Practical No. 4

Problem Statement: Prediction of Personality Traits based on Handwriting Analysis using ML.

**Objectives**

1. Identify different actors and use cases from a given problem statement
2. Associate use cases with different types of relationships
3. Draw a use-case diagram

**Actors:**

1. **User (Writer)**:
   * This is the person whose handwriting is being analyzed.
   * The user provides the handwriting sample to the system for personality prediction.
2. **System (Personality Prediction System)**:
   * The system analyzes the handwriting and predicts the personality traits based on the data.
3. **Administrator**:
   * Administering the machine learning model, updating the system, or managing the database.
   * May include tasks like fine-tuning the model, retraining it with new data, and monitoring performance.
4. **ML Model (Machine Learning Algorithm)**:
   * Not a human actor, but the ML model processes the handwriting data to predict personality traits.
   * It is the underlying engine that powers the prediction but can be considered an external actor in this case.

**Use Cases:**

1. **Input Handwriting Sample**:
   * The user provides a handwriting sample (e.g., by scanning a handwritten document or typing input if a sample is digital).
   * This input is the first step for the prediction system.
2. **Process Handwriting**:
   * The system analyzes the handwriting sample (e.g., extracting features such as size, slant, pressure, and other handwriting characteristics).
3. **Analyze Personality Traits**:
   * The system applies the ML model to analyze the handwriting and predict personality traits based on pre-trained algorithms.
4. **Display Personality Traits**:
   * Once the analysis is done, the system provides an output, such as a report or a visualization of the predicted personality traits.
5. **Retrain Model**:
   * Admin is responsible for retraining the machine learning model using new handwriting samples to improve prediction accuracy over time.
6. **Manage Data**:
   * Admin can manage the database of handwriting samples and personality data (e.g., add new data, update old data).
7. **Provide Feedback**:
   * The system can prompt the user to offer feedback on the prediction, whether they feel it accurately represents their personality or not. This could help in retraining the model or adjusting predictions.

**Use Case Diagram Structure:**

* **System (Personality Prediction System)**: This is represented by a rectangle in the center of the diagram, containing the use cases inside it.
* **Actors** (e.g., User, Administrator, etc.): Represented by stick figures outside the system boundary.
* **Use Cases**: Represented by ellipses, each labeled with the corresponding functionality, such as "Input Handwriting Sample," "Analyze Personality Traits," "Retrain Model," etc.

**Example Diagram Flow:**

1. **User** interacts with the system by submitting a handwriting sample.
2. The **System** processes the handwriting and analyzes personality traits.
3. The **System** then displays the predicted personality traits to the user.
4. The **Administrator** can manage the data, retrain the model, and ensure the system stays up-to-date.