APPLYING STATE-OF-THE-ART PARAMETER RETRIEVAL FOR PROCEDURAL TEXTURES

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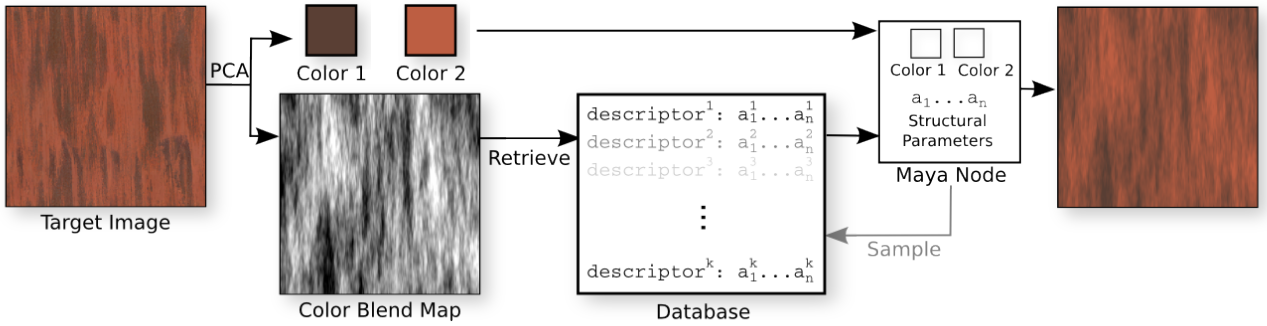

Figure 1: *Principal Component Analysis reveals the constituent colors of a two-tone image and a corresponding blend map. By identifying the most similar image from a database of images generated by a Maya node according to a feature descriptor, we can retrieve structural parameters. Together with the colors, they produce an image closely matching the input [1].*

Keywords: Procedural textures, parameter space navigation.

Abstract

In this abstract we promote the transfer of our recently published research project about the parameter control of procedural textures [1] to an industry applicable version by integrating our system into Autodesk's Maya.

1 Introduction

The choice of parameters for procedural textures in order to achieve a desired appearance poses a challenging problem even for experienced artists. In order to save time and effort, we combine image-based and procedural modeling techniques and automatically determine parameters of a procedural texture to reproduce the appearance of an input image. We concentrate on bringing a procedure as close as possible to the input interactively, giving an artist the time and option to finalize the look individually.

2 Interactive Parameter Retrieval for Two-tone Procedural Textures

Addressing two-tone textures, we separate the estimation of colour and structure information and interpret the problem as image retrieval task from the space of procedural outputs. Applying a perceptually motivated image metric based on a texture descriptor enables us to pre-compute a comprehensive collection of possible parameter sets and yet achieve interactive retrieval performance. Our method supports a large variety of procedural texture models with a unified approach [1].

3 Application

To create a comparable representation of a Maya node, for example for a 2D Texture, the node is setup as image-plane of a camera and with no further adjustments, Software-rendered. Any Maya node could be connected to the pipeline, but the derived feature vector for the comparison of the rendering is currently optimized for texture characteristics.

In a first step, the chosen parameter space of the Maya node needs to be sampled; this is a one-time investment and is parallelized to work with any common render farm. In the second step, for the actual fitting, the database is sequentially searched and the retrieved structural parameters, rotation, and up to two matched colours are automatically set for the node.

We implemented our retrieval pipeline as Python scripts. Only the feature vector computation is, due to performance issues, done with a call of an executable. At this point, we do not achieve the retrieval times of below one second as in the original application, but we believe this to be further improvable with some code adjustments.

4 Conclusion

We argue that the application of a state-of-the-art parameter retrieval technique is promptly applicable, proving an easy transfer from an academic context to an industrial one and we would like to encourage such an immediate exchange of expertise further.

Acknowledgements

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References

[1] Gieseke, L., Koch, S., Hahn, J.-U., and Fuchs, M. "Interactive Parameter Retrieval for Two-Tone Procedural Textures", *Computer Graphics Forum*, 33(4):71–79, 2014