

Even though procedural modeling of trees is a well-studied problem, realistic modeling of tree bark is not. However, the more general techniques of texture synthesis, including texture-by-numbers, may be helpful for modeling tree bark. Texture synthesis is a process of generating an arbitrarily large texture similar to an input image. This method is capable of generating homogeneous textures. This is not enough as many types of bark are inhomogeneous. Texture-by-numbers improves texture synthesis by further guiding the process with provided label maps to allow the generation of even inhomogeneous textures. Many texture-by-numbers algorithms are not currently implemented. In this thesis, we implement a promising texture-by-numbers algorithm along with algorithms for generating the required label maps. This combination of algorithms creates a pipeline for synthesizing realistic tree bark textures based on a single small input image. We test out the pipeline on samples of multiple types of real-world tree bark images and discuss the results. We further suggest multiple directions for improving the employed techniques.