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Estimating Digital Clay Texture of Mesopotamian Models From 2D Images Using Deep Learning to Render Full- Immersive Virtual Reality (VR)

Ali Salim Rasheed [1*]

[1] *Department of Media Technology and Communications Engineering, College of Engineering, University of Information Technology and Communications, Baghdad, Iraq.*

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Correspondence:
Name: Ali Salim Rasheed

Email: ali.rasheed@uoitc.edu.iq

ABSTRACT

Archaeologists have introduced AI-powered digital tools to assist in the geological surveying of artifacts and identifying their compositional textures, whether clay or rocks, as realistic examples of their ancient settlements. Modern digital applications of virtual and augmented reality are concerned with displaying archaeological models and giving the audience a full immersion that simulates the basic materials from which they were built or carved, and diagnosing the rock or clay components of the earth that were used in their manufacture. Deep convolutional neural network algorithms have played an important role in expanding the capabilities of virtual panoramas by making them more realistic and immersive. In this paper, we produce a Mesopotamian deep Panoramic–Virtual Reality (DMP-VR) model for reconstructing a completely immersive, digital clay texture of archaeological models' information-rich and low-noise super-resolution panoramic scene of the Mesopotamian civilization in 360◦ from low-resolution 2D images of Assyrian and Babylonian models gathered from online search engines. Alignment sensor software compensates for tilt issues during acquisition, and images are first rotated using a geometric transformation depending on the data center image stitching, involving cutting training images to random $f_{sub}\times f_{sub}$-pixel sub-images and stitching the ends of features to minimize errors. The quantitative and visual comparison of our method (DMP-VR) with other methods achieved ideal results in terms of reconstructing a super-resolution, fully immersive 360-degree panoramic scene. The artifacts have a digital clay texture that is identical to their original reality.

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تخمين نسيج الطين الرقمي لنماذج بلاد مابين النهرين من الصور ثنائية الأبعاد باستخدام التعلم العميق لتقديم واقع افتراضي كامل الانغماس

علي سالم رشيد [1*]

[1] قسم تكنولوجيا الإعلام وهندسة الاتصالات، كلية الهندسة، جامعة تكنولوجيا المعلومات والاتصالات، بغداد، العراق.

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المراسلة:
الاسم: علي سالم رشيد
Email: ali.rasheed@uoitc.edu.iq

الملخص

لقد قدم علماء الآثار أدوات رقمية تعمل بالذكاء الاصطناعي للمساعدة في المسح الجيولوجي للقطع الأثرية وتحديد نسيجها التكويني سواء من الطين أو الصخور كأمثلة واقعية لمستوطناتهم القديمة. إن التطبيقات الرقمية الحديثة للواقع الافتراضي والمعزز التي تهتم بعرض النماذج الأثرية وإعطاء الجمهور انغماسًا كاملاً يحاكي المواد الاساسية التي بنيت او نقشت منها، وتشخيص المكونات الصخرية أو الطينية للأرض التي استخدمت في صناعتها. لقد لعبت خوارزميات الشبكات العصبية التلافيفية العميقة فائقة الدقة دورًا مهمًا في توسيع إمكانات المشاهد البانورامية الافتراضية من خلال جعلها أكثر واقعية وغامرة. في هذه الورقة، ننتج نموذجًا بانوراميًا عميقًا لبلاد ما بين النهرين – الواقع الافتراضي (DMP-VR) لإعادة بناء نسيج طيني رقمي غامر تمامًا للنماذج الأثرية الغنية بالمعلومات ومنخفضة الضوضاء مشهد بانورامي فائق الدقة لحضارة بلاد ما بين النهرين في 360 درجة من صور ثنائية الأبعاد منخفضة الدقة لنماذج آشورية وبابلية تم جمعها من محركات البحث عبر الإنترنت. يعوض برنامج مستشعر المحاذاة عن مشكلات الميل أثناء الاستحواذ، ويتم تدوير الصور أولاً باستخدام تحويل هندسي حسب مركز البيانات. تتضمن عملية خياطة الصور قص صور التدريب إلى صور فرعية عشوائية $f_{sub} \times f_{sub}$-pixel وخياطة نهايات الميزات لتقليل الأخطاء. حققت المقارنة الكمية والبصرية لطريقتنا (DMP-VR) مقارنة بالطرق الأخرى نتائج مثالية من حيث إعادة بناء مشهد بانورامي فائق الدقة، كامل الانغماس بزاوية 360 درجة تتمتع القطع الفنية الاثرية بنسيج طيني رقمي طبق الاصل لواقعها الاصلي.

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Introduction

Culture reflects the people's reality, a critical method for strengthening community cohesion and preserving diversity, a valuable source of knowledge, a sustainable material for artists, writers, and historians, and it is a link between what our forefathers created and what our grandchildren will present (Aririguzoh, 2022; Abe, 2020; Rasheed *et al.*,2024). Mesopotamia (Iraq) is the home of the oldest civilizations known to humanity throughout history (Allen and Heldring, 2022). On its land, the most famous empires arose, such as the Babylonian, Sumerian, and Assyrian, which provided much knowledge to humanity and inspired many nations that came thereafter (Abdul-Rahman Hussein, 2020). The most prominent part of what it provided was cuneiform writing and a wealth of stone carvings, clay tablets, and archaeological inscriptions that conveyed the events of that distant period (Michel, 2021). Nowadays, the products of those civilizations are considered a dazzling tourist destination for those interested in archaeological culture and researchers and investigators into the events of ancient nations, as the world's museums in important capitals such as the Louvre Museum (Caubet, 2009) in Paris and the British Museum (Nadkarni, 2020) in London are filled with these precious antiquities that are visited daily by hundreds of people to see the way of life, industries and cultures of the people who lived Before Christ (BC).

Virtual reality (VR) technology has come into contact with many facets of life over time and has become an interactive tool in fields such as engineering, education, and electronic shopping, as well as digital gaming and storytelling (Sepasgozar, 2020; Salim *et al.*, 2024). The immersive panoramic experiences in the virtual reality environment have supplied users with a three-dimensional simulation that has achieved complete immersion in the environment. They enjoyed interacting with and recognizing virtual objects because of their virtuality, comprehensive view, and broad eyesight. Specifically, virtual panoramic tourism enables tourists to get a natural feeling while touring archaeological sites available in the world digitally (Siddiqui *et al.*, 2022), as it saves them the trouble of travel and the high cost, representing positive steps in enhancing confidence in wearable technology (Kim *et al.*, 2021). By combining the advanced technological capabilities of wearable technology equipped with cameras and virtual reality (VR) applications (Spero *et al.*, 2022), exciting tourist experiences can be provided with expansive aerial and comprehensive panoramic views that achieve immersion in the digital content by the users wearing the Head Mounted Display (HMD) (Caserman *et al.*, 2021).

Convolutional neural networks (CNNs) permit the virtual environment to respond to the user's actions and classifying his interactions with virtual world components by recognizing and analyzing virtual visual scenes (Kang *et al.*, 2020). Furthermore, attaining seamless flow in tracking the movement of the head and facial movements and the movement of the hands and body in real time inside an interactive and immersive environment facilitates complete mental deception during the virtual experience (Kyrlitsias and Grigoriou, 2022). Deep learning algorithms, for example, generative adversarial networks (GANs), can reconstruct the network texture of characters from authentic images during the training phase, employing Pix2Pix GAN algorithms to enhance 2D super-resolution photographs by refining textures and sharpening features in comparison to the original images. This is done by training the model through a pair of low-resolution images and depth map datasets as inputs (Chaurasia and Chhikara, 2024), resulting in a 3D avatar that contributes to the production of virtual cinema scenes by improving visual accuracy and displaying human behaviours that simulate virtual reality via adaptive response to reality devices (Jabberi *et al.*, 2024). Thus, deep learning algorithms and computer vision applications have significantly improved the overall quality of virtual experiences, particularly regarding interaction and connectivity between real and virtual realities.

This study presents a technical approach called Panoramic – Virtual Reality (DMP-VR) that works to reconstruct the archaeological models of the Mesopotamian civilization in terms of the main structure and covering them with a clay or rock texture according to their original material digitally in order to generate a high-resolution panoramic scene of the Mesopotamian culture. A completely immersive, digital clay texture of archaeological models' information-rich, low-noise super-resolution panoramic scene of the Mesopotamian civilization in 360◦from low-resolution 2D images of Assyrian and Babylonian models gathered from online search engines. Many heritage landmarks have been lost due to climatic conditions or exceptional factors, which led to their extinction and absence from the real scene, and over time, they became forgotten, and only a few scattered images remained on social media sites and search engines on the Internet. They must be restored using modern methods and advanced reconstruction methods; deep learning algorithms and artificial intelligence techniques have provided the possibility of restoring them, so that those interested people and the public can recognize them, and thus protect and preserve them from loss. This falls within the responsibilities and tireless efforts to preserve heritage from loss or destruction because it represents a real legacy for future generations. Deep learning algorithms will be used to reconstruct high-resolution panoramic images of the Mesopotamian civilization from individual low-resolution images found on search engines and international museum websites. It is presented in a virtual reality realm using a heat-mounted display (HMD) to create excitement and immersion while also introducing the audience to the historical heritage of Mesopotamia.

Related Works

Sun *et al.* (2021) presented a lightweight model called Aerial-PASS to analyze images captured in real-time with high accuracy by installing a panoramic ring lens on a drone to capture aerial scenes at a 360° annular field of view. The neural network with semantic segmentation of the panoramic ring in this model achieved a real balance between inference times. Implementing the segmentation involves verifying the validity of the views of public places and streets saved in the network system as a dataset.

Zhang *et al.* (2020) projected geographical panoramic images and virtual 3D environments using panoramic oblique photogrammetry (POP), which uses drones equipped with six fish-eye cameras and panoramic image presentation algorithms to capture the entire panoramic scenery. The experimental findings of this technology revealed that it is effective at constructing a virtual geographical environment with high-resolution panoramic images.

Feng *et al.* (2021) provided an approach aimed at increasing awareness of environmental protection, where the problems of panoramic video installation were fixed by reducing the time of stitching clips using the parallax compensation algorithm by capturing scenes from an altitude of 500 meters. The aerial experiment to capture panoramic scenes demonstrated an increase in awareness of environmental protection and preservation.

Wan *et al.* (2021) proposed a strategy for merging aerial images by achieving constraint-free stitching to generate a panoramic image using the tuning package used in extracting the initial feature set of those images, as well as creating a strong alignment energy while preserving the mesh-based shape transformation used in generating the panoramic scene. Compared to other methods, this method produced effective results while stitching drone photos. Providing a panoramic view by stitching aerial images from drones, the purpose of which is to generate a series of connected and complementary information. These methods have greatly progressed in developing virtual reality applications (Boukerch *et al.*, 2021). It enabled users to fully immerse themselves in digital environments, associate with their elements, and interact with their tools by wearing glasses and a helmet to obtain more realistic views in real-time (Cen, 2021).

Drones have played an important role in guiding virtual reality devices by creating immersive experiences for their users. For example, adopting FPV technology (Efaz *et al.*, 2020) to deliver (360◦) panoramic views contributes to improving experiences through interactive photography that engages and entertains people. The reality of the current field of view is the beginning of generating a new reality with a broad vision in displaying a (360◦) panoramic scene rich with information that achieves comprehensive benefits for users, which is considered the basis of the modern technology industry (Danielsson *et al.*, 2020). Human-computer interaction technology enhanced the user experience and effectively extracted global and local features, and its role emerged in creating the panoramic reality (Katona, 2021).

Deep neural networks have notably generated panoramic images by learning features from large datasets and estimating homogeneity matrices to combine images and predict the wide panoramic frame (Lee *et al.*, 2020). Khamiyev *et al*. (2023) relied on the experiment, where deep neural networks are used, to generate panoramic images in a way that outperforms traditional RANSAC methods in terms of time by 72%, as the proposed model achieved 7.31 pixels of average absolute loss, the absolute value in the X and Y directions. The results were visually reasonable compared to previous methods.

Convolutional neural networks (CNNs) have made significant advances in visual scene construction compared to traditional methods such as SIFT, through their ability to extract complex hierarchical features (edges, textures, and shapes) directly from massive datasets with no need for manual geometry. Achieved by training them to handle complex scenarios such as lighting changes, blurry surfaces, and noise, which are associated with the image capture process. Symmetry estimation is performed using 3 × 3 homography matrices, 8 degrees of freedom to define geometric transformations to align overlapping images and predict image symmetry parameters directly (Tian *et al.*, 2025).

CNNs assume blending masks or employ generative adversarial networks (GANs) to minimize artefacts and ensure smooth transitions between stitched images. Architectures such as Flow Net and Depth-Aware Networks handle parallax by adding optical flow or depth estimation. Homography networks may learn to alter exposures/colors (homogeneity) across photos, hence improving visual uniformity. CNNs are used by applications such as Google Photos to automatically stitch panoramic scenes, VR/AR technology, and Real-time panorama production for an immersive feel.

Ullah *et al.* (2020) proposed an affordable approach for creating 360-degree panoramic images. This image can be either mono or stereo, and it was captured using a drone with sensors set in a circular pattern and six cameras equipped with optical sensors. The ends of the photos were joined using a digital stitching program, and the edges of their features were connected to create a scene. A panoramic view has a sense of integration. Compared to competing approaches, the proposed method produces single-phase material and 3D content more efficiently.

Huang *et al.* (2020) used a panoramic system to examine the target scene for photography and detect restrictions to evaluate the structural integrity of infrastructure using deep learning networks, model PADENet, by using a drone to capture panoramic shots and build a data set after processing those images and removing distortions to train the deep model, which improves accuracy in detecting damage and classifying its type. Deep Convolutional Neural Networks (CNNs) have been advanced through their effective performance in learning priors that can be generalized across the real world. These tasks are not without limitations during training, the basic images that form the panoramic scene, bypassing the convolution and obstacles of large-scale data sets due to limited weights during inference, and modelling long-range pixels (Laschowski *et al.*, 2022).

Methods

The main contribution of this study is to use the deep convolutional neural network architecture (DMP-VR) that allows users to generate high-resolution panoramic scenes supported by digital clay texture UV warping of archeology models in the environment surrounding their heritage position, augments them with data on the shooting scene as well as the orientation and field of view of the drone camera, feeds such data to deep neural algorithms that automatically identify the mountain on-screen coordinates, and finally allows the audience to visualize panoramas historical objects in a full-immersive environment. Our model (as shown in Figure 1) has adopted the generation of super-resolution (SR) images from low-resolution (LR) images of archaeological objects dating back to the Mesopotamian civilization to improve the panoramic scene and achieve complete immersion for the user, which creates more opportunities for interaction and excitement.

Cylindrical image projection

The Deep Mesopotamian Panoramic–Virtual Reality (DMP-VR) model aims to input low-resolution Mesopotamia heritage images to reconstruct their corresponding high-resolution versions to generate a continuous spherical image representation from icosahedral input data. Firstly, Mesopotamian low-resolution 2D images are collected from internet engine searches. Each series is saved as a collection of images; each is stored with PNG metadata. Deep Super-Resolution performance on input images is achieved by representing cylindrical data as an icosahedron and effectively extracting features from a cylindrical, sharpened texture surface of uniform faces. This is accomplished by a unique data structure based on the icosahedron and weight sharing between kernels in various orientations.

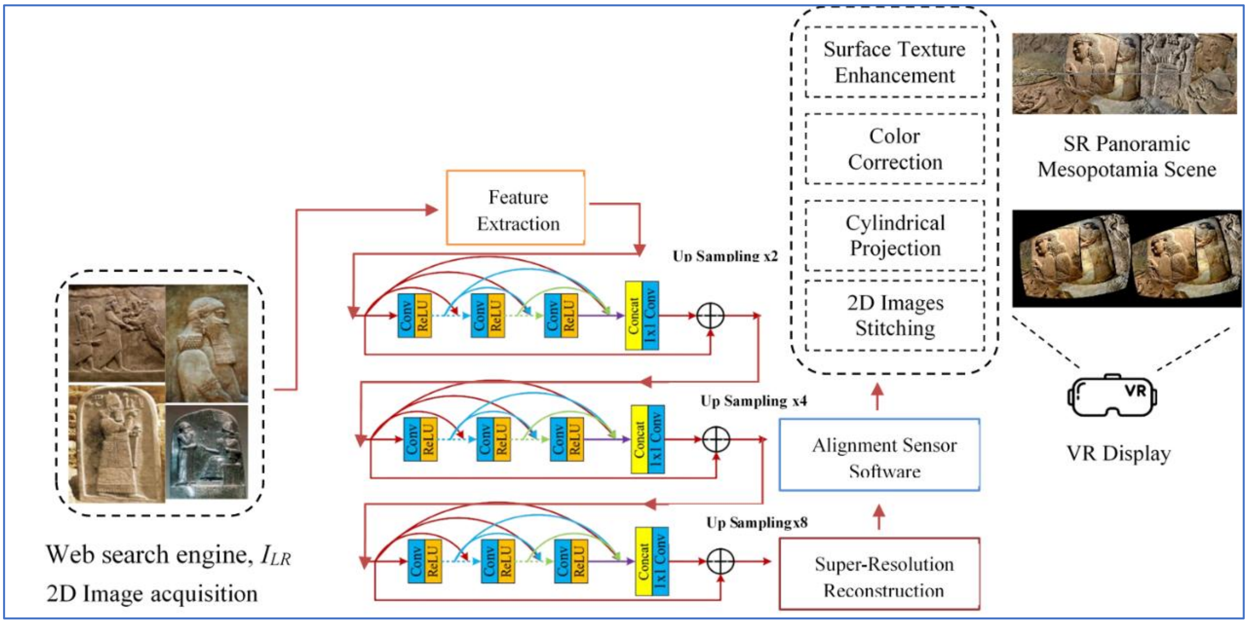

Fig. 1. DMP-VR deep model architecture.

Cylindrical image projection interpolation for the input images of any size (denoted as C) to the desired output size of the SR image: f: C → W. The following deep CNN forward step aims to recover the high-resolution details for W to make an image (denoted as F(W)) similar to the original high-quality image. The desired mapping mentioned above function (F) comprises three convolution layers: feature extraction, non-linear mapping, and scene reconstruction. A series of filters is used to convolve the image and extract its features. The patches are then represented with a set of pre-trained bases. The layer is represented as an operation F1:

$$F_1(W) = max\ (0, W_1 * M + D_1) \qquad (1)$$

Furthermore, *W1* and *D1* demonstrate the filters and biases, respectively. For an image with *c* channels and f_1 filter size, n1 convolutions with a kernel size of $c \times f_1 \times f_1$ are performed. Each member of the n-dimensional D1 vector corresponds to an individual filter. This step's final output is extracting a n1-dimensional feature for each patch. The second layer generates additional n2-dimensional vectors from the mapped n1-dimensional vectors. The appropriate operation is:

$$F_2(W) = max\ (0, W_2 * F_1(W) + B_2) \qquad (2)$$

Where W_2 and *B2* represent the layer equation filters and biases respectively. However, there are n2 filters of size $n1 \times f_2 \times f_2$ and n2-dimensional B2 vector. Finally, the layer produces a high-resolution patch that will be utilized to reconstruct the following layer. Figure (2) shows that the software sensor alignment step prepares the images to be combined into a cylindrical perspective. The implemented solution requires that the order of photos in a series is known from the image-collecting stage, and frame dimensions for input images are known parameters exposed by manufacturers via the operating system's APIs.

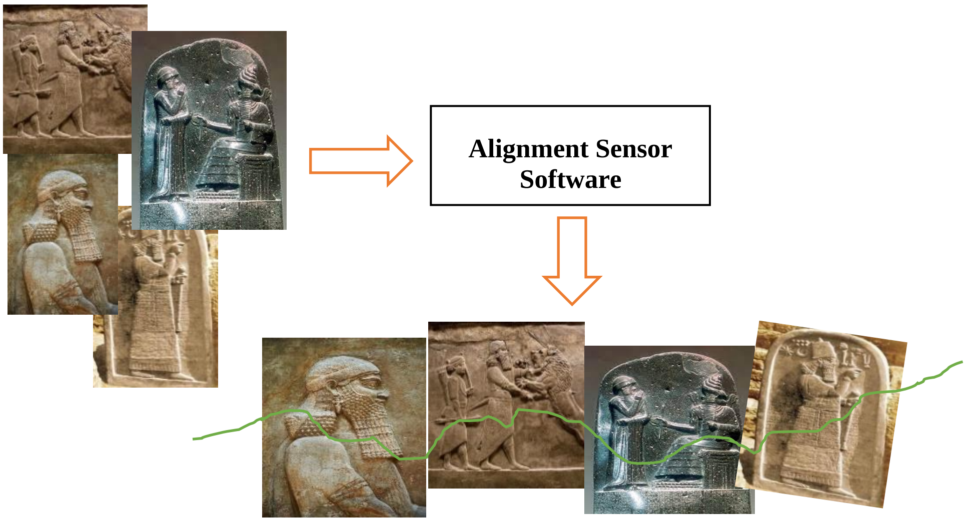

Fig. 2. Alignment sensor software historical Mesopotamian images

Alignment sensor software compensates for tilt issues during acquisition, and images are first rotated using a geometric transformation depending on the data center. Then, they are projected onto the cylindrical reference surface, and pixel-based alignment post-processing is used to refine the relative picture positions inferred from the input data. Sensor-based alignment in this step, images are consecutively distorted by computing and applying a perspective transformation based on pitch and roll values—panoramic cylindrical projection. The next step is to project each image onto the cylindrical reference surface as depicted in Figure 3. First, forward warping is performed to map the image to the cylinder. From the image coordinates (I_x, I_y), the projected coordinates (I_x', I_y') on the cylinder's planar surface are:

$$I_x' = \boldsymbol{s^{\alpha}} = tan^{-1} I_x / f \, , \, I_y' = s \, (y / \sqrt{\boldsymbol{Ix^2 + f^2}} \,) \qquad (3)$$

The 3D cylinder dimensions (α), focal point (f), and scaling factor ($s = f$) are used to decrease distortion at the image center.

Fig. 3. Panoramic cylindrical historical Mesopotamian images projection.

The parameters provided by software specialized in building panoramic scenes from two-dimensional images are options with variable values through which the focal length values can be determined between the software lens that works as a virtual camera, and the dimension values (scales) can be changed to organize the panoramic scene according to the nature of the panoramic shot. This is done through guesswork and manual experimentation.

Panorama image stitching

Generating a panoramic image result from merging two or many super-resolution images within one frame (Liu *et al.,* 2024). In panoramic stitching, there is a logical overlap of the ends of the images to overcome the distortions resulting from the stitching process due to taking these images in different areas and conditions. This results in features of varying color density, which can be overridden by adjusting the alignment directions of adjacent features of those images (Wu, 2023). Color correction aims to minimize the effect of such variations, while feature matching and image parameter computation in the camera calibration phase aid the image stitching process during panorama synthesis (Fu *et al.,* 2023). However, the resulting panoramas typically have wavy aberrations that severely impair perceived resolution. The misalignment of nearby cameras causes these wavy artefacts; we employed the global rotation

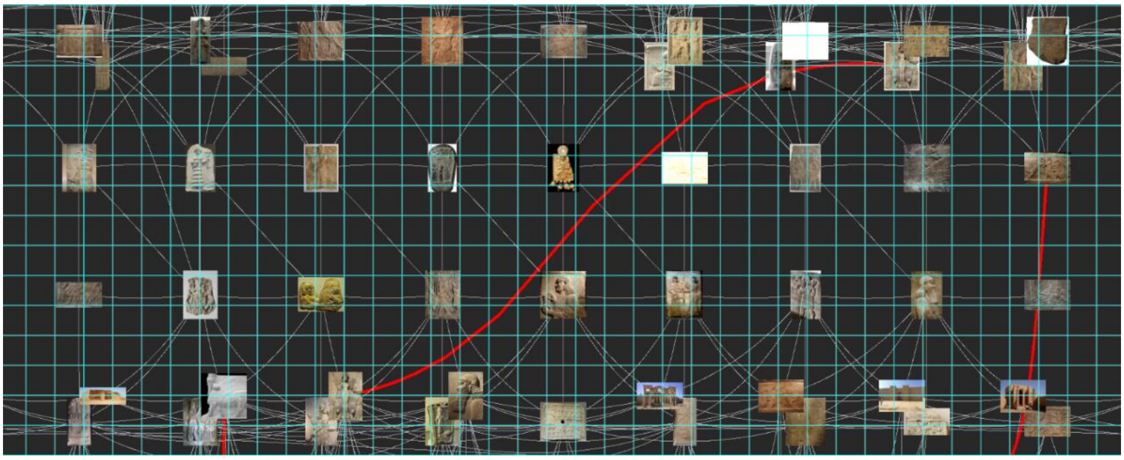

Fig. 4. Image stitching steps with clay digital color correction.

approach for panoramic straightening and generated a high-quality, straight panorama to remove these wavy effects. The first camera parameters are estimated based on image dimensions (La Salandra *et al.,* 2020).

Image stitching involves cutting training images (X_i) to random $f_{sub} \times f_{sub}$-pixel sub-images and stitching the ends of features to minimize errors. After blurring them with a Gaussian kernel, low-resolution samples are made by downscaling and upscaling sub-images. Cylindrical interpolation is utilized to finish the downscaling and upscaling using the same scaling factor (three in our study). To avoid the border effect, no padding is used in the network. As a result, the output size of a sub-image using network filter sizes $\{(f_{sub} - k_1 - k_2 - k_3 + 3)\ 2 \times C\}$ is less than the input size. Create the 360° heritage panoramic image, map the panorama into the 3D environment, and translate the peak coordinates from the planar system of the panoramic image to the cylindrical system as illustrated in Figure 5. First, the collected panorama and peak hotspots or labels are mapped to a planar reference frame representing a full 360° view.

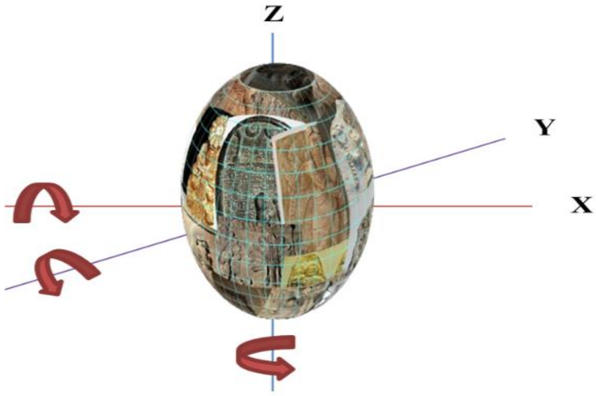

Fig. 5. Result of panoramic cylindrical system.

Results

Experiment

Deep convolutional neural network architecture (DMP-VR) practical evaluations of our method have achieved a high-quality panoramic scene by stitching low-quality Mesopotamian cultural images previously collected from Internet search engines by increasing their color efficiency and sharpening their surface texture. To give it a more credible appearance that mimics the panoramic reality and is based on sensing the credibility of the horizon for those images and reducing the percentage of impurities that result from stitching the pixels of their edges, achieving a logical nature of the overlapping of those images.

In the training phase, we used the Lion dataset (Maier *et al.*, 2020), captured by an RGB-D camera, to generate a pair of images (RGB image, depth map) to train the Pix2Pix GANs model to generate a super-resolution image (SR). Lion Dataset is an archaeological dataset consisting of (515 RGB images - 1296x968 resolution, 515 Depth - 640x480 resolution), 26 Keyframes. Our training stage was performed on a virtual GPU Colab environment.

In the testing phase, the low-resolution 2D images of Mesopotamian artifacts, such as Assyrian and Babylonian models, were gathered from online search engines to generate super-resolution images (SR), which can be stitched together to find a panoramic view using the SIFT algorithm.

In Testing phase experiments, we applied an 30% split, low - resolution (LR) RGB images, nearly 153 images of the Mesopotamian model for testing. The testing of the image samples contributed to achieving highly accurate and reliable results. A 20% holdout validation set (203 images) was extracted from the main data to monitor learning rate and batch size for ensuring stability and reliability of the results.

Quantitative evaluation

As shown in Table 1, the quantitative panoramic experiments achieved better quality results than the panoramic images generated by state-of-the-art methods using quantitative metrics, WS-PNSR and WS-SSIM.

Table 1: Panoramic Quantitative evaluation on our method DMP-VR and state-of-the-art methods for × 2, ×4, and × 8 SR.

Method	Panoramic Image x2		Panoramic Image x4		Panoramic Image x8	
	WS-PNSR	WS-SSIM	WS-PNSR	WS- SSIM	WS-PNSR	WS- SSIM
FCRN(Chen et al.,2020)	22.6	0.4571	25.20	0.5779	26.11	0.7958
EDSR(Lin, 2022)	22.8	0.5493	25.73	0.5852	26.40	0.8003
SRCNN(Mohan et al.,2022)	24.16	0.5384	25.88	0.5955	27.84	0.8428
360-SS(Yoon et al.,2022)	26.93	0.6032	26.83	0.7842	27.98	0.8680
RLFN(Kong et al.,2022)	27.22	0.6419	27.91	0.7339	28.19	0.8738
DMP-VR(ours)	**29.85**	**0.8116**	**30.64**	**0.8869**	**32.20**	**0.9952**

Fig. 6. HDR Mesopotamian panoramic scene.

Fig. 7. Visual result as a virtual reality 360◦ scene.

The most significant potential limitations that negatively affect the performance of our method and other methods are the poor quality of the input images as data sets, and their lack of depth map, which leads to inconsistencies in determining the alignment of the pixel ends during the stitching process, and the resulting panoramic scene does not achieve full immersion and has weak, realistic representations.

The visual results of our model, DMP-VR, have achieved a panoramic scene (Fig. 6) of stitching super-resolution historical images of the Mesopotamian civilization, which were collected and reconstructed in a manner rich in information, with many concepts and topics. Our model enhanced panoramic image quality from four aspects: increased texture details, enhanced clarity, reduced noise, and removal of color fringe. A complete visual perception and total immersion in the virtual environment were achieved using virtual reality glasses (HMD) as shown in Figure (7), as this (360◦) panoramic scene generates an integrated visualization of a specific historical era, for example, Assyrian and Babylonian stories, achieving a comprehensive concept for the user by assembling these murals, of course, generating a new immersive experience. We examined the training phase with our images and studied the effect of cylindrical scenes on the results instead of the traditional ones. Subsequently, the training parameters, number of iterations, and network input image size are adaptively changed based on our images.

Conclusion

We suggested a DMP-VR model for reconstructing a completely immersive, information-rich, low-noise super-resolution panoramic scene of the Mesopotamian civilization in 360◦from low-resolution 2D images of Assyrian and Babylonian models gathered from online search engines. The panoramic results provided users with an immersive experience in the virtual reality environment utilizing HMD, while promoting the rebirth of the heritage of the oldest human civilizations. Our proposed strategy outperformed previous methods in terms of quantitative and visual results by adjusting input photos to set accurate results during the training and generating phases. This study contributes to finding advanced methods and guiding agent learning algorithms in reviving world heritage and enabling generations to preserve the heritage of their ancient peoples and enhance virtual reality tourism; by saving travel trouble and cost, VR tourism has an enormous opportunity to democratize travel, improve connectivity, and minimize environmental impact. But its success is dependent on resolving technological, ethical, and economic barriers through collaboration among tech programmers, travel boards, and legislators. By focusing on user-centric architecture, cultural sensitivity, and ecological practices, businesses can harness VR's revolutionary power while limiting hazards. Then there are obstacles. The user expressed interest in learning about the barriers to acceptance. Technical difficulties could include high content creation costs and latency issues. There are also accessibility issues, such as motion sickness. Ethical and cultural problems, such as excessive tourism and the distortion of cultural places, are also relevant. Related to business difficulties include ROI unpredictability and an absence of standardization. In addition to playing a fundamental role in the development of animation cinema and 3D electronic games, it is considered a complementary scene for artistic activities concerned with the heritage of nations and their civilizations. In the future, we will investigate fast and quality drama video scenes with high-resolution deep methods for panorama videos, which can be applied in various media applications such as 360◦ panorama drama video scenes super-resolution algorithms.

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