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# Geometric Total Variation for Image Vectorization, Zooming and Pixel Art Depixelizing

Bertrand Kerautret\*<sup>1</sup> and Jacques-Olivier Lachaud<sup>2</sup>

<sup>1</sup>Université Lumière - Lyon 2 – Laboratoire d’InfoRmatique en Image et Systèmes d’information  
[LIRIS] – France

<sup>2</sup>université de savoie – Université de Savoie – France

## Abstract

We propose an original method for vectorizing an image or zooming it at an arbitrary scale. The core of our method relies on the resolution of a geometric variational model and therefore offers theoretic guarantees. More precisely, it associates a total variation energy to every valid triangulation of the image pixels. Its minimization induces a triangulation that reflects image gradients. We then exploit this triangulation to precisely locate discontinuities, which can then simply be vectorized or zoomed. This new approach works on arbitrary images without any learning phase. It is particularly appealing for processing images with low quantization like pixel art and can be used for depixelizing such images. The method can be evaluated with an online demonstrator, where users can reproduce results presented here or upload their own images.

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\*Speaker