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COMPUTER VISION HOMEWORK 2 REPORT

A) Calculating transforms matrix using source and target

B) Switching from first image to second image using t value.

C) Calculating Homogeneous coordinates. Using Homogeneous coordinates makes it possible for these geometric transforms (e.g. translation or affine) to be represented as matrix vector multiplication, i.e. a linear transformation.
[x1,y1, x2, y2, x3, y3]
becomes
[x1, x2, x3]
[y1, y2, y3]
[1, 1, 1]

D) Mtx
[x1, y1, 1, 0, 0, 0]
[0, 0, 0, x1, y1, 1]
[x2, y2, 1, 0, 0, 0]
[0, 0, 0, x2, y2, 1]
[x3, y3, 1, 0, 0, 0]
[0, 0, 0, x3, y3, 1]
Creating an array A which is in Ax = b equation

E) Mtx^(-1)*Q gives us coefficients needed for transformation

F) Transform
[a11, a12, a13]
[a21, a22, a23]
[0, 0, 1]
Creating Transform matrix using coefficients like above.

G) Finding points with integer values for bilinear interpolation and multiply them by their weigths.

H) Bilinear interpolation for each transformed points

I) Corresponding triangle in inter image
homo_inter_tri
[a1, a2, a3]
[b1, b2, b3]
[1, 1, 1]

J) Filling inside the polygon to create a mask
homo_inter_tri[1::-1,:].T
[b1, a1]
[b2, a2]
[b3, a3]

K) Gives x and y coordinates inside the polygon
seg[0] = [x0, x1, x2, x3, x4, x5, ...]
seg[1] = [y0, y1, y2, y3, y4, y5, ...]

L) Makes column vectors of [x_i, y_i, 1] those obtained points
mask_points
[[x0, x1, x2, x3, x4, ...]
[y0, y1, y2, y3, y4, ...]
[1, 1, 1, 1, 1, ...]]

M) Make it x1 y1 x2 y2 x3 y3 again in order to pass it to the calc_transform function
inter_tri : one dimensional array
[a1, b1, a2, b2, a3, b3]

N) Compute mapping function

O) Make Bilinear transformation

P) Taking weighted sum for two transformed image. Used the mapping functions to warp I to I(t) and J to J(t) Then, blend I(t) and J(t)