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**Assignment-07**

**Assignment 7: Classification Technique – Graduate Admissions**

**1. Objective**

To predict whether a student will get admission to a foreign university based on their GRE, TOEFL scores, academic records, and research experience using a **Decision Tree Classifier**.

**2. Dataset Description**

* Features:
  + **GRE Score**
  + **TOEFL Score**
  + **University Rating**
  + **SOP Strength**
  + **LOR Strength**
  + **UG GPA**
  + **Research Experience**
  + **Admitted (0 = No, 1 = Yes)** *(Target Variable)*

**3. Classification Algorithm**

* **Decision Tree Classifier**:
  + A flowchart-like tree structure where internal nodes represent feature tests, branches represent outcomes, and leaves represent class labels (Admit/Not Admit).
  + Works well for **interpretable** and **rule-based predictions**.

**4. Data Preprocessing**

* Handle missing values (if any).
* Apply **Label Encoding** (only if there are categorical variables, e.g., Research).
* Normalize/scale scores if needed (optional).
* Check for data consistency.

**5. Data Preparation**

* Split data into:
  + **Training Set** (typically 80%)
  + **Testing Set** (20%)
* Use train\_test\_split() from sklearn.model\_selection.

**6. Model Application**

* Use DecisionTreeClassifier from sklearn.tree.
* Train the model using training data.
* Predict on test data.

CODE- From Visual Studio Code.

**7. Model Evaluation Metrics**

* **Confusion Matrix:** Shows TP, FP, TN, FN.
* **Accuracy:** TP+TNTotal\frac{TP + TN}{Total}TotalTP+TN​
* **Precision:** TPTP+FP\frac{TP}{TP + FP}TP+FPTP​
* **Recall:** TPTP+FN\frac{TP}{TP + FN}TP+FNTP​
* **F1 Score:** Harmonic mean of precision and recall.