

Part 1: Short Answer (14 points)

1. Problem Definition (6 pts)

AI Problem:

Predicting the likelihood of hospital readmission within 30 days after patient discharge.

Objectives:

1. Identify high-risk patients early to enable timely interventions.
2. Reduce unnecessary hospital readmissions and associated costs.
3. Improve overall quality of post-discharge care.

Stakeholders:

1. **Hospital Administrators** – to manage readmission-related penalties and improve performance metrics.
2. **Patients and Caregivers** – to receive better follow-up care and avoid preventable readmissions.

Key Performance Indicator (KPI):

Percentage reduction in 30-day hospital readmission rate after AI implementation.

2. Data Collection & Preprocessing (8 pts)

Two Data Sources:

1. **Electronic Health Records (EHR):** Contains patient demographics, diagnoses, procedures, medications, and lab results.
2. **Health Insurance Claims:** Includes billing data, discharge summaries, and readmission events.

Potential Bias in the Data:

Bias may occur if certain demographic groups (e.g., low-income or rural patients) are underrepresented in the training data. This could cause the model to underperform for these populations and worsen healthcare disparities.

Three Preprocessing Steps:

1. **Handling Missing Data:** Use imputation techniques (mean, median, or regression) to fill in missing values in lab tests or discharge notes.
2. **Encoding Categorical Variables:** Convert features like diagnosis codes and insurance types using one-hot or label encoding.

3. **Normalization:** Apply min-max scaling or standardization to numeric fields such as age, length of stay, or lab results to ensure consistent model input.

Part 4: Support Reflection (6 pts)

To support the final reflection:

- I will **review all team sections** for consistency and suggest edits to improve clarity, especially in explaining technical concepts.
- I will **ensure alignment between sections** – for example, confirming that the problem defined is accurately reflected in the modeling and evaluation phases.
- I will contribute to **refining the final write-up** by checking grammar, structure, and overall logical flow, ensuring the document feels like a cohesive team effort.