Practical No. 8.

Aim : To implement the Naive Bayes classification algorithm using python on a real-world dataset & evaluate its performance.

Input : 1] Iris dataset
2] Target : species of flower.

output : Accuracy
classification Report : Precision
Recall
f1-score
support.

Theory :-

Naive Bayes is a probabilistic classifier based on Baye's theorem. It is termed "naive" because it assumes that all input features are independent of each other, which rarely happens in real data. Despite this assumption it performs, it performs remarkable well in practice, especially in text classification, spam detection, & sentiment analysis.

Baye's Theorem:

Bayes theorem provides a way of calculating posterior probability P(A|B) from prior probability P(B) & P(B|A)

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$$

where:
P(A|B) is the posterior probability
P(B|A) is the likehood
P(A) is prior probability of A
P(B) is the prior probability of B.

Types of Naive Bayes:

1) Gaussian Naive Bayes -
Assume that features follows normal distri
It is useful when dealing with continuous da

2) Multinomial Naive Bayes -
Suitable for descrete data, ex as word coun
text classification.

3) Bernouli Naive Byes -
Deals with binary / boolean features It m
presence or absence of features.

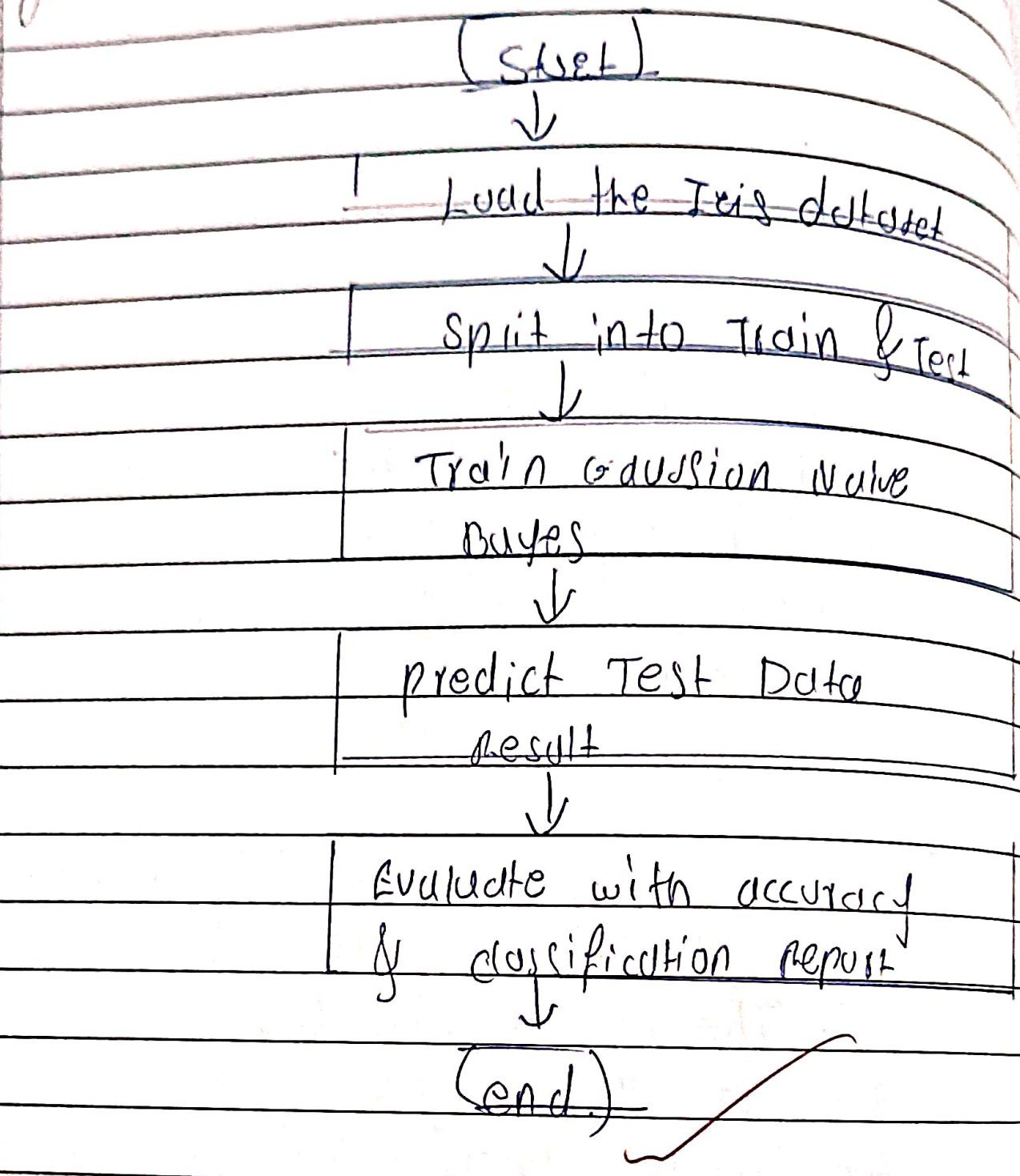
Algorithm :

[Step 1] : Start
[Step 2] : Load the dataset
[Step 3] : Split the data in training & testing sets.
[Step 4] : Train the Naive Bayes classifier.
[Step 5] : predict using the test set
[Step 6] : Evaluate the model using accuracy & classification report.

Conclusion :

In this practical, we successfully implemented the naive Bayes classification Algorithm using the Iris dataset. The model provided a high accuracy indicating that the Naive Bayes classifier is effective for simple classification problems. Although it assumes feature independence, it still performs well in many real-world applications due to its efficiency & ease of use.

Flowchart :


Start
Load the Iris dataset
Split into Train & Test
Train Gaussian Naive Bayes
predict Test Data result
Evaluate with accuracy & classification report
End