C00 Exercise 1: read

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1. The context is synthesizing a new image from a set of source images that are photographs each depicting a similar scene. The researchers are trying to find out whether their automatic technique, based on finding patches that are consistent across most of the source images, produces a synthesized image that is more realistic and more representative of the shared static content than those produced by other techniques like averaging source image pixels or manual blending.

2. Generating a new image from source photographs is used both for removing artifacts such as of moving objects or of flash lighting, and for artistic effects such as combining illumination settings. This research is important for those applications because it shows whether an automatic new technique can produce better images than existing techniques.

3. The quality of images synthesized by the new technique under a variety of parameter settings, and by source pixel averaging, was measured by inspection. There is also a hint that the computational resources used by the new technique were measured.

4. The new technique produces a good synthesized image on one example where both pixel averaging and maximum likelihood techniques show ghosting or discontinuities (Figures 2 and 3). In another example, the new technique produces an image which doesn't resemble the desired object in some parts of the image (Figure 8), while an extension to the technique does better (Figure 9). The extended technique was tested on source images of different but similar objects (Figure 11) with "interesting [good] results" (Figure 12).

5. The authors conclude that the new technique is simple and useful, and can find shared static content better than other techniques. This success is attributed to the exploitation of spatial coherence in the source images, whereby the favoring of patches that are shared by at least some source images provides robustness against transient objects.

6. It is difficult to accept the authors' findings, both because few examples are shown and because the means of evaluation is imprecise. Only one of the examples involves a comparison to some of the existing techniques for image synthesis.

   Four different photographs appear in the paper, and each is used for a specific purpose; for example, one shows the convergence process for the new technique. There are hints that more source image sets were tested, but no indication of the number or variety. The focus on spatial coherence deserves some evidence that spatial coherence is prevalent in image sets of a particular kind (like photographs, or photographs of buildings).

   Synthesized image quality is determined by observation without further measurement. Counting the number of ghosts, discontinuities, and artifacts, for example, would clarify the criteria for image quality and enable easier evaluation of the results.