

Digital image processing project 1

——dehazing

Goals

The goals of this project are as follows:

1. Understand image histogram and the process of histogram equalization.
2. Implement various methods for image enhancement (dehazing).
3. Gain experience dealing with image/video (reading, processing, writing image/video).

Description

There are some images under the folder IEI2019. Those named beginning with H are images to be enhanced, while the two beginning with R are normal images. Good dehazing algorithm works well with all the images, without compromising the visual quality of normal images.

There are several video files under the folder IEV2022. The computational complexity (or time consumption) must be taken into consideration when dealing with video enhancement.

Questions

1. Compute the histograms of image H22.png, H26.jpg, R1.jpg.
2. Compare the above histograms and write some comments about image quality and image histogram.
3. Enhance all the images under folder IEI2019 and enhance at least one video clip under the folder IEV2022, increase the contrast, reveal more details hidden in the fog (haze). Do it either in spatial domain or in frequency domain. Different dehazing techniques such as Dark Channel Prior or those based on Retinex or Homomorphic Filtering might be used.

Please keep an eye on the run-time efficiency of your algorithm.

Submitting your work

1. Make a PPT file, and present your work in the class (**Oct 25**). Each group has 10 minutes.
2. Submit the following materials to your Teaching Assistants before **23:59, Nov 1**:

A. Source code (*.m/*.c/*.cpp/*.py, ...)

B. Output results (in jpg, bmp or png format for images and mp4 or avi format for videos)

C. Project report (in word or pdf format)

List the names and student IDs of all team members on the first page of the report. It's recommended that you send a single zipped file named as YourGroupID+ProjectX (e.g. Group5+Project1.rar/ Group5+Project1.zip)

3. Your presentation and project report should be in English. Try your best!

All team members share the same project score! Teamwork! Teamwork! Teamwork!