Kyungbang Case Study

Transforming Quality Data Management with AI at Kyungbang Textile Factory

To help Kyungbang modernise its quality control processes, we designed and built a centralised, AI-enhanced data system that consolidates fiber quality test results, supplier reports, and purchase records. By introducing automation and machine learning, the project aims to dramatically reduce manual workload, improve decision speed, and unlock new levels of data insight for blending and quality assurance.

The Challenge

Kyungbang’ s quality team faced multiple operational bottlenecks:

- **Manual Reconciliation Overload**: Specialists spent significant time manually comparing HVI and AFIS test data against supplier reports. These came in various formats—PDFs, Excel files, and even paper—leading to errors and delays in production decisions.
- **Disjointed Data Retrieval**: Staff had to search across emails, ERP records, and machine logs to retrieve information for specific lots or batches, then manually align and validate the data. This slowed down incident response and hindered historical analysis.
- **Blending Inefficiencies**: Optimal mixing ratios were based on experience and trial-and-error rather than hard data. This resulted in inconsistency in yarn quality and dependence on senior staff.

Our Approach

We tackled these issues through a multi-layered, AI-integrated solution:

- **Structured, Centralised Database**: All quality data is migrated into a SQL database with standardised schemas to serve as a single source of truth.
- **AI-Powered PDF Parsing**: Using language models, we automated the extraction of tables and metadata from PDF invoices, HVI, and AFIS reports—handling inconsistencies and formatting quirks that traditional tools struggled with.
- **ETL Automation**: We built a robust pipeline that:
  - Parses and extracts raw data from files
  - Standardises units, cleans missing values

    - Links files to the correct lots and loads them into the database
- **Web Interface for Data Access**: A user-friendly application allows staff to import/export reports, browse and filter test results, and perform advanced analysis—all without relying on Excel.
- **AI-Driven Enhancements** *(in progress & planned)*:
    - **Predictive Blending Suggestions**: Training machine learning models to recommend ideal blending ratios based on historical test outcomes
    - **Anomaly Detection**: Automatically flagging outlier test results for faster issue resolution
    - **Natural Language Search**: Enabling staff to query data using plain English (e.g. “Show lots from March with high trash content”)
    - **Automated Summary Reports**: Generating weekly/monthly quality insights, supplier comparisons, and trend alerts

The Result

The project is still underway, but we expect to deliver:

- **Over 90% reduction in manual reconciliation effort** through AI-driven data extraction and linking
- **Faster, data-informed production decisions**, even during quality incidents
- **More consistent yarn quality** through predictive blending models
- **Scalable, future-ready infrastructure** for integrating new machines, suppliers, and analytics tools

By combining industrial domain knowledge with AI-powered automation, we’re helping Kyungbang transform its quality operations—from reactive and manual, to proactive and data-driven.