MAEG5720

Computer Vision in Practice

Assignment 1

Date: 24th, Sep 2021

Due Date: 18:30pm 8th, Sep 2021

Aim: The aim of this assignment is to warm you up for MATLAB and get prepared for the coming assignment. Hence, the assignment will be simple and easy.

Given: A RGB image.

What to submit: Please submit (1) PDF file showing the question number and result. (2) your MATLAB .m file (please label your outcome).

(1) MATLAB has built-in functions enable you to read, display and manipulate images easily Your first question is to know basic Image transformation functions

MATLAB comes with many image processing functions for image manipulation. You job is to

(a) Use the given colour image and read an image into your workspace using "imread" function and display the image on screen(10%)
(b) Convert your image to grayscale and displace again. (10%)
(c) Rotate the grayscale image 30 deg counter-clockwise with MATLAB function (10%)
(d) Translate your image by [10, 10] using MATLAB function (10%)
(e) Warp the image by matrix T=[sc -ss 0; ss sc 0, Tx, Ty,1] using "imwarp" function and compare the result of (d) by yourself (10%)
Remark:
(i) MATLAB use another representation `[x y 1] = [u v 1] * T'` in affine transformation. The transformation matrix T' is a transpose of T
(ii) sc is scale*cosine(angle in radian), ss is scale*sine(angle in radian))

(2) When you need to do resize your image, you can use MATLAB "imresize" function
(a) Use the given colour image and read the image. Resize it by half resolution ***without*** filter (i.e. using 'nearest' option) (9%) Then. expand it using Near Neighbour interpolation, bilinear and bicubic interpolation (21%)
(b) Select a colour image and read the image. Resize it by half resolution ***with*** filter (i.e. using 'bilinear' option) (9%) Then. expand it using Near Neighbour interpolation, bilinear and bicubic interpolation (21%)

Optional

(3) Write you own code to do image upsizing using NN and Bilinear approach (Optional 10% bonus) Please write your own code. (TA and I google also)