Assignment 2

AI for Medicine

Instructions

- This assignment aims to:

i. Apply advanced data analytics techniques to real-world medical or healthcare-related problems.

ii. Integrate multiple methods — regression, clustering, association rule mining, and classification — to develop data-driven insights or solutions.

iii. Encourage independent problem framing and creative modeling relevant to engineering system design or optimization.

Instructions

- Each student will:

i. Identify a problem related to the Integrated Design Project (IDP) undertaken by your juniors. (One group per student)

ii. Collect or simulate a dataset that represents engineering system performance, sensor data, operational data, or experimental measurements related to that project.

iii. Conduct an end-to-end data analysis pipeline using at least two different types of data analysis methods (e.g., regression + clustering, or classification + association rules).

Deliverables

Submission Deadline: Week 13

- Technical report (max 15 pages) following the format provided.
  - Submit as: KIE4033_Asgn2_StudentID.pdf
- Code: Provide GitHub link in your report
- Presentation: 5-minute recorded presentation
  - Record in MS Teams.

Report Format (max 15 pages)

- Cover Page
- Abstract (150 words)
- Introduction
- Problem Definition
- Data Description & EDA
- Proposed AI-based Solution Concept
- Results & Discussion
- Conclusion
- References

Rubrics

Criteria	5	4-3	2-1
Problem Definition & Relevance (10%)	Problem well-defined, highly relevant to AI4Medicine, clear objectives aligned with clinical context.	Clear problem and objectives with moderate linkage to AI4Medicine context.	Problem stated but lacks clarity or strong relevance to AI4Medicine.
Data Understanding & Preprocessing (15%)	Comprehensive preprocessing, justified data source, strong handling of missing/outlier values.	Good preprocessing with some justification and minor issues with data handling.	Basic data handling with limited justification and incomplete preprocessing.
Methodology & Justification (25%)	Innovative and correct application of multiple analytical methods with clear rationale.	Appropriate methods applied correctly, minor improvement possible in explanation or execution.	Methods applied with limited understanding or missing rationale.

Rubrics

Criteria	5	4-3	2-1
Results & valuation(20%)	Insightful, accurate, and well-validated analysis with professional interpretation of results.	Accurate analysis and reasonable interpretation, some minor gaps in validation.	Some analysis results presented, but interpretation shallow or inconsistent.
Business Intelligences (10%)	Exceptional ability to extract actionable insights and connect with healthcare or business intelligence outcomes.	Good insights drawn, though limited connection to business or clinical applications.	Limited insights with minimal business or clinical value.
Presentation (20%)	Highly engaging, clear delivery, excellent visualization, and timing.	Clear and well-paced presentation with good visuals.	Average presentation, lacks engagement or depth.