

FL#3

1. Design the edge detection system.
 - A. Use Sobel mask.
 - B. Input : image
 - C. Output : gradient map (dx, dy), edge strength map, edge orientation map, final edge map

2. Canny edge detector.
 - A. Use OpenCV canny edge detector, and compare the result with the edge map by Sobel mask in problem 1.

3. Design image scaling system.
 - A. Design bilinear scaling function.
 - B. Input : image (MxN), scaling factor (k>0)
 - C. Output : kM x kN scaled image

4. Design image transform system.
 - A. Design perspective transform function, where nearest-neighbor (NN) interpolation method to fill out the hole.
 - B. Input : image, 3x3 matrix with DoF=8 (number of parameters)
$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & 1 \end{bmatrix}$$
 - C. Output : transformed image.
 - D. Example.



$$\begin{bmatrix} 3 & 0 & 0 \\ 1 & 1 & 0 \\ 0.15 & 0 & 1 \end{bmatrix}$$

