

Machine Learning-Homework 2

Shih-Min, Lin
Department of Applied Mathematics
National Chung Hsing University
Taichung, Taiwan

I. PREPROCESS

- (i) 把圖片轉成jpg檔
- (ii) Texture及Cartoon圖resize成64*64的大小

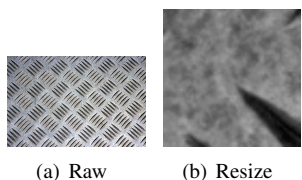


Fig. 1. Texture pic.

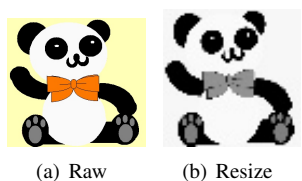


Fig. 2. Cartoon pic.

C. Results

- 1. Texture Dictionary
Step:2000

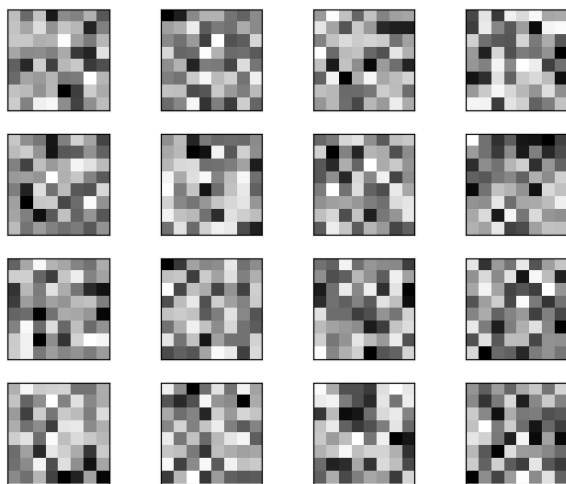


Fig. 3. Texture

- 2. Cartoon Dictionary
Step:3000

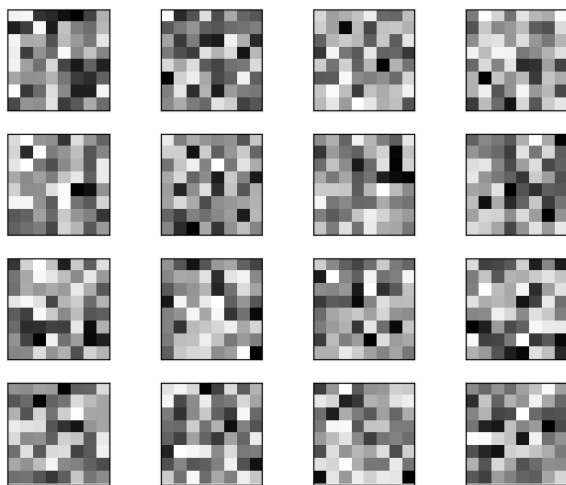


Fig. 4. Cartoon

II. LEARN TWO DICTIONARIES RESPECTIVELY

A. Texture Partition

將圖片切成一格一格，原本64*64的圖片切成8*8的小圖，將8*8的小圖flatten成64*1的向量 y_1 , $A = [y_1 \dots y_k]$

B. Model

Objective function:

$$\min_{D,A} \|Y - DA\|^2 + \lambda \sum |\alpha_j|_0$$

Sparse Coding:

$$\min_{D,A} \|Y - \hat{D}\hat{A}\|^2 + \lambda \sum |\alpha_j|_0$$

Dictionary Upgrading:

$$\min_{D,A} \|Y - D\hat{A}\|^2 + \lambda \sum |\hat{\alpha}_j|_0$$