COMP 421 – HOMEWORK 01

REPORT

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After reading training and test data from the given csv file, I placed the data in relevant matrices in which rows represent each image and columns represent pixel indices.

Then I estimated the parameters by taking mean values of columns in the training sets of each class (A, B, C, D, E). This actually estimates the probability that a pixel occurs in the relevant class (letter).

In the prediction function that I implemented, I used the following discriminant function to compute prediction values of an image for each class:

$$g_i(x) = \sum_j \left(x_j \log p_{ij} + \left(1 - x_j\right) \log(1 - p_{ij}) \right)$$

(The safe-log function used as stated by the professor)

The prediction function returns the index of the class whose prediction value is the maximum among all classes. (1 for A, 2 for B, etc.)

Then, I implemented two for loops (one for training data, one for test data) to fill the confusion matrices. In the loops, I call the prediction function for each image from the relevant set and update the relevant confusion matrix according to the result returned by the function.

At the end, I successfully received the same results with the ones in the homework description document.