Manufacturing Analytics, Simplified
The Problem

Lack of Production Visibility
Silos of Disconnected Data
No Machine Connectivity
The Solution
MachineMetrics is filling this gap with the first vertically integrated out-of-the-box Industrial IoT Platform for Manufacturers.
Case Study: Applying Anomaly Detection on Control Data

Add Part Counts
Case Study: Applying Anomaly Detection on Control Data

Remove periods of inactivity
Case Study: Applying Anomaly Detection on Control Data

Obtain cleaned signal
Case Study: Applying Anomaly Detection on Control Data

Apply Principal Components Analysis (PCA)
Case Study: Applying Anomaly Detection on Control Data

Apply PCA/Pull out Part Signatures
Case Study: Applying Anomaly Detection on Control Data

Determine Time Series Features of each Part Signature

Others:
- Autocorrelation
- Maximum change of mean
- Flat spots
...
Case Study: Applying Anomaly Detection on Control Data

Obtain Time Series Features for each Part Signature

Apply PCA on Time Series Features and Find Outliers with DBSCAN
Results

Apply PCA on Time Series Features and Find Outliers with DBSCAN
Alternative Use Case
Case Study: Applying Anomaly Detection on Control Data

Detect Part Cycles
Find when the part_count field increments and take data between part_counts.
Discard data where machine is not executing.

Isolate Part Signatures
Take each part and arrange them as variables next to each other.

Determine Latent Structure of Part Signatures
Perform Principal Component Analysis (PCA) and find first two components which explain most of the variation in the part signature.

Determine Time Series Features of PCs
Apply Anomalous to measure the characteristics of the PCs and find time series features.

Productionalize
Deploy the algorithm in the cloud (centralized).

When an anomaly is detected, an alert is sent to the operator through real-time dashboard/SMS/Email.
The algorithm could be deployed on premise (MM edge device).

Cluster to Find Anomaly/Outlier
Apply DBSCAN clustering algorithm to find a cluster of normal parts and outlier abnormal parts

Determine Latent Structure of Time Series Features
Perform PCA on time series features to find first two components which condense the time series features.
"We believe a new, more powerful, business model has evolved...When built right, they create a reinforcing cycle: Their products get better, allowing them to collect more data, which allows them to build better models, making their products better, and onward. "
-WSJ
MachineMetrics has compiled the most powerful and largest set of machine data in the world.
Appendix
A Virtuous Cycle

1. Data Capture
   Data is captured at high frequency from machines connected to our cloud service

2. Analysis
   Data is analyzed and useful products are released to customers (benchmarking, anomaly detection, etc.)

3. Reception
   Customers receive data products and are incentivized to connect more machines to MachineMetrics

4. Expansion
   Customers expand with MachineMetrics and more data is fed to our algorithms

Repeat Steps 1 → 4