

ON THE POTENTIAL AND CHALLENGES OF NEURAL STYLE TRANSFER FOR THREE-DIMENSIONAL SHAPE DATA

Timo Friedrich, Nikola Aulig, Stefan Menzel

Honda Research Institute Europe, Germany
timo.friedrich@honda-ri.de, nikola.aulig@honda-ri.de, stefan.menzel@honda-ri.de

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Abstract: In the field of two-dimensional image and video processing, convolutional neural networks have been successfully applied to generate novel images by composing content and style of two different sources, a process called artistic or neural style transfer. However a usage of these methods for three-dimensional objects is not straightforward due to the unstructured mesh representations of typical shape data. Hence efficient geometry representations are required to use neural network based style transfer concepts for three-dimensional shapes and to enable the fast creation of style options for instance in a product ideation process. In this paper an overview of current state-of-the-art shape representations is presented with respect to their applicability of neural style transfer on three-dimensional shape data. Combinations of three-dimensional geometric representations with deep neural network architectures are evaluated towards their capability to store and reproduce content and style information based on previously proposed reconstruction tests.