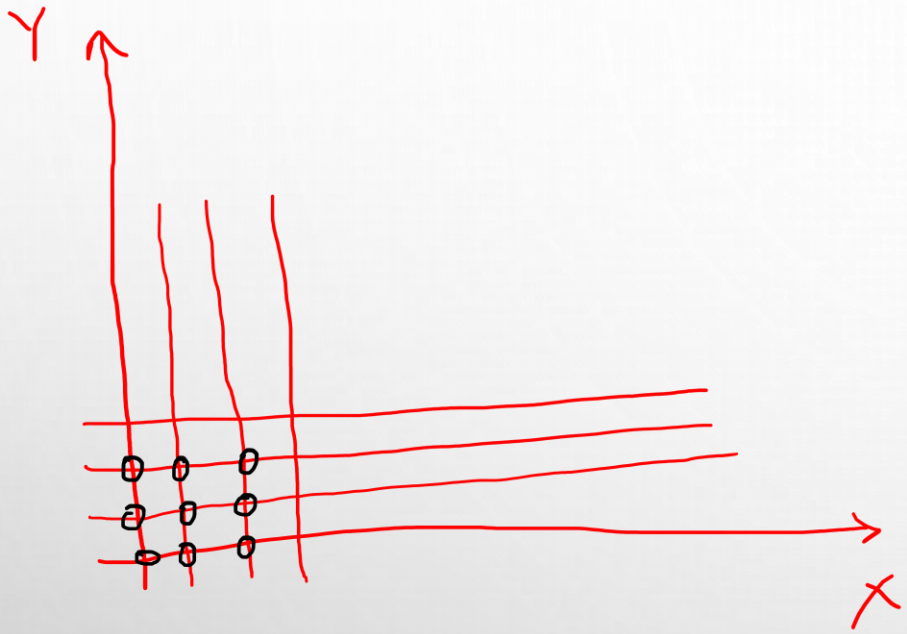
TRANSFORMATIONS, INTERPOLATION & RESAMPLING

Translation



$t_x = 1$; $t_y = 2$

$(0,0) \rightarrow (1,2)$

$(0,1) \rightarrow (1,3)$

$(0,2) \rightarrow$

$(1,0) \rightarrow$

$(1,1) \rightarrow$

$(1,2) \rightarrow$

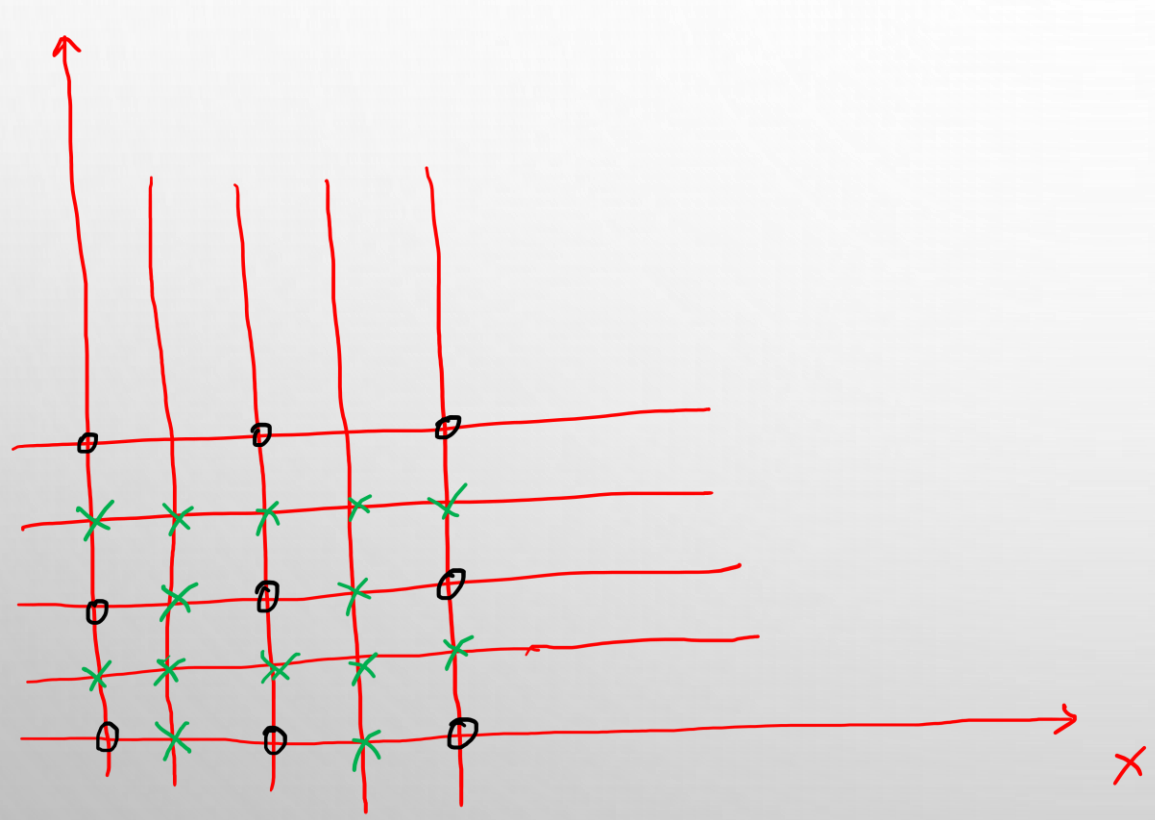
$(2,0) \rightarrow$

$(2,1) \rightarrow$

$(2,2) \rightarrow (3,4)$

Scaling

$$C_x = C_y = 2$$



$(0,0) \rightarrow (0,0)$

$(0,1) \rightarrow (0,2)$

$(0,2) \rightarrow (0,4)$

$(1,0) \rightarrow (2,0)$

$(1,1) \rightarrow (2,2)$

$(1,2) \rightarrow (2,4)$

$(2,0) \rightarrow (4,0)$

$(2,1) \rightarrow (4,2)$

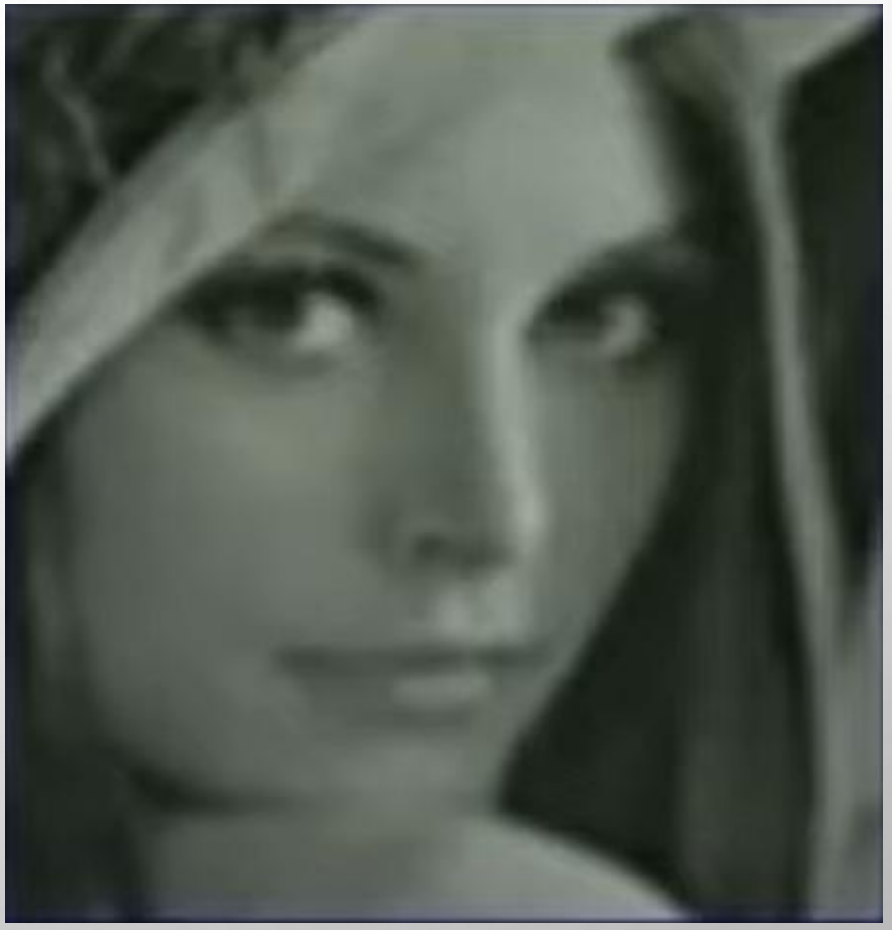
$(2,2) \rightarrow (4,4)$

Scaled image by factor 3

Nearest Neighbour Interpolation

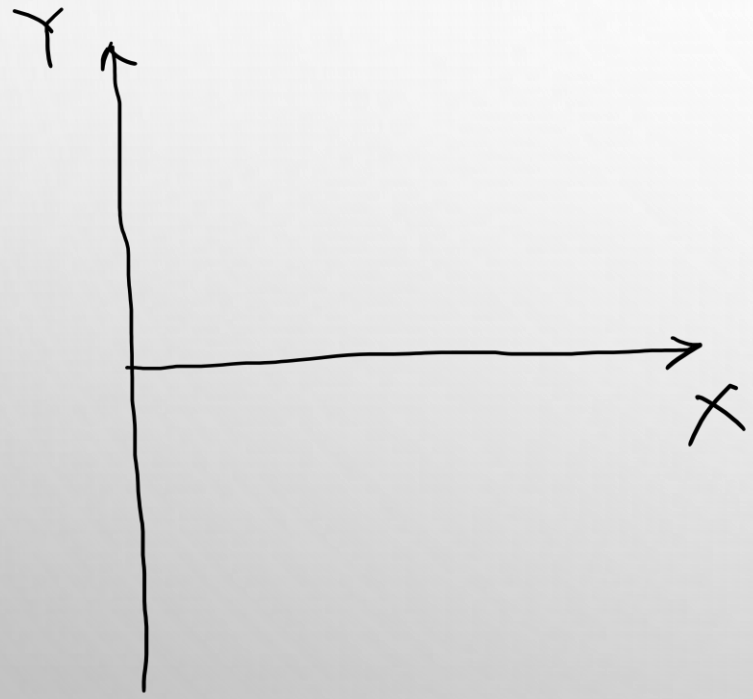
Bilinear Interpolation

Bicubical Interpolation



Robotics

$\alpha = 45^\circ$



$(0,0) \rightarrow (0,0) \rightarrow (0,0)$

$(0,1) \rightarrow (0.707, 0.707) \rightarrow (1,1)$

$(0,2) \rightarrow (1.414, 1.414) \rightarrow (1,1)$

$(1,0) \rightarrow (0.707, -0.707) \rightarrow (1,-1)$

$(1,1) \rightarrow (1.414, 0) \rightarrow (1,0)$

$(1,2) \rightarrow (2.121, 0.707) \rightarrow (2,1)$

$(2,0) \rightarrow (1.414, -1.414) \rightarrow (1,-1)$

$(2,1) \rightarrow (2.121, -0.707) \rightarrow (2,-1)$

$(2,2) \rightarrow (2.828, 0) \rightarrow (3,0)$

Rotated image by 30 degree

Bicubic Interpolation