

Computer Vision

Lab 05: Image Segmentation

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1 Image Preprocessing

smoothed image

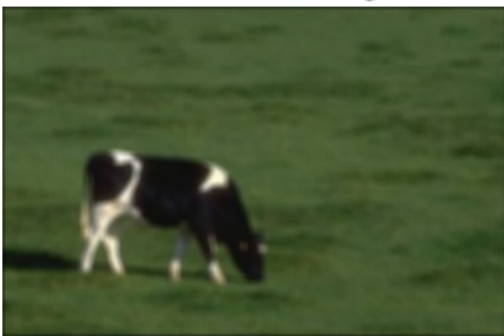


Figure 1. Smoothed image for Cow

L*a*b* image



Figure 2. L*a*b* image for Cow

smoothed image



Figure 3. Smoothed image for Zebra

L*a*b* image



Figure 4. L*a*b* image for Zebra

It is better to do segmentation in the L*a*b* color space as compared to RGB color space because unlike the RGB and CMYK color models, L*a*b* color is designed to approximate human vision. It aspires to perceptual uniformity, and its L component closely matches human perception of lightness. Apart from Image Segmentation, it can also be used to make accurate color balance corrections by modifying output curves in the a and b components, or to adjust the lightness contrast using the L component.

2 Mean-Shift Segmentation

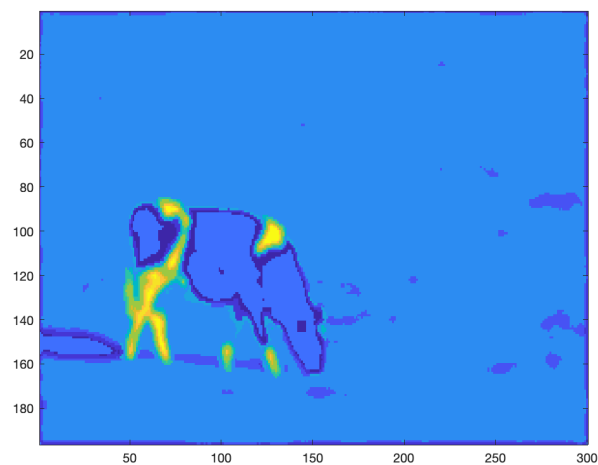


Figure 5. Image Map for Cow from Mean-Shift Segmentation

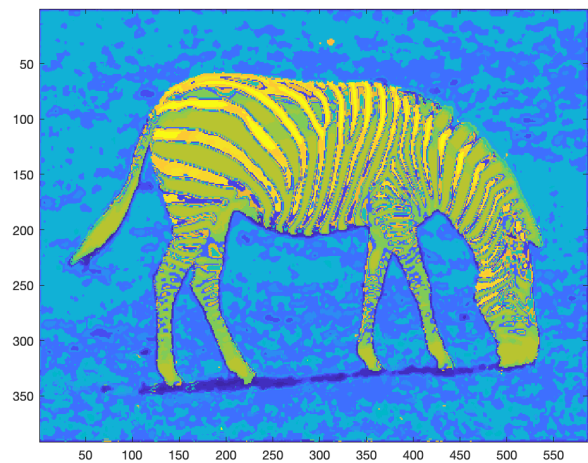


Figure 6. Image Map for Zebra from Mean-Shift Segmentation



Figure 7. Segment Visualization for Cow



Figure 8. Segment Visualization for Zebra

3 EM Segmentation

3.1 $K = 3$

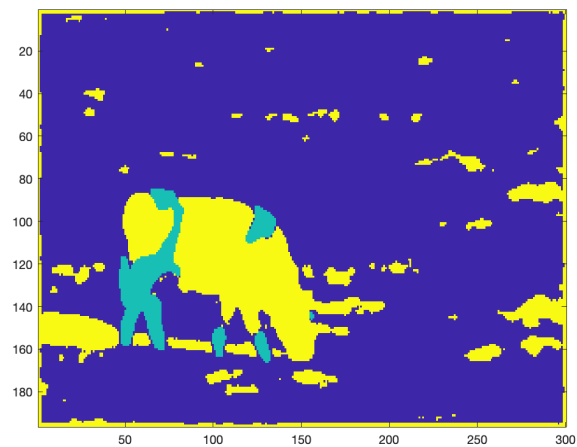


Figure 9. Image Map for Cow from EM Segmentation

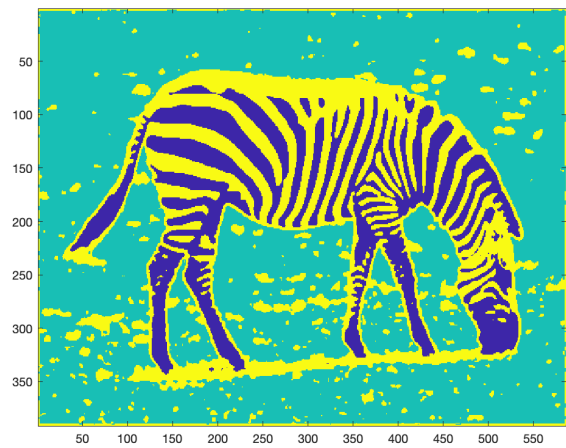


Figure 10. Image Map for Zebra from EM Segmentation



Figure 11. Segment Visualization for $K = 3$



Figure 12. Segment Visualization for $K = 3$

3.2 $K = 4$

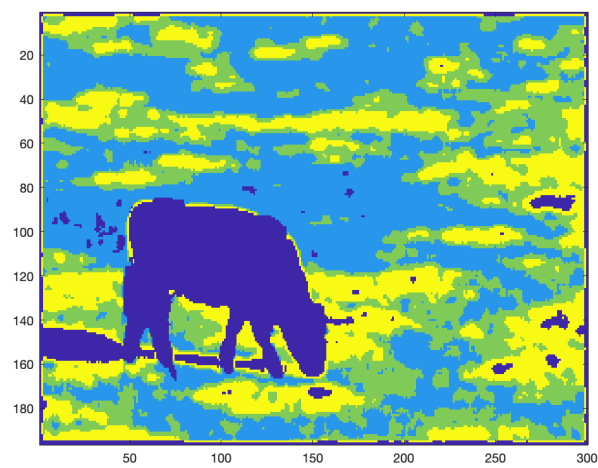


Figure 13. Image Map for Cow from EM Segmentation

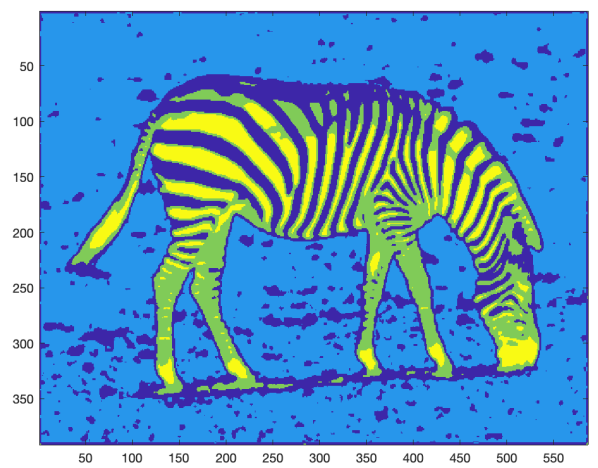


Figure 14. Image Map for Zebra from EM Segmentation



Figure 15. Segment Visualization for $K = 4$



Figure 16. Segment Visualization for $K = 4$

3.3 $K = 5$

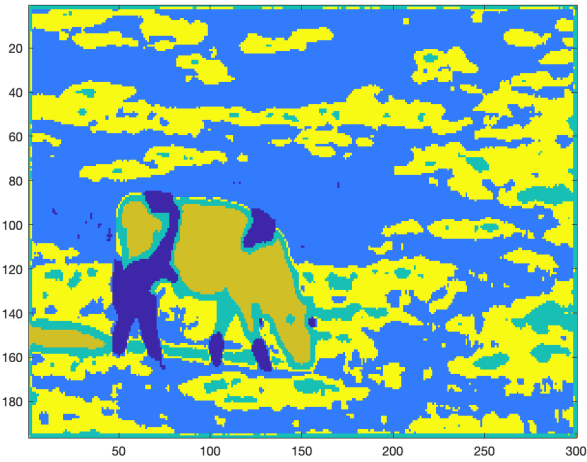


Figure 17. Image Map for Cow from EM Segmentation

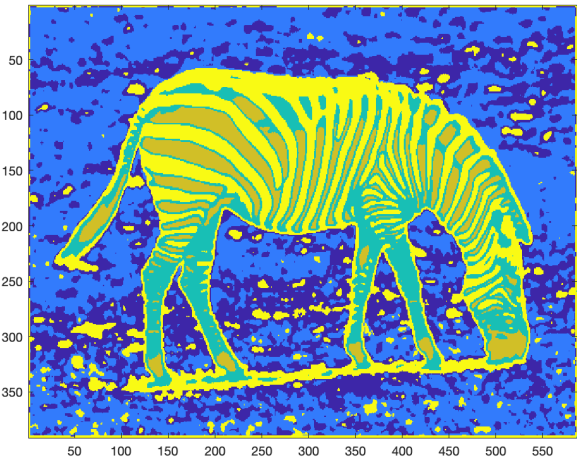


Figure 18. Image Map for Zebra from EM Segmentation



Figure 19. Segment Visualization for $K = 5$



Figure 20. Segment Visualization for $K = 5$