Texture Synthesis: Using Deep Learning to Create High-Quality Textures

Overview

A leading company in the game development industry that specializes in creating high-quality textures for games and films. They wanted to find a solution to synthesize high-resolution textures from low-resolution textures to reduce the time and effort required to create textures manually.

CUSTOMER

One of the world's largest photogrammetry asset library and bundled toolset: Megascans, Bridge and Mixer — forming a robust content creation ecosystem for producing high-quality 3D content.

Country: Pakistan
Industry: Private Sector
Customer Size: 500 - 1000
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Problem Statement

The main challenge for this company was to create a technique that could synthesize high-quality textures with high fidelity from low-quality textures. This would require a deep learning approach that could effectively capture the details of the texture and reproduce it at a higher resolution.

Technical Solution

To tackle this problem, they (the company) worked with Red Buffer, a leading research and development company that specializes in computer graphics and machine learning. They developed a custom model that used a combination of loss functions to synthesize an 8k to 16k texture from a 4k texture. The model was based on state-of-the-art techniques and was capable of handling both stochastic and non-stochastic textures.

The approach used a hybrid of three losses, including a perceptual loss, style loss, and a texture loss. The perceptual loss ensured that the synthesized texture had the same overall appearance as the original texture, while the style loss ensured that the texture had the same style as the original. The texture loss ensured that the synthesized texture had the same level of detail as the original.

Results

The results of the project were impressive, with the custom model outperforming the state-of-the-art results achieved by Gatys et al. The model could synthesize high-quality textures with high fidelity and was much faster than the previous approaches. The approach was also able to handle semantic image inpainting problems, which allowed them (the company) to tackle a wider range of texture synthesis challenges.

Overall, their (the company) collaboration with Red Buffer was a success, and the company was able to reduce the time and effort required to create high-quality textures for games and films. The deep learning approach developed by Red Buffer provided them (the company)l with a powerful tool for texture synthesis that has helped the company maintain its position as a leader in the game development industry.

Technologies	Domain
AWS ECR, Sagemaker Experiments, Sagemaker Studio, S3, Tensorboard	Gaming, Photogrammetry, Content Creation