**Image Interpolation Algorithm**

Nearest Neighbor Interpolation and Bilinear Interpolation 11712610 马思清

1. **Nearest Neighbor Interpolation**

Nearest Neighbor Interpolation is a basic interpolation technique in image processing. When reshaping an image( increase or decrease the number of pixels), we first create a new image which have different pixel density and normalized it with the old image in the same scale.The main problems is how to determine the intensity of each new pixel. In Nearest Neighbor Interpolation, for each new pixel, the intensity is determined by the nearest old pixel, so called nearest neighbor. Notice that some equidistance situations may occur, if so, we choose one of the nearest pixels, in this algorithm, we always choose the top left corner.

The pseudo code:

1. **Bilinear Interpolation**

Bilinear Interpolation is a modified imterpolation approach. Comparing with the Nearest Neighbot Interpolation, Bilinear use a linear processing method instead of the nearest neighbor to determine the intensity of the new pixel. In this new approach, for each new pixel whose intensity is unknown, we first find four nearest old pixels, which form a retangle around the new pixel. Then based on the intensity of these four points, use an linear fitting method to get the intensity of the new pixel.

The pseudo code: