

Examining Fairness and Interpretability of ML Models in Predicting Neutropenic Fever Post-Chemotherapy

Supervisor: Dr. Farnaz Rahimi

Neutropenic fever is a complication of chemotherapy, characterized by fever and low neutrophil counts, and is associated with significant morbidity and mortality. Accurate prediction of neutropenic fever is critical for early interventions and improved patient outcomes. However, predictive models in healthcare must be both fair across diverse patient demographics and interpretable for reliable decision-making.

This project aims to evaluate the fairness and interpretability of machine learning models for predicting neutropenic fever after chemotherapy using the MIMIC-IV dataset. The research will focus on identifying disparities in prediction performance across protected demographic attributes (e.g., age, race, and gender) and leveraging interpretability methods to uncover important clinical features and assess potential biases in the models.

The project will proceed in the following steps:

- Train and evaluate machine learning models for predicting neutropenic fever post-chemotherapy.
- Apply and compare fairness metrics to assess disparities in model performance across different demographic groups.
- Apply state-of-the-art methods such as feature importance methods for evaluating interpretability.
- Perform validation and reporting the outcomes.

Requirements:

- Proficiency in Python programming
- Strong knowledge of machine learning models and their evaluation methods