

THE CANARY DASHBOARD

Anomaly Detection + Leading vs Lagging Indicators

1. The Two Frameworks Used:

ANOMALY DETECTION

Automatically spotting when a number breaks its normal pattern — before a human would notice.

LEADING VS LAGGING INDICATORS

Lagging indicators tell you what already happened (revenue, churn). Leading indicators warn you what is about to happen (buffering, login failures).

How the Two Connect (Fusion Logic)

Anomaly detection watches thousands of signals at once. Leading indicators make sure it is watching the ones that arrive **early**. Fused, you get warned while you can still act — instead of reading about the damage in next month's report.

2. Application: **NETFLIX (USA)**

Background — What Happened and Why

- Netflix streams to millions of people simultaneously across a vast, complex system.
- By the time churn shows up in a monthly report, the unhappy customers have already left — the damage is done.
- Lagging metrics like cancellations are true but useless for prevention.
- The company needed to know something was wrong in minutes, not months.

What They Did

- Monitored live technical signals that lead customer unhappiness — stream starts, buffering, playback errors.
- Built automated anomaly detection so deviations trigger alerts without a human watching a chart.
- Treated a dip in successful stream-starts as an emergency, because it predicts churn.
- Deliberately injected failures (chaos engineering) to make sure the alarms actually worked.

Applying the Fusion — Step by Step

1

Sort the signals by how early they warn

Cancellations tell Netflix what already happened, too late to fix. Live technical signals — like failed stream-starts and buffering — warn hours or days earlier.

2

Watch the early signals automatically

Netflix has software learn each signal's normal pattern and raise an alert the moment something breaks that pattern, without a human staring at a chart.

3

Treat an early dip as an emergency

A drop in successful stream-starts is treated as urgent, because it predicts unhappy customers who will otherwise quietly cancel.

4

Test that the alarms actually work

Netflix deliberately breaks parts of its own system to make sure the warnings fire when they should.

The Result

Problems get caught and fixed while the customer is still on the sofa, not after they've cancelled. The dashboard predicts the lagging metric instead of reporting it.

3. Key Takeaways

- Alarms belong on leading metrics; lagging metrics are for grading the alarms.
- 'Normal' has rhythms — good detection models the pattern, not a fixed line.
- Match response cost to anomaly confidence; false alarms have a price too.
- Use in fraud, reliability, churn, and operations — anywhere damage compounds silently before reports arrive.