EDU CLaaS

Formative Assignment 1b

Module Name	Python Programming for AI
Course Name	Bachelor of Technology in Software Engineering
Assignment Title	Identifying Machine Learning Scenarios

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The objective of this assignment is to assess your understanding of Machine Learning concepts by identifying scenarios or tasks that either involve Machine Learning or do not. Through this assignment, you will learn to distinguish between situations where Machine Learning is applicable and those where it is not.

Instructions

- Part 1: Scenario Identification

    1. You will be presented with ten different scenarios or tasks.

    2. For each scenario, you need to determine whether it involves Machine Learning (ML) or not.

    3. Provide a brief explanation (2-3 sentences) for each scenario explaining why you think it does or does not involve Machine Learning.

- Part 2: Justification

    o After identifying whether ML is involved or not, justify your decision by referring to key characteristics and principles of Machine Learning that support your choice.

Scenarios

1. Spam Email Filter: A system that automatically moves emails suspected of being spam into a separate folder.

2. Weather Forecasting: Predicting the weather for the next week based on historical weather data.

3. Calculator: A device or software that performs arithmetic calculations.

4. Autonomous Car Navigation: A self-driving car that uses sensors and data to navigate without human intervention.

5. Voice Assistant (e.g., Siri or Alexa): A virtual assistant that responds to voice commands and questions.

6. Language Translation App: An application that translates text from one language to another.

7. Chess Game: A computer program that plays chess with a human opponent.

8. Image Viewer: Software that displays images from your computer.

9. Medical Diagnosis: A system that analyzes medical data to provide a diagnosis.

10. Recipe Book: A collection of recipes for preparing different dishes.

Submission Guidelines

- Submit your assignment as a typed pdf document.

- Clearly label each scenario (e.g., Scenario 1, Scenario 2) and provide your determination (Involves ML / Does not involve ML) along with a brief justification for each.

Grading Criteria

- Your assignment will be evaluated based on the following criteria:

- Accurate Identification: Correctly identifying whether Machine Learning is involved or not in each scenario.

- Justification: Providing clear and relevant justifications for your decisions, citing ML principles where applicable.

- Clarity and Organization: The clarity of your explanations and the overall organization of your assignment.

Task Wise Solutions:
- **Scenario 1:** Spam Email Filter
  - **Determination:** Involves ML
  - **Justification:** Spam filters utilize Machine Learning as it requires the classification and identification of what Spam mail looks like which are gathered from large datasets and trained with a label if they are spam or not.
- **Scenario 2:** Weather Forecasting
  - **Determination:** Involves ML
  - **Justification:** Modern weather forecasting requires the use of historical data and complex statistical models which involve the use of ML to predict future weather conditions accurately.
- **Scenario 3:** Calculator
  - **Determination:** Does not involve ML
  - **Justification:** A calculator is utilizes arithmetic operations with predefined and rule-based algorithms which are primitive and does not require ML systems.
- **Scenario 4:** Autonomous Car Navigation
  - **Determination:** Involves ML
  - **Justification:** Self-driving cars rely heavily on ML such as object detection and classification, sensor data interpretation and real-time decision making. These systems utilize a trained dataset containing vast amounts of driving data relating to proper driving, regulation, safety and handling of complex environments.
- **Scenario 5:** Voice Assistant (e.g., Siri or Alexa)
  - **Determination:** involves ML
  - **Justification:** Voice Assistants use a Speech to Text system which utilizes ML to understand specific audio patterns to understand the user's voice and then natural language processing and context understanding takes over so that the assistant can trigger commands from request. They improve their accuracy by learning from user interactions and language data.
- **Scenario 6:** Language Translation App
  - **Determination:** Involves ML
  - **Justification:** Modern translation apps utilize ML models like neural networks to perform language translation. Such

models learn from extensive parallel texts (bilingual corpora) to improve accuracy overtime.

- **Scenario 7:** Chess Game
    - **Determination:** Does not involve ML
    - **Justification:** Traditional chess bots use rule-based algorithms and search techniques rather than learning from data as they were created to be run on weaker hardware. Modern versions of Chess bots exist that use ML but due to complexity and high hardware requirements, most of these programs stick to primitive methods.
- **Scenario 8:** Image Viewer
    - **Determination:** Does not involve ML
    - **Justification:** An image viewer's primary function is to display image files encoded in a specific format through a renderer. There is no need for an ML system to be utilized here.
- **Scenario 9:** Medical Diagnosis
    - **Determination:** Involves ML
    - **Justification:** Medical Diagnosis systems often use ML for medical data analysis and pattern identification for quick and accurate disease classification. These systems are designed to assist healthcare professionals by providing insights based on learning from historical cases stored on a large dataset.
- **Scenario 10:** Recipe Book
    - **Determination**: Does not involve ML
    - **Justification:** A recipe book is just a static collection of cooking instructions and ingredients for meals without any mechanism for update or learning overtime. It simply just stores and presents information.