German University in Cairo
Department of Digital Media Engineering and Technology
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DMET 901: Computer Vision

Assignment 1

This assignment aims to test your knowledge of image processing techniques. This is to be done by providing some input images, alongside the correlated output of desire. (In some cases, some intermediate results are provided as well.) Image processing techniques subjects of testing are Arithmetic Operations, Geometric Operations, and Image Filtering. This assignment is divided into three sections as defined below.

Color Correction

In this section, you are asked to enhance some images by editing their appearance.

1. GUC top view: The top view image of the GUC, shown in Figure 1, is overbright. Your task is to dim it, as shown Figure 2.

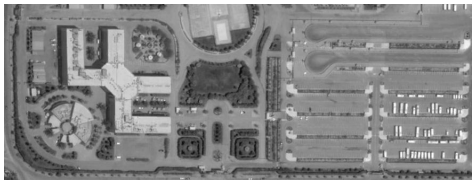

Figure 1: GUC top view

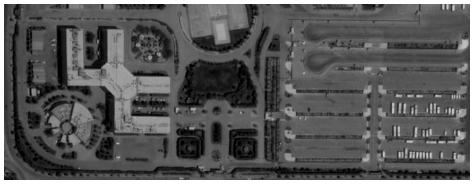

Figure 2: Top view after Dimming

2. Calculators shadow: As shown in Figure 3, the calculator has a shadow on the background. Your task is to eliminate that shadow. You can change the color of the background.

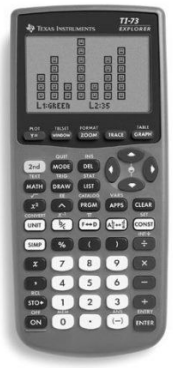

Figure 3: calculator with shadow

Figure 4: calculator without shadow

3. Cameraman's coat: As shown in Figure 5, the coat of the cameraman is too dark. The aim here is to show its details, without affecting the rest of the image. The result of brightening the whole image is shown in Figure 6. However, the output we seek is as shown in Figure 7.

Figure 5: cameraman

Figure 6: brightening

Figure 7: selective brightening

Basic Segmentation

In this section, you are asked to eliminate some segments of an input image. The segment to be eliminated has a property that differentiate it from the rest of the image. The image to work on is a lake image shown in Figure 8. Your task is to eliminate the lake, as shown in Figure 9. The main property which the lake area has is that the lake is smoothly detailed, unlike the tree area for example. As shown in Figure 9, your output if not required to be perfectly accurate. Figures 10 & 11 show intermediate results that may give you hints to lead you to the desired output.

Figure 8: Lake

Figure 9: Lake after elimination

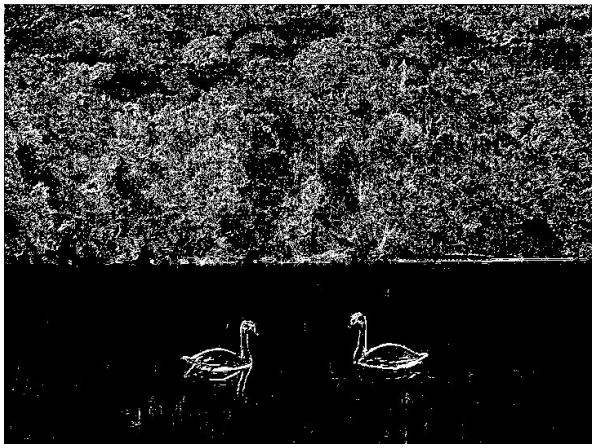

Figure 10: areas with high details marked white

Figure 11: widening of white pixels

Images Combination

In this section, you are asked to combine a pair of images into one. The first image, as shown in Figure 12, contains a man (James Bond). The main feature in this image that it has no background. Your task is to add a background to this image. Two background images are to be taken into consideration, shown in Figures 13 & 14 (showing London). The images are to be combined (Figures 12 with 13 together, and Figures 12 with 14), resulting in images shown in Figures 15 & 16 respectively. The main notes, in Figure 15, James Bond is shifted to the left, and in Figure 16, he is looking to the other side.

Assignment Regulations

- You will work on this assignment *individually*.
- The deadline is on the 20th of October.

- There will be evaluations after the midterms.
- The assignment is to be implemented using openCV on either Java, C++, or Python.
- Images to work on are available on the course page under the name of images.zip.

Figure 12: James Bond

Figure 13: London #1

Figure 14: London #2

Figure 15: combining Figures 12 & 13

Figure 16: combining Figures 12 & 14