Xt-EHR T7.2 Sub-team for Imaging Reports Model

Xt-EHR Analysis Platform

Document: analysis-process-flow

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Analysis based on PARROT v1.0 dataset and Xt-EHR FHIR Implementation Guide

Analysis Process Flow and Methodology

Overview

This document details the methodology used to analyze the Xt-EHR Imaging Report information model against real-world usage patterns from the PARROT dataset.

Process Flow Diagram

```mermaid graph TB subgraph "■ Data Sources" A["■■ Xt-EHR FHIR IG v0.2.1
EHDS Information Models
*github.com/Xt-EHR/xt-ehr-common*"] B["■ PARROT v1.0 Dataset
2,738 Real-World Reports
*14 Languages, 21 Countries*"] end

subgraph "■ Model Extraction Phase" C["■ Extract Data Elements
Header & Body Structure
*EHDSImagingReport.fsh*"] D["■■ Classify Element Types
Required vs Optional
*Cardinality Analysis*"] end

subgraph "■ Real-World Analysis Phase" E["■ Parse Report Content
Multi-language Processing
*Clinical Narratives*"] F["■ Identify Usage Patterns
Modality, Anatomy, Findings
*ICD Code Classification*"] end

subgraph "■■ Comparative Analysis Phase" G["■ Map Real-World to Model
Element Usage Frequency
*Quantitative Assessment*"] H["■ Gap Analysis
Used vs Unused Elements
*Coverage Statistics*"] end

subgraph "■ Evidence-Based Classification" I["■ BASIC Elements
11 Core Elements
*90%+ Clinical Value*"] J["■ INTERMEDIATE Elements
6 Enhanced Workflow
*Targeted Use Cases*"] K["■ BEYOND BASIC Elements
31+ Admin/Technical
*Specialized Functions*"] end
```

subgraph "■ Implementation Strategy" L["■ Phase 1: Basic Profile
Immediate Clinical Value
Low Complexity"] M["■ Phase 2: Enhanced Profile
Workflow Integration
Medium Complexity"] N["■ Phase 3: Full Profile
Comprehensive Coverage
High Complexity"] end

A --> C A --> D B --> E B --> F C --> G D --> G E --> G F --> G G --> H H --> I H --> J H --> K I --> L J --> M K --> N

style A fill:#e1f5fe,stroke:#0277bd,stroke-width:2px style B fill:#f3e5f5,stroke:#7b1fa2,stroke-width:2px style I fill:#c8e6c9,stroke:#2e7d32,stroke-width:2px style J fill:#fff3e0,stroke:#ef6c00,stroke-width:2px style K fill:#ffebee,stroke:#c62828,stroke-width:2px style L fill:#e8f5e8,stroke:#4caf50,stroke-width:2px style M fill:#fff8e1,stroke:#ff9800,stroke-width:2px style N fill:#fce4ec,stroke:#e91e63,stroke-width:2px ```

Detailed Methodology

1. Data Source Analysis

Xt-EHR Model Extraction

Source: Xt-EHR/xt-ehr-common v0.2.1 - **Method**: Parse FSH (FHIR Shorthand) model definitions - **Focus**: EHDSImagingReport and EHDSImagingStudy logical models - **Output**: Comprehensive element inventory with cardinality and descriptions

PARROT Dataset Processing

Source: PARROT v1.0 - **Method**: JSONL parsing and content analysis - **Scope**: 2,738 reports across 14 languages and 21 countries - **Analysis**: Content extraction, modality classification, clinical narrative processing

2. Mapping and Analysis

Element Usage Mapping

```python

# Example mapping process

real_world_elements = extract_from_parrot_reports() model_elements = parse_xt_ehr_models() usage_mapping = map_elements(real_world_elements, model_elements) coverage_analysis = calculate_coverage(usage_mapping) ```
```

Classification Criteria

| Category | Usage Threshold | Implementation Priority | Clinical Impact |

BASIC	>75% real-world presence	High	Critical for patient care
INTERMEDIATE	25-75% presence or high clinical value	Medium	Enhanced workflows
BEYOND BASIC	<25% presence, admin/technical focus	Low	Specialized use cases

3. Evidence-Based Recommendations

Validation Process

Quantitative Analysis: Statistical coverage of real-world reports 2. **Clinical Review**: Assessment of clinical necessity and workflow impact 3. **Implementation Assessment**: Technical complexity and resource requirements 4. **Use Case Mapping**: Alignment with specific healthcare scenarios

Traceability Matrix

Every classification decision includes: - Reference to source Xt-EHR model element - Quantitative evidence from PARROT analysis - Clinical justification - Implementation complexity assessment

Quality Assurance

Data Validation

Cross-verification of PARROT dataset statistics - Consistency checks across language and country variations - Validation against published healthcare standards

Model Verification

Direct reference to official Xt-EHR FSH definitions - Version control tracking (v0.2.1 specific) - Cross-reference with FHIR Implementation Guide documentation

Reproducibility

Complete methodology documentation - Open-source analysis scripts - Publicly available datasets - Version-controlled analysis results

References

Xt-EHR Project: EHDS Logical Information Models v0.2.1 2. **PARROT Dataset**: Multi-language Radiology Reports v1.0 3. **Analysis Scripts**: GitHub Repository 4. **FHIR Standards**: HL7 FHIR R5

This methodology ensures full traceability and reproducibility of our evidence-based recommendations for Xt-EHR implementation prioritization.