DMW Assignment

A One-Class Classification Decision Tree

Based on Kernel Density Estimation

Submitted By - [Akhil Shukla, IIT2018112] [Akhil Singh, IIT2018198][Javed Ali, IIT2018501][Manan Bajaj, IIT2018502][Lokesh, IIT2018503]

6 th Semester, B.Tech, Department of Information Technology, IIIT Allahabad

Algorithm :

For each attribute aj ∈ A t , the algorithm achieves the following steps, at a given node t.

1. Check if the attribute is still eligible and compute the related Kernel Density Estimation (KDE), i.e., an estimation of the probability density function f ˆ j (x) based on the available training instances
2. Divide the space χ t , based on the modes of f ˆ j (x) .
3. The quality of the division is assessed by the computation of the impurity of the resulting nodes deriving from division.

Implementation

The above algorithm is for unbalanced datasets. Applied the OC-Tree algorithm on Iris Dataset.

Observation

OCSVM Precision Score on letter recognition dataset-0.9885057471264368

OCSVM Recall Score on letter recognition dataset-0.9809885931558935

Iforest Precision Score on letter recognition dataset-0.9898348157560356

Iforest Recall Score on letter recognition dataset-0.9873257287705957

References

[1] Itani, Sarah, Fabian Lecron, and Philippe Fortemps. "A one-class classification decision tree based on kernel density estimation." *Applied Soft Computing* 91 (2020): 106250.

[2] Letter Dataset - https://archive.ics.uci.edu/ml/datasets/Letter+Recognition