SHM Heavy Equipment Price Prediction
WeAreBit Tech Case Assessment

PROJECT OVERVIEW

Dataset Scale:
- 412,698 equipment auction records
- 1989 - 2012 time period
- $4,750 - 142,000 price range
- $31,215 average sale price

Business Objective:
- Develop ML models for accurate equipment valuation
- Target: 60% of predictions within 15% tolerance
- Enable automated pricing for SHM marketplace
- Reduce manual valuation overhead and errors

Technical Approach:
- Advanced ML algorithms (RandomForest, CatBoost)
- Comprehensive feature engineering
- Temporal validation methodology
- Production-ready pipeline development

KEY CHALLENGES IDENTIFIED

1. Data Quality Issues
   - 82% missing usage data (machine hours)
   - Critical for depreciation modeling

2. Market Volatility
   - Financial crisis impact (2008-2010)
   - Requires time-aware validation

3. High-Cardinality Features
   - 5 categorical features >100 values
   - Complex encoding requirements

4. Geographic Variations
   - State-level price differences
   - Regional market effects