technology,

without established standards, which complicates its mass implementation. Despite this, the contours of the market for this technology are already being formed [6].

The use of augmented reality has breathed new life into the activities of museums, increasing their audiences, and visitors have gained new experiences. For example, the National Museum of Natural History launched the "Skin and Bones" application, which allows you to see living images of extinct animals based on their skeletons. The American Museum of Natural History has created an app that brings exhibits to life.

In our research, we will focus on the use of augmented reality technology in contemporary art and determining the factors that influence the creation of quality technology.

The purpose of the article. The main goal of our research is focused on identifying influencing factors on the creation of high-quality AR technology for the art and exhibition spheres and determining their mutual influence.

Presentation of the main research material. Augmented reality technology is developing rapidly, and its application is finding more and more areas in the modern world, creating new opportunities for interaction with information and the environment. The use of augmented reality (AR) in art opens up new possibilities for artists, viewers and museum curators, allowing the creation of interactive, immersive and multifaceted experiences. Museums and galleries can use AR applications as virtual guides that provide additional information about exhibits by showing 3D models, animations or videos when the user points their device's camera at the artwork. Art exhibitions can include interactive elements such as animations or audio-visual effects that are activated using AR. This allows viewers to interact with the artwork on a new level. AR applications can enable virtual tours of museums and galleries, allowing visitors to explore collections from anywhere in the world. These technologies provide an opportunity to see paintings or sculptures in their original context or to learn more about the techniques used to create the work through interactive AR elements. Static works of art, such as paintings or drawings, can come alive with AR. For example, characters in a painting can move or interact with each other, adding a new dimension to the art. Artists can create installations that respond to the viewer's actions, changing their appearance or behavior depending on how the user interacts with them through the AR application.

Factors influencing the process of creating augmented reality for artistic works can interact with each other, affecting different aspects of the project. For example, the choice of technology can affect the constraints that are available to artists, thereby limiting their creative possibilities. On the other hand, technology can also help make a project more accessible by allowing different artists to work on a project from anywhere in the world.

In addition, the project budget can influence the choice of technology and artists involved in the project. If the budget is limited, this can lead to using less complex techniques and using less expensive artists.

Also influencing factors may be the requirements of the project customer or content consumers, who may require specific functions or sensations from the project.

Therefore, various influencing factors can interact with each other to determine the technology, budget, artists and requirements that enable the creation of augmented reality for artworks.

Creating augmented reality (AR) for the reproduction of works of art is a complex process that requires taking into account various parameters and following a certain sequence. The importance of parameters in the creation of augmented reality (AR) technology for the reproduction of works of art may depend on the specific goals of the project and the context of its use. However, some parameters can be considered more critical for successful implementation. To determine the influencing factors and their importance, a survey was conducted among experts and the following factors-parameters were singled out: content; technical requirements; Software; location and tracking. Among the less important parameters for the creation of high-quality AR technology were the following parameters: interactivity and metadata. Let's consider what kind of parameters.

One of the important parameters of creating high-quality AR technology is content. The content of augmented reality is digital copies of works of art. This parameter was identified as the most critical, since the quality of digital models or scans directly affects the user experience. High-quality 3D models and accurate replicas of works of art are the basis for a successful AR application. This is because if the content is of poor quality or inaccurate, even the best technology will not be able to compensate.

The technical requirements parameter, namely computing power and sensors, was singled out as the next most important parameter. This parameter has been given high importance because insufficient processing power or poor quality sensors can lead to poor performance, lag and problems with AR playback. Because technological limitations can seriously affect the user experience, making the interaction unsatisfactory.

An important parameter for creating high-quality AR technology is the selected software. Its importance is determined by the fact that the right choice of platform determines the capabilities of the application, such as stability, support for different devices and integration with other systems. Accordingly, the wrong choice of platform can limit the functionality of the application and complicate the process of its development and maintenance.

The next parameter highlighted by experts is location and tracking. This parameter is important because the accuracy of tracking the position of the user and objects in space is key for natural and realistic interaction. Inaccurate tracking can cause a disconnect between the real and virtual worlds, reducing the effectiveness of AR.

As the survey showed, interactivity and metadata (information about works of art) are secondary, but by no means important.

Interactivity refers to the interaction between the user interface and gestures. This parameter is important especially for applications that involve active interaction of the user with the content. Due to the fact that the convenient interface improves the overall user experience, making the interaction intuitive and pleasant.

The metadata parameter is less critical, but still important to ensure completeness of information and added value to the user. Metadata enriches the user experience by providing context and additional knowledge about the artwork.

The main important parameters of augmented reality (AR) technology, such as content, technical requirements, software and location and tracking, interact with each other to create a single system that provides a quality user experience.

An equally important question that needs to be decided and investigated when choosing a quality technology for creating augmented reality is the interaction between the selected parameters and how one parameter affects another parameter.

Technical requirements, namely computing power and sensors, depend on the content, namely: more complex and detailed content requires higher specifications of devices to provide a smooth user experience, and compression and optimization technologies can help reduce computing power and memory requirements .

In turn, the technical requirements depend on the software. The software must make efficient use of available computing resources, ensuring a balance between rendering quality and performance. In turn, optimization of tracking and rendering algorithms can significantly improve performance on devices with limited resources.

If we consider the dependence of technical requirements on location and tracking, the following should be noted: the accuracy of tracking depends on the quality of the device's sensors and cameras, high-quality sensors provide better interaction with AR content; SLAM (Simultaneous Localization and Mapping) systems require significant computing resources for accurate real-time tracking.

Regarding the dependency of software on content, it was noted that software should support a variety of formats and standards for handling high-quality content, and platforms should provide tools to easily import, customize and animate digital models.

As for the dependence of the software on technical conditions, the following can be said: the efficiency of the software depends on optimization for the specific hardware characteristics of the devices, and the frameworks must provide the ability to work on different devices, taking into account their computing power.

We can also say about the dependence of the software on location and tracking. As research has shown, software must integrate tracking technologies to accurately place and stabilize AR content. Also, the tracking algorithms built into the software must be efficient and reliable to ensure a stable user experience.

Location and tracking, namely position tracking, also depends on the selected parameters. So, if we look at the dependency on the content, we can note that the content must be correctly positioned and stabilized in the real world, which requires accurate tracking, and the animations and interactions must be synchronized with the user's movements, which depends on the quality of the tracking.

Regarding the dependence of location and tracking on technical conditions, we can note that high tracking accuracy requires high-quality sensors and cameras, as well as significant computing resources for real-time data processing. It should also be noted that SLAM and other tracking technologies can be resource intensive, which in turn affects device performance.

It should also be noted that the location and tracking depend on the software. As research has shown, the software should provide reliable and accurate tracking, using image and sensor data processing algorithms, respectively. Also, tracking integration with content and user interface should be seamless to ensure seamless access.

Conclusions.

The use of augmented reality in art allows not only to expand the boundaries of traditional art, but also to create new forms of expression and interaction with the audience. It gives artists tools to experiment, museums and galleries ways to attract new visitors, and viewers a richer and more immersive art experience.

As our research has shown, the main important parameters of augmented reality technology interact with each other in such a way that each parameter affects the other. High quality content requires appropriate technical resources and optimized software, while tracking accuracy depends on the quality of sensors and the efficiency of data processing. To create a successful AR application, it is necessary to ensure the harmonious interaction of all these parameters, achieving a balance between content quality, performance and ease of use.

To create a successful AR application, it is necessary to provide high-quality content, take into account technical requirements, choose the appropriate software and tracking technologies, create an intuitive interface, conduct thorough testing and optimization, ensure effective marketing and support, as well as comply with legal and ethical standards. A successful AR application creates an immersive, interactive and useful experience for users, which contributes to its popularity and success in the market. Therefore, different parameters of impact can interact with each other to determine the technology, budget, artists and requirements that allow creating augmented reality for artworks.

In conclusion, one can say that the research of augmented reality technology is an important step for ensuring innovative development, improving user experience, introducing new technologies in various fields, obtaining economic benefits, promoting social and cultural development, as well as expanding scientific knowledge. This allows one to maximize the potential of AR and create solutions that can change our daily lives.

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ВИОКРЕМЛЕННЯ ОСНОВНИХ ПАРАМЕТРІВ ВПЛИВУ НА СТВОРЕННЯ ЯКІСНОЇ AR-ТЕХНОЛОГІЇ ТА ЇХ ВЗАЄМОВПЛИВ

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Дослідження технології доповненої реальності (AR) має важливе значення з кількох причин, пов'язаних з її потенціалом трансформувати різні аспекти нашого життя та діяльності. Як зазначено в статті, доповнена реальність є новою технологією, яка допомагаю додати до реального світу певний інтерактивний контент. Що в свою чергу, допомагає краще зрозуміти побічне та розширити інформацію про предмет який споглядаємо. Доповнена реальність реалізується в різних галузях нашого життя, осторонь не стоїть і галузь мистецтва і все що з нею пов'язане. З дослідження літературних джерел, бачимо, що дана технологія є досить молодою і є ще досить не вивченою. В статті наведено проведене дослідження та опитування респондентів, щодо параметрів, які впливають на створення якісної технології доповненої реальності для мистецьких творів. Наводиться ряд способів використання даної технології в мистецтві та виставковій діяльності. Групою експертів виокремлено, на їх розсуд, параметри, які є вагомим для створення та вибору технології доповненої реальності. До вагомих параметрів було віднесено такі параметри як: контент, технічні вимоги,

програмне забезпечення, локація та трекінг. До мени важливих, але вартих уваги, було виділено параметр інтерактивність та метадані. Окрім впливу даних параметрів на створення та вибір якісної технології доповненої реальності, в статті розглянуто і особливості впливу кожного параметру один на одного. Зазначені особливості та вимоги до даних параметрів та на що потрібно звертати увагу. Проведені дослідження підтвердили сподівання, що різні параметри впливу можуть взаємодіяти між собою, визначаючи технологію, бюджет, художників та вимоги, які дозволяють створювати доповнену реальність для художніх творів. А дослідження технології доповненої реальності є важливим кроком у розвитку інновацій, впровадженні нових технологій в різні галузі суспільства, в тому числі й в мистецтві. Впровадження даної технології дасть можливість отримати економічні вигоди, сприятиме соціальному та культурному розвитку населення, а також розширення наукових знань. Дані технології можуть змінити наше повсякдення життя, особливо в час різних карантинів та ведення військових дій.

Ключові слова: *доповнена реальність, мистецтво, параметри, технології, контент, програмне забезпечення, технічні вимоги, локація, трекінг.*