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Evaluating RADiCAL Motion Capture AI: A study on Pre-Visualization Workflows

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Abstract

The study Artificial Intelligence (AI) is the most developed computer technology that provides facilities that work easily with computer software and hardware. AI technology is used in major sectors to make their work easy and smart. AI technology is used in video production and film making for various applications. In filmmaking pre-visualization is the most important part were the movie is visualized based on the script. Storyboard creation is the most common part of visualization but the development of technology has made the directors spend on Three Dimension (3D) animation graphics to visualize the scene. The script will be converted to storyboard and then to pre-visualization video using a 3D animation software. The 3D visuals are created using software's like Maya, Auto Desk 3Ds Max, and Blender. The conversion script into a previsualized 3D form consumes more time and budget. RADiCAL Motion Capture AI is the website developed by Gavan Gravesen that has many features to create pre-visualization visuals. This website provides features like creating motion capture videos without multiple cameras and creating pre-visualization videos using preset assets and elements. These Pre-visualization elements will be useful to everyone in making their 3D previsualization videos easy with a low budget. In this research the evaluation of RADiCAL Motion Capture AI website will be analyzed to know about creating a pre-visualization 3D Visual and how this technology will be helpful in filmmaking. Qualitative research methods will be used for analysing the RADiCAL motion website and process of making pre-visualizations. The process of creating a pre-visualization video using RADiCAL motion AI will be discussed with existing literature and studies related to previsualization.

Keywords: Visualization, Artificial Intelligence, Animation, 3D visuals

Introduction

The development of advanced technologies in the field of film making enhances the process of pre-production work easily. There are various software's and websites that are useful in the filmmaking process. The process of previsualization is most important as it helps to create the storyboard and make a clear idea about the production process. The early process of making pre-visualization was creating the hand drawn visuals. This process was time consuming and does not provide much detail about the scene or shot. The website RADiCAL Motion AI is useful to create pre-visualization videos. The website provides easy access to the users to create videos of their own choice with the preset. This website can be used by the film directors to create the pre-visuals where they will get a video which will give the outcome of the movie. The generated video will be helpful in creating the budget and preparing the set and art works. The production process can be planned based on the output video and ideas generated through it. According to Dui et.al., (2019) the results of the research study appear to support our theories that distant collaboration in previsualization can be effectively accomplished using VR technologies. The collaborative setting was deemed more practical in a real-world pre-production scenario by the participants in our trial. As justifications for the tool's utility, the participants cited the application of various abilities and the connection to a well-known real-life situation where collaboration is a common aspect of filmmaking.

REVIEW OF LITERATURE

The pre-visualization process is the main requirement of filmmaking which will help in planning the production and script breakdown. According to Quentin et.al., (2019) The professional market will see an increase in VR's prominence as the technology becomes more mature. By offering a platform that facilitates content creation for the various stages of film pre-production, this article introduces the use of virtual reality (VR) for film storyboarding, pre-visualization, and technical preparation for the first time. Delineating the design space for VR storyboard tools, conceptualizing the system iteratively, and evaluating it are the paper's primary contributions. Expert interviews have demonstrated the need to provide basic tools that allow creatives to maintain control over the storyboarding process. Therefore, we have developed a system to trade off control and expressiveness. For instance, the editing process is streamlined at the price of fine control in order to facilitate rapid prototyping. According to Tenmoku et.al., (2006) Our belief that such a novel application can open up new possibilities for AR/MR technology is the primary motivation behind our early project concept presentation. Although it's a really appealing career, filmmaking is very tough. Thus, as this project moves forward, a number of difficult issues could arise.

Lemon (2012) in his research states that Previs allows me to generate work swiftly and intuitively while saving time and money. I can then take notes, make changes, analyze as I go, and make fresh passes that are all better than the last one while talking myself through it. Every choice has justifications that I can observe, test, and attempt, and I become more informed and articulate about my own work with every iteration. I find things that I was previously unaware existed. The fact that Previs is infinitely customizable is another advantage. Although a person will employ previs techniques differently than a huge studio, they will still find it to be a helpful tool in their own unique way. According to Arda et.al.,(2019) findings, the technology suggested in this study is helpful for previs in real life, where filmmakers may discuss, edit, and verify various camera techniques and character movements. Due to the participants' prior knowledge of pre-

production and filmmaking, the results regarding the usefulness of VR technologies for previsualization of the proposed tool were positive. One of the most significant aspects mentioned was the ability to test and discuss various aspects of takes and scenes.

Trimbee (2021) the precision of the previz in traditional fixtures would be improved by several aspects. For example, Gobos, Beam Focus, and Shutter Cuts. Although achieving these now isn't entirely unattainable, it requires more effort than one might think. Generally speaking, any focus remarks or actions that one might do during a show focus would be more user-friendly for designers if there was a focus menu that would enable the user to adjust the light's appearance. According to Chen et,al., (2024) In order to improve control over camera dynamics, CinePreGen Presents, a revolutionary method of visual previsualization that makes use of engine-powered diffusion. Participants from the fields of animation, game design, and filmmaking participated in the user study, which showed how easy it is to use and how well it works to enhance the previsualization process. The ability of CinePreGen to offer expert camera control with history-keeping features and accomplish coherent rendering informed by ground truth data was emphasized in both quantitative and qualitative evaluations. We think that by combining engine capabilities with generative AI models, our solution may help industry experts and individual producers alike improve creativity and expedite operations. Sergi et.al.,(2014) in their research stated that We developed a brand-new technique for modeling the projection of a stereoscopic film in a virtual previz setting. Our approach solves a number of the drawbacks of the current pre-production tools for stereoscopic filmmaking when combined with real-time interaction approaches. Above all, it enables the visual representation of the 3D deformations created in a real-time 3D projection. Dynamic stereoscopic previz can be used to create storyboards enhanced with virtual projection room snapshots and to rapidly preview intricate stereoscopic 3-D views.

Sei et.al., (2008) the paper presents a new real-time pre-visualization technique for videographers in this research. The technique works well in outdoor settings with natural elements like rocks and trees. Geometric registration with a pre-built point-based 3-D model and feature point matching between the models and observed ones is the essential method to meet the aforementioned need. The suggested technique was implemented as a pre-visualization prototype that can show virtual objects superimposed on a live video at a speed comparable to that of a portable camera. The virtual actors' projected images allowed us to verify our camera work. Bodini, (2023) Using pre-existing assets in one's own previs can save time. When making assets, producers can save time by using free resources like Mixamo and the Epic Games Marketplace, which allows them to concentrate more on the narrative. This pipeline provides the quickest method for creating a previs that requires the least amount of importing and exporting across different tools, in my opinion. The abundance of motion capture animation and models made available in this expanding artistic civilization does not, however, result in a decline in video quality. Muender et.al., (2018) VR has the potential to be a productive tool in previs, allowing creative staff to present their ideas more expressively in 3D instead of through text, explanations, or drawings. Due to its simple and intuitive use, virtual reality (VR) previs appears to be advantageous for creative staff with limited technological expertise.

Objectives of research

1. To analyse the RADiCAL motion capture AI website.

2. To analyse the various tools available to create a pre-visualization.
3. To Evaluate the RADiCAL motion capture by conducting two experiments.

Research Methodology:
The research was conducted using a qualitative research method. The Racial Motion AI website was analysed and various tools and assets in the websites were explained. The website was evaluated with two experiments to know about the process of creating the pre-visualization.

About RADiCAL Motion AI:

The website serves as a 3D production platform with the goal of making real-time animation tasks like motion capture, animation, and scene design easier. The website has two products that are designed to work together smoothly to support 3D scene design and motion capture. The first is **RADiCAL Motion**, which uses an integrated AI-powered, markerless, real-time, multiplayer motion capture system to assist with motion capture without the need for any complex suits or motion capture equipment. It provides accessible motion capture that may be used to test our designed characters. The second is **RADiCAL Canvas**, a web application that lets you collaborate on 3D design and prototypes in real time. Its main benefits include giving you a solution for your previsualization work with RADiCAL Canvas. It is useful for creating pre-visualisation animation videos and also helps in the pre-production process in filmmaking, which can help in planning the budget, location, and properties required for the location during the production process. It allows you to access it from any location without having to copy your work file because it runs entirely online via a website with cloud support. Therefore, you don't have to be concerned about using a high-end machine that supports your 3D content. Its ability to integrate with numerous applications like Unreal, Maya, Blender, and Unity is another important feature that allows it to be customized to meet the needs of the customer.

Tools and Assets in RADiCAL Motion AI:

RADiCAL Motion:
Motion capture has always been an expensive technology that can only be accessed by content creators with big budgets and access to the technology. With RADiCAL Motion, this hindrance can be overcomed as it provides AI-powered technology where you can just record a video using the camera connected to any device or upload a pre-recorded video without using any kind of mocap suits.

Create Motion:
To start creating 3D Motion is a very simple process: just record a video using the laptop or a webcam or upload a prerecorded video. Once the above step is done, you can see your motion converted to 3D motion and applied to a character already available in the website source, as seen in Figure. 1. It shows whether the motion is calibrated or not; if not, then you need to do a T-calibration at the beginning of the video for precise motion capture. It not only captures the motion but, to a certain level, also captures the facial expressions and lip movements, which can be assigned to the characters available that support facial expressions.

Figure - 1

Characters:

Another major aspect is characters; you have many choices of characters, both male and female, even fictional characters, which can be used according to the need of the user for pre-vis. The characters can further take up the motion that we had already uploaded and assigned to the default character as shown in Figure. 2. The process is very seamless and can be done by anyone with limited knowledge of handling systems and the internet.

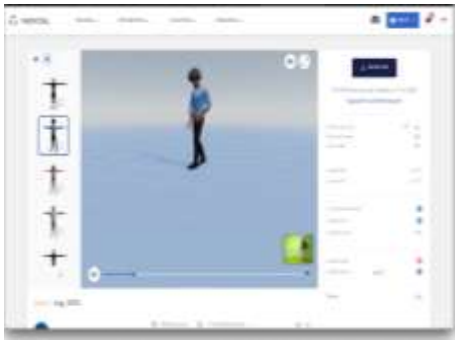


Figure - 2

Environment:

The environment can also be set, as there are few available backgrounds in which you can create your base background, which will give an idea about the environment your characters are going to be placed in according to the lighting conditions as shown in Figure. 3.

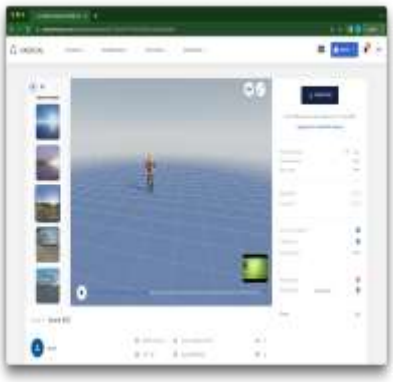


Figure - 3

We can see that RADiCAL Motion can capture motion and convert it to 3D motion, which can be further assigned to pre-created characters also without the hassle of going to a studio or hiring a professional camera setup to capture motion. Everything can be done using a laptop and internet facility. Another major advantage is it can be exported to .FBX format, which most of the 3D animation software accepts.

RADiCAL Canvas:

Creating a 3D visual has always needed a lot of time and effort, which could not be so favorable for previs due to time constraints. RADiCAL Canvas breaks that barrier as it helps in creating 3D visuals effortlessly with its ease to create a 3D visualization and scene design, offering accessibility to customize environments, manage and add assets, animate characters, and much more with the ease of drag and drop.

Outliner:

With open accessibility to all features, the outliner tool makes customization very simple. All the assets, characters, and everything in the environment are neatly streamlined in layer style format, which makes it easy to customize without any hassle of disturbing any nearby assets that we have placed as shown in Figure 4.

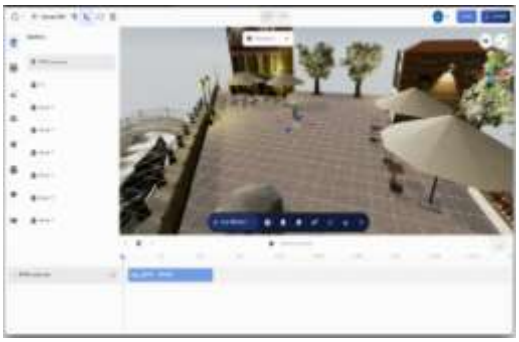


Figure - 4

Properties:

The tool is very simple, which allows us to change the basic properties of the asset or characters that we want to modify. Properties like position allow you to change the position of the selected asset or character, scale allows you to change the scale of the asset or character according to the scene setup, and finally the rotation properties allow you to rotate the assets and characters according to the requirement as shown in Figure. 5.

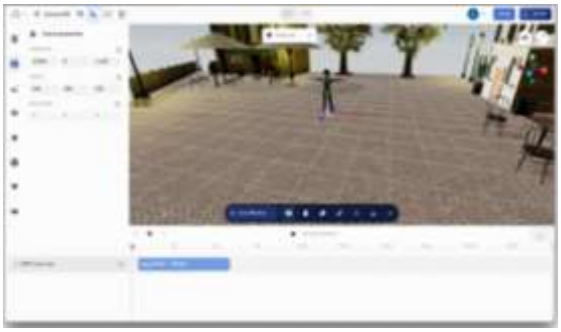


Figure - 5

Environment:

The tool is an important tool, as this creates the actual lightning atmosphere for the scene that we have created. It has options like images, where you can change the background through the various available backgrounds with atmospheric ambient lighting setups; the sky option can be used to have only the sky as your background and its ambient lighting properties that can be changed by selecting the available sky backgrounds. The blank option is very simple, as it only gives you a blank background. The exposure tool increases and decreases the intensity of the light in the scene, and the rotation option changes the direction of the light according to the requirement. Figure 6.

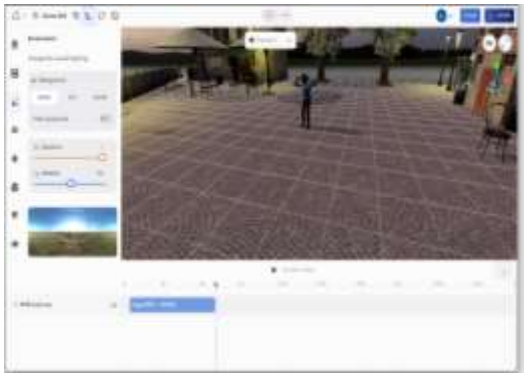
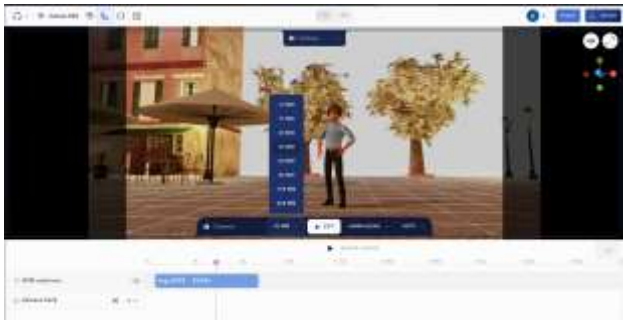


Figure - 6

Camera:

Camera tool has options where you can use various focal length cameras that can be applied to your scene. That variable focal length that is available in the application ranges from ultra wide to telephoto. You can not only fix one camera but can even set a multiple camera setup to your designed scene. Figure-7, Figure-8.



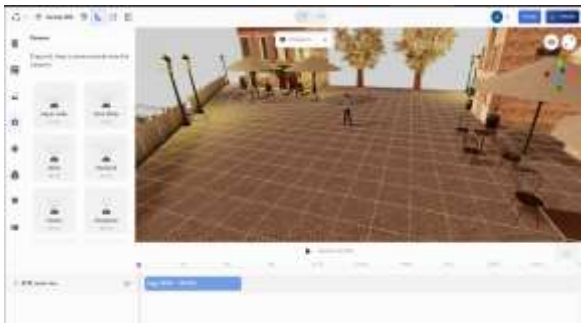


Figure - 7.
Figure - 8.

Lights:

Light tool, as the name suggests, deals with lights in the scene. It has two simple options: lightbulb and spotlight, which can be used for lighting the scene or asset or using the bulb as an element inside the asset, which can be like a lamp. Figure - 9.

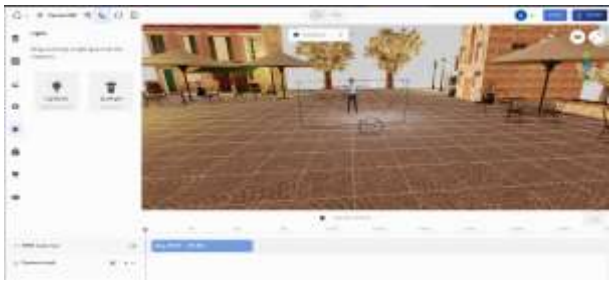


Figure - 9

Assets:

The Assets tool is the major tool that helps you in designing your scene. It has n number of assets ranging from your plane surface, trees, chairs, tables, buildings,

properties, etc., that you can use to design your scene. Another major advantage of the tool is the integrated Sketchfab search box, which allows you to search and download free assets. The upload option allows you to upload .jlb, .fbx, and .obj files that can also be integrated into the application. Figure - 10.

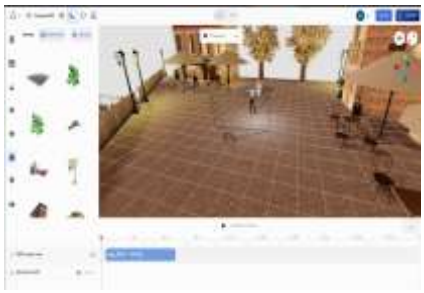


Figure - 10.

Characters:

The character tool has few characters, both male and female, which can be used in the scene design as per the requirements, or we can even upload a .gib file of the character that we have created in any 3D modelling application. Figure 11.

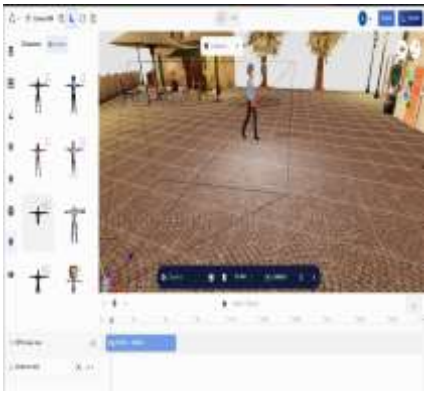


Figure - 11.

Motion Capture AI:

Experiment 1:

The Pre-Visualization process was experimented with two different users. User 1 was considered as experiment 1. Creating a pre-visualization set for a scene was tested by user 1. The usage of various assets and properties were the core of this experiment. The user1 selected the basketball ground as the scene area where two characters meet each other and discuss the scene. The playground canvas is readily available in the website which was used for creating the previs.

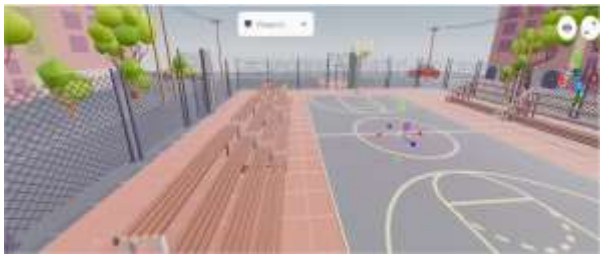


Figure - 12.

The scene was created with a long shot showing two characters. Wide angle lens camera is used in the frame for long shots. The properties in the scene which were preexisting were used. There are other property elements such as chairs, table and environment properties are also available for making the scene as expected in the printed or sketched story board. The scene was equipped with a camera showing the wide angle and the two characters who are facing each other. The same canvas can be used further for keeping long shots and over the shoulder shots. The Figure - 12. Represents the basketball ground and the two characters as per the visualization of user 1.

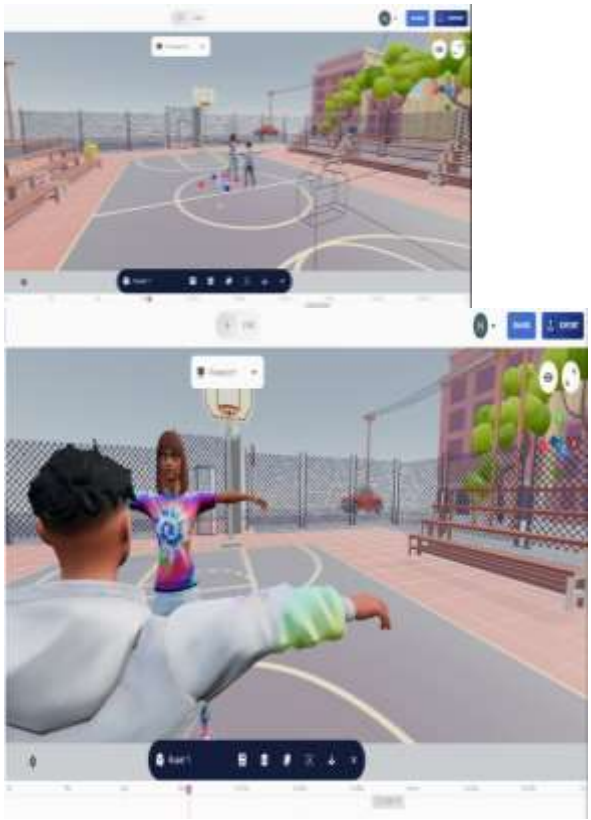


Figure - 13.
Figure - 14.

Experiment 2:
The user2 created a previs using marker less motion capture feature available in RADiCAL Motion AI. A video was recorded in green screen studio and that was uploaded on the website. The website provides the feature of applying that motion to the preexisting character available in the website. The Experiment 2 was tested with motion capture video and the canvas available on the website. Figure 13 & 14 represent the canvas containing scenes with animations and lighting. The motion captured character was merged with the scene. This feature helps the user 2 to create the expected previs easily and plan accordingly for the actual production process. The canvas also provides facility to edit the lighting and other properties of animation by adjusting the timeline. The User can also add additional properties that are available in the presets. Thus it was a great experience for the user 2 to create such a motion capture previs video easily using a website.

Conclusion:
Previsualization is the most required pre-production work which is often seen in television, film making, animation and game designing. The previsualization makes the final decision of the production process which involves budget, location and properties to be used in the shot. The previsualization video helps the director and the team to plan about the shot and camera angle which can be done in real. The animated previsualied video will be helpful to decide how the shot can be developed. The previsualized animation also paved the way for the use of animation, green screen production, motion capture and stop motion scenes in the movie. The RADiCAL motion AI provides all features for creating a pre visualization which will fulfill the imagination of the director. It is cost effective and time saving for the directors to decide and plan about the production process. The main feature of collaborating and working remotely will be helpful to the creator to share their ideas among each other. There are many different softwares available for creating previs but RADiCAL Ai is the website which works without any installation and provides the features of a 3D software. Thus previsualization has become easy with RADiCAL motion and AI support for motion capture. The website will be useful for both small and large budget films. The video visualization will be more useful to understand how the shot will look and make more aesthetic film production.

References

1. Ardal, D., Alexandersson, S., Lempert, M., & Abelho Pereira, A. T. (2019, December). A collaborative previsualization tool for filmmaking in virtual reality. In Proceedings of the 16th ACM SIGGRAPH European Conference on Visual Media Production (pp. 1-10).
2. Bodini, A. (2023). Filmmaking of the future: A co-design-led investigation

into the potential of immersive technologies to enhance the small and medium audiovisual production processes (Doctoral dissertation, Brunel University London).
3. Chen, Y., Rao, A., Jiang, X., Xiao, S., Ma, R., Wang, Z., ... & Dai, B. (2024). CinePreGen: Camera Controllable Video Previsualization via Engine-powered Diffusion. arXiv preprint arXiv:2408.17424.
4. Lemon, N. E. (2012). Previsualization in Computer Animated Filmmaking (Master's thesis, The Ohio State University).
5. Muender, T., Fröhlich, T., & Malaka, R. (2018, April). Empowering creative people: Virtual reality for previsualization. In Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems (pp. 1-6).
6. Quentin, Galvane., I-Sheng, Lin., Fernando, Arqelaquet., Tsai-Yen, Li., Marc, Christie. (2019). VR as a Content Creation Tool for Movie Previsualisation. 303-311. doi: 10.1109/VR.2019.8798181
7. Sei, Ikeda., Takafumi, Taketomi., Bunyo, Okumura., Tomokazu, Sato., Masayuki, Kanbara., Naokazu, Yokoya., Kunihiro, Chihara. (2008). 21. Real-time outdoor pre-visualization method for videographers —real-time geometric registration using point-based model—. doi: 10.1109/ICME.2008.4607593
8. Sergi, Pujades., Laurent, Boiron., Rémi, Ronfard., Frédéric, Devernay. (2014). 6. Dynamic stereoscopic previz. doi: 10.1109/IC3D.2014.7032600
9. Tenmoku, R., Ichikari, R., Shibata, F., Kimura, A., & Tamura, H. (2006). Design and prototype implementation of MR pre-visualization workflow. In DVD-ROM Proc. Int. Workshop on Mixed Reality Technology for Filmmaking (pp. 1-7).
10. Trimbee, E. THEAT [AR]: Augmented Reality Based Pre-visualization Of Theatrical Design Elements (Doctoral dissertation, Toronto Metropolitan University). (2021)