This part is for the dictionary learning. The basic idea is based on the method in reference. Here we tried to speed the original algorithm in a hierarchical way.

Goal:

To reconstruct the image with lower pixel fraction and get acceptable psnr value

Method:

1 Start from the quarter size of the original image to get the first level dictionary

2 Get the second level dictionary based on former level for the half size image

3 Get the last level dictionary based on former level for the whole size image

In particular, there are different ways to enlarge the dictionary, resample the element coefficients as well as mix enlarge and split procedures.

Problems:

In my view, quarter size image has lost a lot of information. Dictionary starting from this level will not work well. The hierarchical idea does speed up the algorithm a lot but does not give us reconstruction of better quality.

Future work:

The distributed realization of the original algorithm