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Deep Learning Techniques (LAB)

Date	Title	Sign
24/07/2025	1. Exploring the deep learning platform	
31/07/25	2. Implement a classifier using open-source dataset	
31/07/25	3. STudy of the classifiers with respect to statistical parameters	
14/08/25	4. Build a simple feed forward neural network to recognize handwritten character	
22/08/25	5. STudy of Activation functions and their role	
09/09/25	6. Implement gradient descent and backpropagation in deep neural networks	
16/09/25	7. Build a CNN model to classify Cat and Dog image	

LAB 3

31/07/25 Study of the classifiers with respect to statistical Parameters

* Aim :

To implement various classifier Using Iris dataset and analysis the statistical parameter

* Objective :

1. To understand the working principles of KNN and Navie Bayes classifier
2. To implement both algorithm on a standard datasets
3. To evaluate model performance using statistical parameters
   - → Accuracy
   - → precision
   - → Recall
   - → F1-score
4. To compare classification performance between two algorithms

* pseudocode : KNN

Input : Training data (x_train, y_train), Test data (X_test, number of neighbors K

for each sample in x_test

1. Calculate distance from to all points in x_train
2. Sort distances and select the k nearest neighb
3. find the most frequent class label among neighbors
4. Assign that label to the test sample
5. output : predicted class labels for all test samples.

* Statistical parameters

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

$$\text{precision} = \frac{TP}{TP + FP}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$\text{F1-score} = 2 * \frac{\text{precision} * \text{Recall}}{\text{precision} + \text{Recall}}$$

Bayes Theorem

$$P(C/X) = \frac{P(X/C) \cdot P(C)}{P(X)}$$

Naive Bayes

Input: Training data (X_train, y_train), Test data (X_test)

1. Calculate prior probability for each class:
   P(class) = (number of sample in class) / (Total samples)
2. For each feature, calculate conditional probability
3. For each test sample:
   for each class:
   calculate posterior probability

output: predicted class labels for all test samples

output:-

KNN

Accuracy = 0.98

classification Report

	precision	recall	f1-score	support
setosa	1.00	1.00	1.00	16
versicolor	1.00	0.94	0.97	18
virginica	0.92	1.00	0.96	11
Macro avg	0.97	0.98	0.98	45
weighted avg	0.98	0.98	0.98	45

Naives Bayes

Accuracy : 1.00

classification Report

	precision	recall	f1-score	support
setosa	1.00	1.00	1.00	16
versicolor	1.00	1.00	1.00	18
virginica	1.00	1.00	1.00	11
Macro avg	1.00	1.00	1.00	45
weighted avg	1.00	1.00	1.00	45

*Result:

Successfully the [illegible] implemented the KNN and Naives Bayes classifier using statistical parameter