# Student Performance Grade Class Prediction

## Overview

This project aims to predict student performance grades using machine learning models. The workflow includes data preprocessing, exploratory data analysis, model training, and deployment via a Streamlit web app.

## Approach

1. **Data Preprocessing:**
   * The dataset (Student\_performance\_data \_.csv) was cleaned and prepared using pandas.
     + Drop
     + Fillna
     + Duplication
     + fillna
   * Exploratory Data Analysis (EDA) was performed using seaborn and matplotlib to visualize distributions and relationships.
     + Box plot
     + Heat map
     + Scatter plot
   * Features were selected and encoded as needed for model training.
     + FBR
     + FEW
     + SelectKBest
2. **Modeling:**
   * Two models were trained using scikit-learn: Decision Tree and Support Vector Machine (SVM).
     + SVM
     + Decision Tree
   * The models were evaluated for accuracy and saved as .pkl files for deployment.
3. **Deployment:**
   * A Streamlit app (app.py) allows users to input student features and select a model to predict the grade class.

## Tools Used

* **pandas:** Data manipulation and preprocessing
* **seaborn:** Data visualization
* **matplotlib:** Data visualization
* **scikit-learn:** Machine learning modeling and evaluation

## Results

* Both models achieved reasonable 80+ accuracy in predicting student grade classes.
* For detailed results, visualizations, and code, see data\_preprocessing.ipynb file.

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