CT032-3-3 Further Artificial Intelligence

Part 1: Analysis & Design (30%)

Assignment Overview

You are required to develop a machine learning solution for prediction, classification, or clustering using real-world data. This first part focuses on planning and designing your solution before implementation.

Learning Outcomes

By completing this assignment, you will:

- Demonstrate understanding of AI/ML model design principles.
- Apply feature selection and engineering concepts.
- Create detailed technical documentation.
- Develop architecture frameworks for AI solutions.

Assignment Components

1. Feature Selection and Analysis (40 marks)

- Clearly define the problem and objectives of your proposed model.
- Conduct a thorough literature review to identify potential indicators and dimensions.
- Evaluate the relevance and suitability of each feature/indicator/dimension for your specific problem.
- Provide clear explanations and justifications for your chosen features.
- Demonstrate how your selected features align with your model's goals and the existing literature.

2. Architecture Framework Design (40 marks)

- Break down your proposed solution into logical, sequential steps.
- Identify the key components needed in your architecture framework.
- Organize the components into a cohesive, efficient structure.
- Ensure your architecture integrates your selected features and aligns with problem objectives.
- Provide detailed explanations and justifications for each component and design choice.
- Use clear diagrams or flowcharts to visually represent your architecture framework.

3. Algorithm Selection and Justification (20 marks)

- Research and compare different algorithms suitable for your model and data.
- Select the most appropriate algorithms based on performance, efficiency, and compatibility.
- Provide clear, technical descriptions of your chosen algorithms.
- Explain how each algorithm fits into your overall model architecture.
- Justify your algorithm choices by linking them to your specific problem, data, and objectives.
- Discuss any limitations or trade-offs of your selected algorithms and how you plan to address them.

Submission Requirements

1. Documentation Standards and Citation Formatting

a) Technical Documentation Guidelines

1. Writing Quality:
   - Clarity: Use clear, concise, and professional language
   - Terminology:
     - Employ precise technical terminology.
     - Ensure consistency in terminology throughout the document.
     - Define specialized terms or acronyms on first use.
2. Visual Elements
   - Diagrams and Flowcharts:
     - Include clear, descriptive labels.
     - Use consistent formatting and color schemes.
     - Add captions explaining the purpose of each diagram.
     - Ensure all visual elements are referenced in the text.

b) Documentation Format

Structural Elements

1. Page Layout**:**
   - Consistent fonts (recommended: Arial, Calibri, or Times New Roman)
   - Uniform spacing (typically 1.5 line spacing)
   - Clear margins (1-inch standard)
2. Headings**:**
   - Hierarchical structure with clear section and subsection headings
   - Consistent formatting for different heading levels
3. Page Numbering**:**
   - Sequential page numbers
   - Header or footer placement
   - Start numbering from the title page or contents page

c) Citation Formats: APA

APA (American Psychological Association) Citation Format

1. In-text Citations:

- Author-date style (Smith, 2020)
- Direct quotes include page numbers

2. Reference List:
    - Alphabetical order
    - Hanging indent
    - Full bibliographic details
3. Examples:
    - Book: Author, A. A. (Year). *Book title*. Publisher.
    - Journal Article: Author, A. A. (Year). Article title. *Journal Name, Volume*(Issue), pages.

2. Required Proposal Sections:

a) Title page with student details
b) Table of contents
c) Three (3) main sections as outlined above.
d) References
e) Appendices (if needed)

3. The submission documentation's content should include the following items:

a) Proposal
b) Teamwork Evaluation Form
c) Marking rubric

This is a group assignment.

The electronic submission must be done by the assigned due date and time. Failure to do so will subject to academic misconduct.

Each reference cited in text must appear in the reference list, and each entry in the reference list must be cited in text.

A Turnitin report is necessary for assessment purposes. A Turnitin similarity report indicating a percentage below 15% is deemed acceptable, signifying the originality of the written research report. Conversely, a percentage below 10% is considered acceptable for the AI plagiarism detector.