Dense Labeling with User Interaction: an Example for Depth-Of-Field Simulation.

Supplementary material

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1 Influence of Parameters in the Performance.

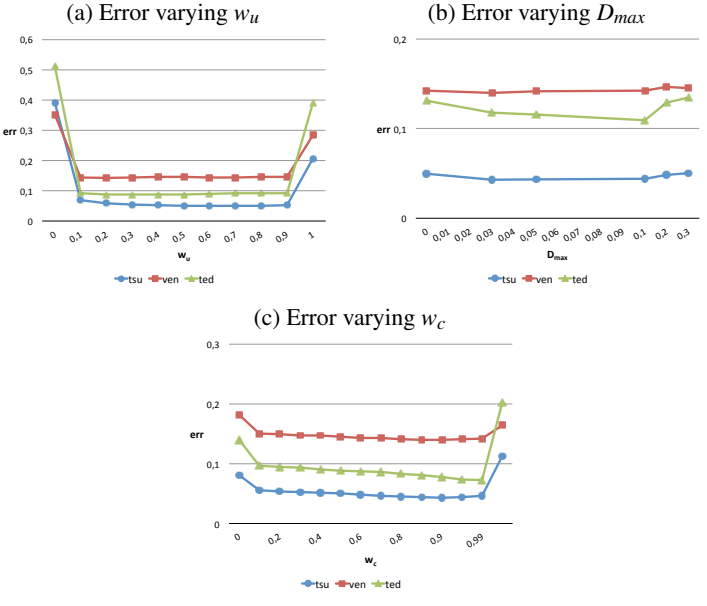

Figure 1: Error varying the system parameters. (a) Error variation of the unary weight w_u. The error is pretty similar in intermediate values, what implies that the system is not very sensitive to this value. (b) Error variation of the D_{MAX} parameter. If D_{MAX} is too high (above 0.1), the effect of w_c is dramatically reduced since almost all binary equations pass the threshold. (c) Effect of w_c. If we only connect superpixels with binary equations when their boundary color is very similar (w_c=1), the error increases because too many neighboring relationships are completely ignored. The best behavior is observed with very high values.

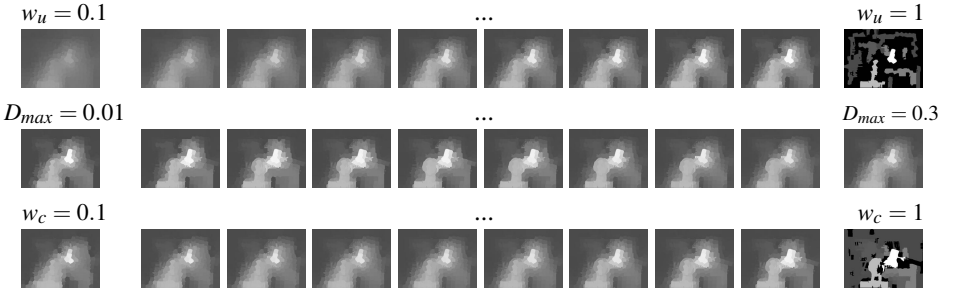

Figure 2: Labeling obtained with different values of the system parameters: w_u, D_{MAX} and w_c. Our formulation includes some control parameters which have been set experimentally to provide the best trade-off for our application (w_u=0.4, D_{MAX}=0.04 or w_c=0.99)

2 Dense labeling results

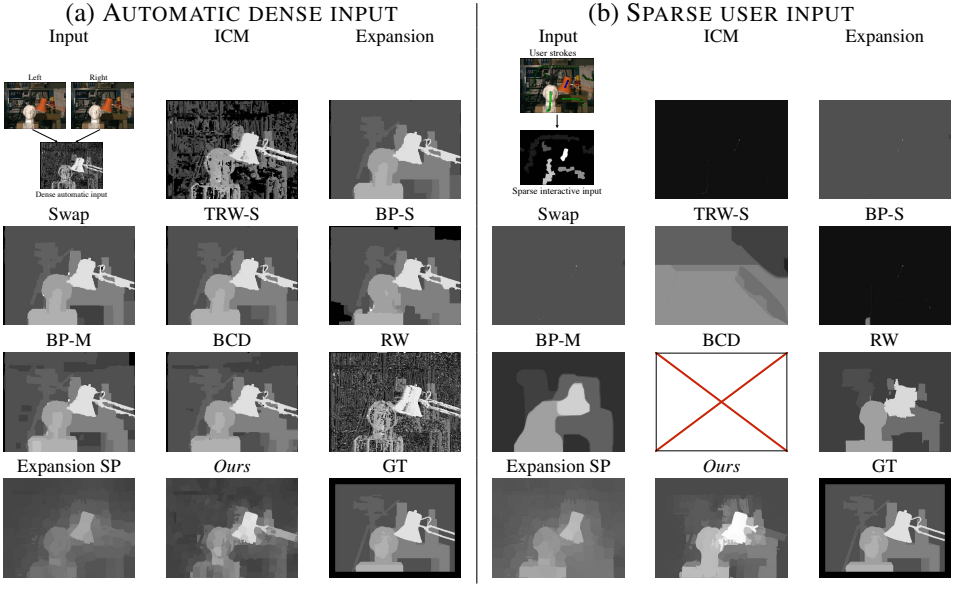

Figure 3: *Tsukuba*-test. Final disparity estimation obtained by each of the evaluated methods using a common input: (a) *dense automatic input* and (b) *sparse user input*. MRF-based methods are focused on obtaining an accurate solution using (a) an initial estimation available, and therefore, they are suboptimal when (b) a very sparse input is used. Besides execution time, our approach presents other advantage against RW. RW can only assign a choice among the input labels, i.e., if five depth values are given as input, only those five values will compose the final solution.

3 Application of the interactive dense labeling

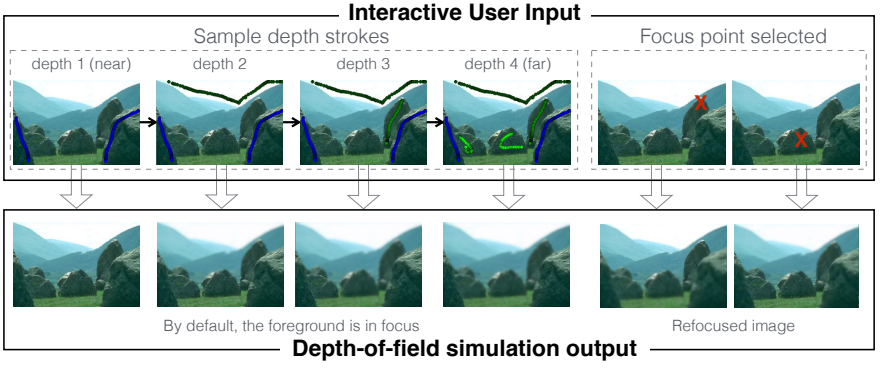

Figure 4: Behavior of the interactive depth-of-field application with user interactions. Left: the user marks a few strokes (different colors for different depths) to represent object positions. Each new edition interactively re-estimates depth labels and applies a depth-of-field effect. Right: the user changes the focus.

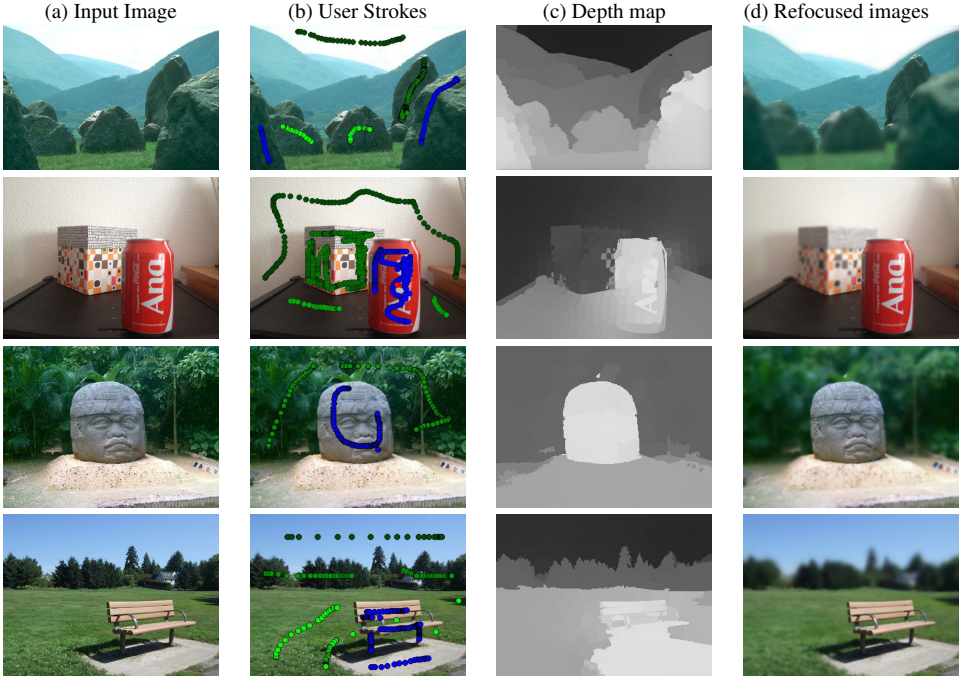

Figure 5: Results from interactive depth-of-field application. With a few user strokes (b) over the original image (a), the user can quickly get different depth-of-field effects in the image (d). The estimated depth map (c) is used to generate the depth-of-field effects.