Lab -2

CSET340- Advanced Computer Vision and Video analytics

Task-1: - Perform following operations on image-

1.1 Image Resizing: Resizing involves changing the dimensions of an image, either by scaling it up or down.

1.1 Image resizing (interpolation methods)
- 1.1.1 Linear
- 1.1.2 Nearest Neighbors
- 1.1.3 Polynomial

1.2 Image Blurring: Blurring is used to reduce image detail, suppress noise, or create artistic effects. Common techniques include:

1.2 Image blurring
- 1.2.1 Box blurring
- 1.2.2 Gaussian blurring
- 1.2.3 Adaptive blurring

Task-2: - Apply Machine Learning Algorithm and find the model accuracy based on K fold Cross Validation with (80-20 train-test split).

2.1 Use MNIST dataset

2.2 Use any two of the following algorithms-
- 2.2.1 Naive Bayesian or its variant.
- 2.2.2 Support Vector Machine (SVM) or its variant
- 2.2.3 Decision Trees/ Random Forest.
- 2.2.4 AdaBoost or other ensemble algorithms.

2.2.5 Artificial Neural Networks (NN) or its variant.

2.3 Results should be obtained on following parameters-

2.3.1 Accuracy

2.3.2 Precision (Positive Predictive Value)

2.3.3 Recall (Sensitivity)

2.3.4 F-Measure

2.3.5 Confusion Matrix

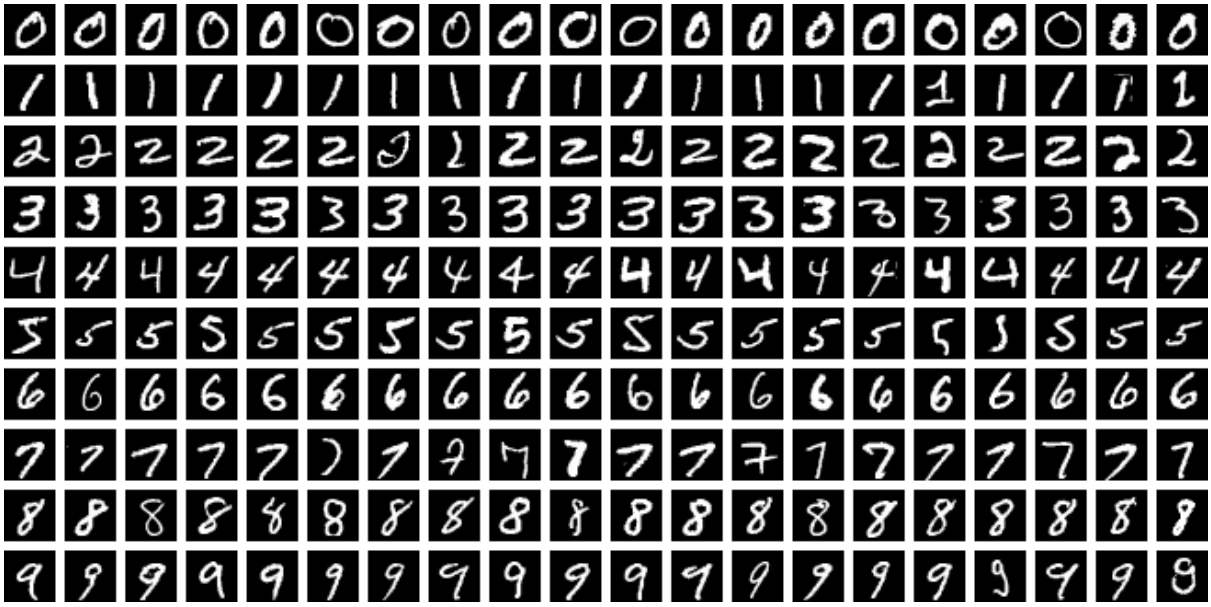
2.3.6 ROC

2.3.7 AUC

Appendix:-

About MNIST :-

- The MINST dataset stands for "***Modified National Institute of Standards and Technology***".
- The dataset contains a large collection of handwritten digits that is commonly used for training various image processing systems.



- The dataset was created by re-mixing samples from NIST's original datasets, which were taken from American Census Bureau employees and high school students.
- It contains 60,000 training images and 10,000 testing images, each of which is a grayscale image of size 28x28 pixels.
    - **Number of Instances:** 70,000 images
    - **Number of Attributes:** 784 (28x28 pixels)
    - **Target:** Column represents the digit (0-9) corresponding to the handwritten image
    - **Pixel 1-784:** Each pixel value (0-255) represents the grayscale intensity of the corresponding pixel in the image.
    - The dataset is divided into two main subsets:

    - **Training Set:** Consists of 60,000 images along with their labels, commonly used for training machine learning models.
    - **Test Set:** Contains 10,000 images with their corresponding labels, used for evaluating the performance of trained models.
- Link:- https://www.kaggle.com/datasets/hojjatk/mnist-dataset
- Note:- Use sklearn, pyspark, or any other ML library for applying the ML algorithms.
    - Load the dataset in sklearn using ‘load_digits’.
    - Load the dataset in pyspark using 'spark.read.csv()”
    - Submission to be done on LMS as per instructions provided there.