ChatterFix Predictive Intelligence Architecture

AI-Powered Failure Prediction & Proactive Maintenance

USER INTERFACE LAYER

- Predictive Dashboard
- Mobile App (Field Techs)
- Alert System (Real-time)
- Management Reports

API SERVICES LAYER

- /predict/failures — Asset failure predictions
- /predict/asset/{id} — Single asset analysis
- /training/retrain — Model retraining
- /maintenance/auto-create — Auto PM generation
- /realtime/alerts — Live notifications
- /analytics/performance — Model metrics

Work Order System

AI & MACHINE LEARNING LAYER

- **Feature Engineering** — Rolling Stats, Trend Analysis, Anomaly Detection
- **Failure Prediction Models** — Random Forest, Isolation Forest, Ensemble Methods
- **Gemini 1.5 Flash** — Technical Analysis, Pattern Recognition, Root Cause Analysis
- **GPT-5 Synergy** — Natural Language, Recommendations, User Communication
- **Optimization Engine** — Schedule Optimization, Resource Allocation, Cost Minimization
- **Learning System** — Model Updates, Feedback Loop, Accuracy Improvement

Notification Service

Asset Management

DATA SOURCES LAYER

- **TimescaleDB IoT Sensors** — Temperature, Vibration, Pressure, Current
- **PostgreSQL Work Orders** — Historical Maintenance Records
- **Asset Database** — Equipment Specifications, Hierarchy
- **Maintenance Logs** — Technician Notes, Procedures
- **External Systems** — ERP, SCADA, Historian

LEGEND:
- Data Sources
- AI/ML Processing
- API Services
- User Interfaces
- External Systems