

# Example-Based Texture Transfer Between Images

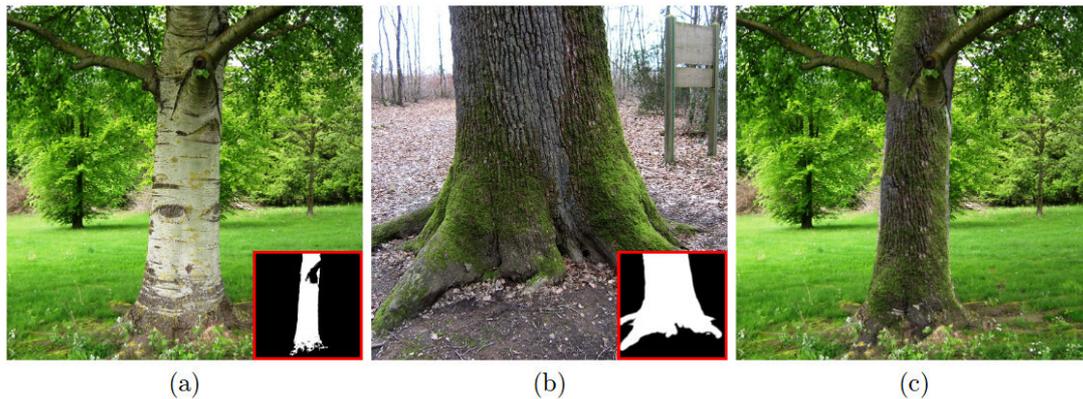
Master degree subject - M2R - MOSIG - GVR

**Contact:** [Romain.Vergne@inria.fr](mailto:Romain.Vergne@inria.fr) (web) [Joelle.Thollot@inria.fr](mailto:Joelle.Thollot@inria.fr) (web)

**Location/duration:** [Maverick team](#), Inria (655 Avenue de l'Europe, 38334 Montbonnot), 5-6 months

**Keywords:** Computer Graphics, Image analysis, Texture synthesis, Appearance edition, Visual perception.

**Context.** If many algorithms and filters exist for manipulating particular features such as colors or textures in still images, it is still extremely difficult to modify object appearances unless you are an expert designer. Consider the 2 images (a) and (b) of the trees in the figure below. If one wants to transfer the textured appearance of (a) into (b), what should be the rules to obtain the desired result (such as in (c))? Current works [DBP<sup>+</sup>15, FJS<sup>+</sup>17] use different types of user- or automatically- defined maps to guide the synthesis. However, it is still not clear what exactly are the relevant image cues that should be used to seamlessly transfer the appearance of an object and ensure coherent lighting, material and shape cues in the resulting image.



**Goal.** The goal in this project will be to automatically transfer the textural properties of an object in an image into another object. We will then start from 2 input images (a source and a reference) and their corresponding object's masks as input. The student will have to carefully preserve the relevant image cues during the transfer (lighting, macroscopic object shape, occlusions, etc) in order to obtain a plausible result.

**Approach.** We will take inspiration from recent patch-based texture synthesis algorithms [KEBK05, LJWF12, DSB<sup>+</sup>12, DBP<sup>+</sup>15] to transfer the texture from one image to another. The student will be able to start with our current GPU implementation described in [this report](#). Particular attentions will have to be paid to preserve plausible physical properties in the generated image (lighting, shape, etc). To that end, we will rely on relevant image descriptors (luminance, compressions, directions, occlusions) that will be used to guide the synthesis [VBBF16, Fle14]. This project will hopefully provide a powerful tool for manipulating materials in images. It will also help to better understand which visual cues participate in our comprehension of shape and lighting characteristics.

## References

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