Computer Vision. Homework 4.

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Project Report

My project is an image classifier, implemented in Python using <u>K-Nearest Neighbor</u> algorithm. In process of making this project, I followed these steps below:

1. Create a database of the images from training set, using dictionary data structure: an image name as a key and a list of intensity values of each pixel as a value.

2. Find the neighbors of each test image, measuring Euclidian distances between a test image and every image from training set. Save the Euclidian distances into dictionary with training image name as a key and its distance to the test image as a value.

3. Classify images according to the filenames of k training images with the smallest distance.

4. Count correct predictions and calculate the classification accuracy rate.

According to abovementioned steps, I created four functions: <u>createDatabase</u> for step 1, <u>euclidianDiatance</u> and <u>findNeighbors</u> for step 2, <u>classifyImage</u> for step 3.

Libraries I used: numpy, math, operator (to sort the dictionary values), also I used resize function from skimage.transform (to change image sizes) and imread function from skimage.io.

I defined <u>k as 7</u>, because it gives the highest <u>accuracy rate</u>: <u>56.67%.</u>

Also, the images in both train set and test set have different sizes, so I resize all of them to <u>128x64.</u>

The output

Test image: 58.jpg Seems like it is NOT a horse	Test image: horse219.jpg Seems like it is a horse
Test image: 59.jpg Seems like it is a horse	Test image: horse220.jpg Seems like it is NOT a horse
Test image: 60.jpg Seems like it is NOT a horse	Test image: horse221.jpg Seems like it is a horse
Test image: 61.jpg Seems like it is NOT a horse	Test image: horse222.jpg Seems like it is NOT a horse
Test image: 62.jpg Seems like it is a horse	Test image: horse223.jpg Seems like it is NOT a horse
Test image: 63.jpg Seems like it is NOT a horse	Test image: horse225.jpg Seems like it is NOT a horse

Test image: 64.jpg
Seems like it is NOT a horse

Test image: 65.jpg
Seems like it is NOT a horse

Test image: 66.jpg
Seems like it is NOT a horse

Test image: 67.jpg
Seems like it is NOT a horse

Test image: 68.jpg
Seems like it is NOT a horse

Test image: 69.jpg
Seems like it is NOT a horse

Test image: 70.jpg
Seems like it is a horse

Test image: 71.jpg
Seems like it is NOT a horse

Test image: 72.jpg
Seems like it is NOT a horse

Test image: horse226.jpg
Seems like it is a horse

Test image: horse227.jpg
Seems like it is NOT a horse

Test image: horse228.jpg
Seems like it is NOT a horse

Test image: horse229.jpg
Seems like it is a horse

Test image: horse230.jpg
Seems like it is NOT a horse

Test image: horse231.jpg
Seems like it is NOT a horse

Test image: horse232.jpg
Seems like it is NOT a horse

Test image: horse234.jpg
Seems like it is a horse

Test image: horse235.jpg
Seems like it is NOT a horse

17 correct predictions out of 30 test images

Classification accuracy: 56.67 %