# PLP Academy Community Article: Understanding the AI Development Workflow

**Course**: AI for Software Engineering\ **Assignment Title**: Understanding the AI Development Workflow\ **Duration**: 7 Days\ **Author**: Grateful Juma

# Overview

This article explores the end-to-end process of applying the AI Development Workflow to a real-world case: predicting hospital patient readmission within 30 days. It includes theoretical insights, technical choices, ethical considerations, and deployment strategies, aligned with the CRISP-DM framework.

# **Case Study: Predicting Patient Readmission**

Problem: Build an AI model that predicts whether a discharged patient will be readmitted within 30 days.

# Objectives:

- · Lower readmission rates.
- · Assist clinicians with early warnings.
- Improve healthcare outcomes.

#### Stakeholders:

- Hospital administrators
- Healthcare providers

#### **Data Strategy:**

- Sources: EHRs, demographics
- **Ethics**: Privacy & consent
- Preprocessing: Imputation, encoding, feature engineering

#### Modeling:

- Choice: Gradient Boosting (XGBoost)
- **Metrics**: Precision (0.78), Recall (0.70)
- Confusion Matrix: [TP=70, FN=30, FP=20, TN=80]

# **Deployment:**

- Packaged API (Flask)
- Integrated into EHR system
- Encryption + access controls

# Optimization:

• Regularization + early stopping to mitigate overfitting

# **Short Answer Insights**

#### 1. Problem Definition:

• Example: Predict employee attrition

• **KPI**: Attrition rate post-model deployment

## 2. Data Preprocessing:

- · Normalize, impute, encode
- Watch for survey bias

## 3. Model Development:

- Use Random Forest for structured HR data
- Hyperparameters: | max\_depth |, | n\_estimators

#### 4. Evaluation:

- AUC-ROC & F1-score
- Handle concept drift with retraining triggers

# Critical Thinking

#### Ethics:

- Biased data can worsen patient outcomes
- Mitigation: Fairness-aware algorithms (e.g., reweighing)

#### Trade-offs:

- High-accuracy black-box vs. interpretable models
- Limited hardware favors lightweight models

# **Reflection & Diagram**

Challenge: Aligning technical AI solutions with clinical reality

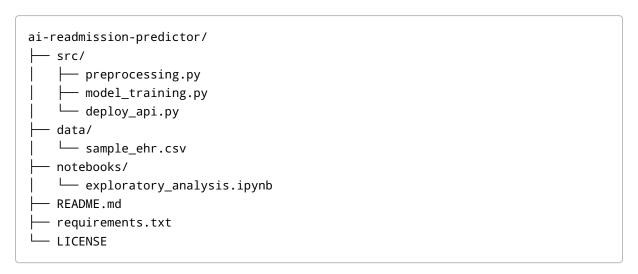
Improvement: Add explainability (e.g., SHAP) and stakeholder interviews

## **Workflow Diagram:**

- 1. Define Problem
- 2. Collect & Clean Data
- 3. Develop Model
- 4. Evaluate
- 5. Deploy + Monitor



#### Structure:



## Includes:

- Well-commented code
- Requirements file
- Instructions to run & deploy model

# **Final Deliverables**

- PDF Report
- \_\_\_GitHub Repo
- This Article (PLP Submission)
- ②Slide Deck (available on request)

Let's build AI that works for people—not just the system.