Texture synthesis algorithms have been researched extensively in the past decade. However, most synthesis algorithms are governed by a set of parameters and produce different results depending on which parameter settings are chosen in conjunction with an exemplar used as a basis for synthesis. So far, automatically selecting parameters suitable for synthesis has been a relatively unexplored topic. In effect, this makes texture synthesis supervised rather than fully automatic.

In this technical paper, we propose automatic parameter optimization methods for example based texture synthesis. We cover research to directly estimate specific texture synthesis parameters, such as patch size and iteration convergence, based on input textures. We also examine various similarity measures and evaluate their effectiveness. The goal for each measure is to properly evaluate how well the resulting synthesis compares to the original input. A good similarity measure will enable the search for the optimal texture synthesis parameters by maximizing the quality of the synthesis as a function of parameters.

We apply presented methods to a state of the art texture synthesis algorithm, namely the one proposed by Kopf et al [14]. It is easy to find a set of exemplars for which there is no single optimal set of settings. The results show a promising foundation for further research in establishing an automated optimal synthesis for a multitude of textures.