

AI-DRIVEN MANUFACTURING TRANSFORMATION FOR A BIOTECH LEADER

Connected AI program across bioreactors and document intelligence

Challenge

A leading global biotechnology corporation pursuing breakthrough science for serious and life-threatening diseases needed to modernize commercial drug production end-to-end. Estimating viable cell density for fermenter inoculation depended on manual methods that slowed yield and quality decisions, while bioreactor operations lacked predictive intelligence to prevent failures before they occurred. At the same time, twenty years of paper records constrained data access, searchability, and operational efficiency across the manufacturing footprint.

Approach



Built a real-time predictive model on Keras and TensorFlow to estimate viable cell density during commercial drug production, integrated with Google Cloud Storage and BigQuery for live data access.



Delivered a multi-phase bioreactor program spanning digitization, data transformation, AI acceleration, machine intelligence, soft-sensor automation, Industry 4.0 adoption, and digital twin simulation.



Engineered deep-learning models for remaining useful life, process failure, and sensor failure prediction — extending into AR/XR-enabled workflows and optical AI for cell-state monitoring.



Digitized twenty years of paper documents on GCP using a Cloud OCR + Custom OCR pipeline with NLP entity extraction, confidence-threshold validation, and human-in-the-loop correction.

Outcomes Delivered



Enabled real-time prediction of viable cell density and PCT viability, supporting faster, more precise commercial drug production decisions.



Improved bioreactor yield and quality through intelligent sensing, predictive maintenance, and data-driven research operationalization.



Replaced two decades of manual document handling with a searchable, secure digital archive — reducing labor effort and saving time and cost.

Closing

Veltris combined applied deep learning, Industry 4.0 engineering, and document intelligence to give a global biotechnology leader a connected production foundation — turning manual processes, paper records, and reactive operations into predictive, data-driven manufacturing at scale.