



Code and Paper

IDEA

With the development of more robust style transfer models, the production of 2D procedural content for assets has become increasingly available for a larger audience. The work by [1] and [2] has shown that generating textures and full 3D objects for game, VR/AR and interactive applications is possible. The problem with style transferring features this way is the high complexity and cost of generating 3D content through deep learning.

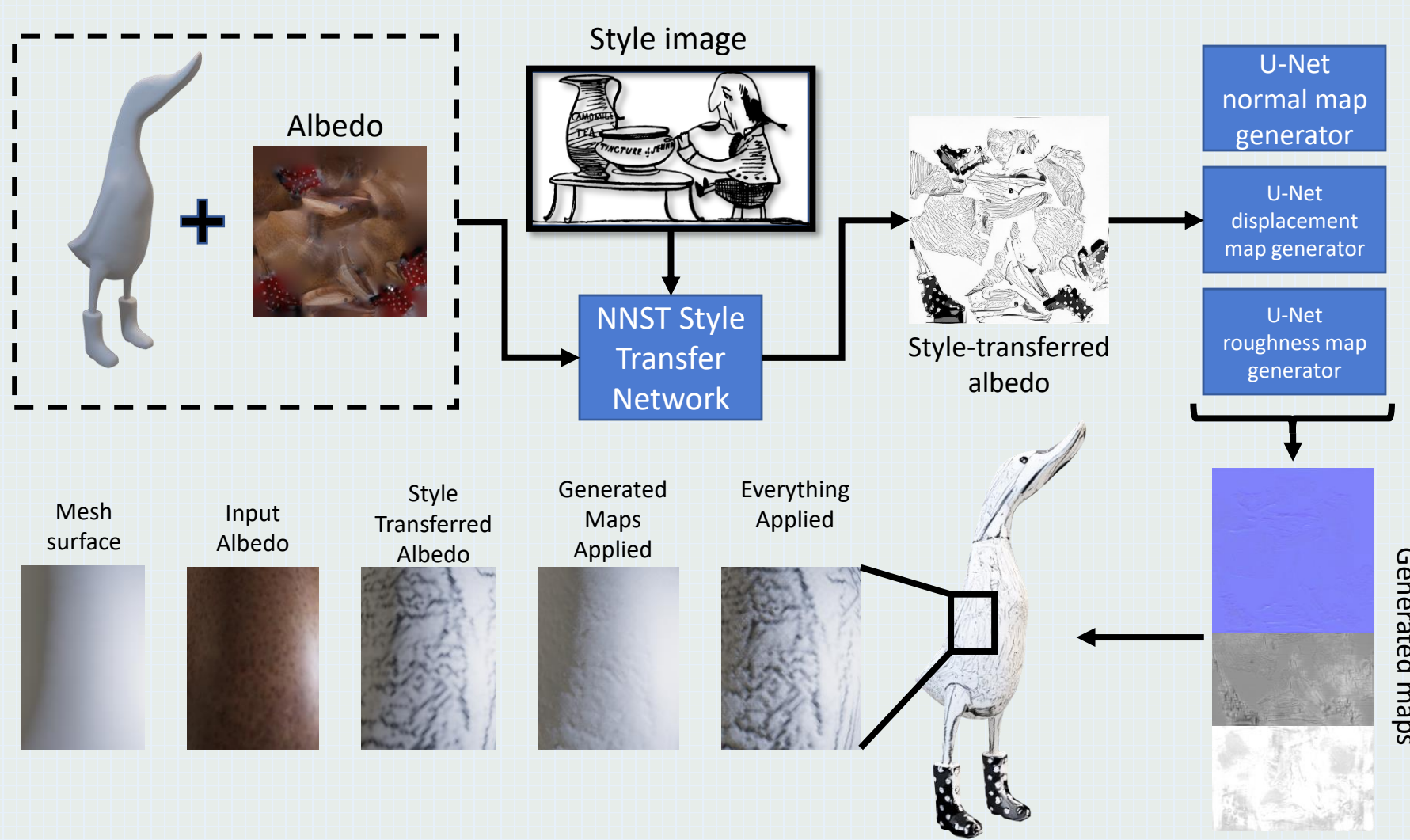
This paper tries to remedy this by presenting an initial exploration of a pipeline for combining style transfer on albedo textures with transferring these new style features to the 3D objects through the generation of normal, displacement and roughness maps



Texture style transfer features can be carried over to the underlying 3D mesh by generating normal, displacement and roughness maps from the styled albedo textures



OVERVIEW



Proposed pipeline taken as input a 3D mesh with an albedo texture. This texture is run through a style transfer model together with a styling image. The resultant texture is then used as an input to three U-Net networks which generate normal, displacement and roughness maps

METHODOLOGY

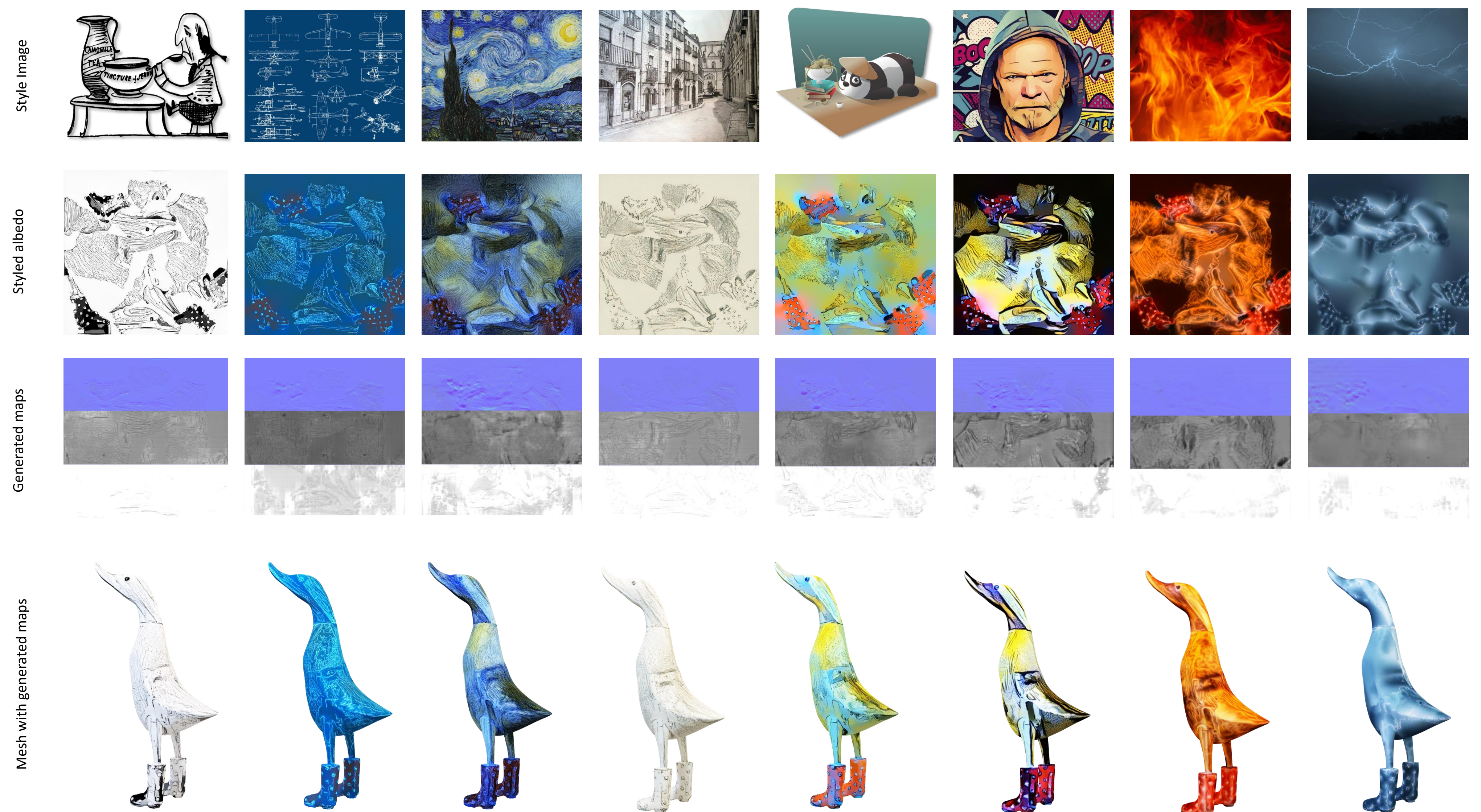
The proposed pipeline contains two main parts. The first is the style transfer model which takes the albedo texture together with a style image and produces a style transferred texture. We tested five state-of-the-art style transfer networks. It is important that the style transfer results preserve the albedo texture features, so we compare the five networks based on SSIM between the input and styled results. We see that the NNST model provides the best content preservation.

	[3]	[4]	[5]	[6]	[7]
Average SSIM	0.353	0.283	0.402	0.386	0.424

The second are U-Net models trained to generate normal, displacement and roughness maps from the style transferred albedo. The models are trained on 1.4k pairs of input textures and each of the three map types and validated on 150 additional pairs.

RESULTS

To test the proposed pipeline, 5 3D reconstructed model of statues were selected that represent different texture types and materials. In addition, 8 style images were tested containing natural, cartoon, hand-drawn and painting styles. Some of the results especially for the normal and displacement maps become over-smoothed, which can be attributed to the not enough features in the styled albedo maps. Some of the NNST results also exhibit color bleeding, which is a problem mentioned in the NNST paper.



REFERENCES

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