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| **Experiment no.** | |
| **AIM :** | **Decision Trees** |
| **Theory:** | A **Decision Tree** is a supervised learning algorithm used for **classification and regression**. It works by recursively splitting the dataset based on feature values to create **homogeneous subsets**. For **numerical features**, splits are made using **thresholds**, and the best split is chosen by minimizing an impurity measure such as **Gini impurity** (or maximizing Information Gain). The process continues until nodes become pure or stopping criteria are met. |
| **Code:** | [**https://github.com/CodeCraftsmanRaj/ML\_Sem6**](https://github.com/CodeCraftsmanRaj/ML_Sem6) |
| **OUTPUT:** |  |
| **CONCLUSION:** | In this experiment, a decision tree was manually constructed by calculating **Gini impurity** for different numerical feature split points. For the feature **Prev\_Exam\_Score**, candidate thresholds were evaluated, and the split at **63.0** produced the **minimum weighted Gini impurity (0.222)**. This shows that decision trees effectively identify the most informative feature thresholds to separate classes, and manual calculations help in understanding how trees make optimal decisions. |