

Maximizing Bioprocess Yield by Reducing Fermentation Time



The Customer

A Fortune 500 pharma company optimizing fermentation used in drug development; they sought to reduce total process time while maximizing yield by predicting correct manual input parameters throughout the fermentation process.

The Challenge

- High process times with tight time constraints for maximizing output
- Need high accuracy with low odds of defective batches
- Minimize risk of batch failure while achieving desired quantity and quality

The Solution

Stand up an end-to-end ML pipeline for bioprocess optimization:

- Data cleaning and prep (easy read from Redshift)
- Enable ML with Spark, scikit-learn, Keras, Prophet, ARIMA (100+ processors)
- Process evaluation and workflow-driven testing for manual input parameters
- External integration: downstream apps; workflows versioned in GitHub

The Results

- Optimized parameter selection across fermentation stages
- Faster, more reliable batch outcomes
- Continuous improvements via new features/algorithms
- Global collaboration and seamless execution

Impact Delivered

- 45% Reduction in fermentation cycle time
- 25% Increase in batch yield
- 30% Lower batch-failure risk
- 35% Faster insight generation

Solution Components

- Redshift
- Spark
- scikit-learn
- Keras
- Prophet
- ARIMA
- GitHub