CSE3812: Artificial Intelligence Lab - Assignment 3

Assignment Title: Predicting Student Exam Success Using KNN

1. Chosen k and Rationale:

The value of k chosen was 3. This value was selected as it provides a balance between overfitting and underfitting, ensuring the model captures local patterns without being overly influenced by noise.

2. Data Observations and Preprocessing:

- Dataset has 10 samples with features: Hours_Studied, Hours_Slept, Prior_Grade, and Result.
- No missing values were found.
- Features were scaled using StandardScaler to improve KNN performance.

3. Final Accuracy and Confusion Matrix Analysis:

- Accuracy: 0.67 (67%).
- Confusion Matrix:

  [[2 1]

  [1 1]]

- The model correctly classified most students but misclassified some due to the small dataset size.

4. Results Discussion:

- Limitations:
  - Small dataset limits the model's generalization ability.
  - Imbalanced class distribution may affect performance.

- Suggested Improvements:
  - Collect more data for better training.
  - Explore additional features like attendance, participation, etc.
  - Experiment with other classification models for comparison.

5. Example Prediction:

For a student who studies 3 hours/day, sleeps 6.5 hours/day, and has a prior grade of 77, the model predicts: 'pass'.