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Title:	Cellular Automata for Image Inpainting
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Abstract:	Inpainting is the art of synthesizing missing portions of images using known background information. Various methods have been proposed in the literature, Exemplar based methods fill the missing region by choosing an appropriate patch from the known region. Other methods use the geometrical properties of the image to propagate information inwards. Classically, Cellular Automata have been studied largely as discrete dynamical systems for modeling of complex discrete systems and pattern generation. However, in the last decade researchers have shown an interest in solving various Image Processing tasks such as Image Denoising, Edge Detection and even complex tasks like Image Segmentation using a Cellular Automaton. In this thesis we have presented an approach using Cellular Automata to fill the omitted regions while trying to maintain visual plausibility and coherence. Image pixels are taken as the cells of the Cellular Automaton, each of which is assigned an initial confidence which is iteratively improved. The neighborhood of the cell represent the search space for an exemplar based best candidate replacement strategy. In this thesis various parts of our algorithm are discussed in detail. Results are on par with modern algorithms when the missing region is thin but the method suffers when the missing region is wide and complicated structures are present in the image. An approach based on multiresolution decomposition combined with an iterative segmentation and inpainting scheme is also discussed. We have also discussed the results of our algorithm when applied with a intelligent hole partitioning algorithm.

Figure 1.2: Text is removed from the image

Figure 1.1: The woman is removed form the original image

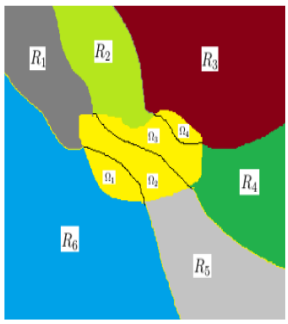

Figure 3.2: The hole has been partitioned to connect neighbouring regions correctly