

Microsoft Azure Cognitive Services: Anomaly Detector

MACHINE LEARNING AND TIME SERIES DATA



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Overview



Azure Cognitive Services

What is time series data?

- Data abnormalities

Machine learning and anomaly detection

**Azure Cognitive Services Anomaly
Detector**

**Demo: Azure Cognitive Services Anomaly
Detector in action**



What is Azure Cognitive Services?



Cognitive Services bring AI
within reach of every
developer.



Azure Cognitive Services

Vision

Analyze image
content

Speech

Process speech

Web Search

Leverage Bing web
search capabilities

Language

Extract meaning from
unstructured text

Decision

Make quick decisions



Azure Cognitive Services

Decision

Make smarter decisions faster

Language

Anomaly Detector^{PREVIEW}

Identify potential problems early on.

Speech

Content Moderator

Detect potentially offensive or unwanted content.

Vision

Personalizer

Create rich, personalized experiences for every user.

Web search



Data Anomalies in Time Series



What is time series data?



Series of data points
indexed in time order.



Sample Time Series Data



Engine speed



Sensors



Stock market



Any data with
time



Sample Time Series Data



Car speed



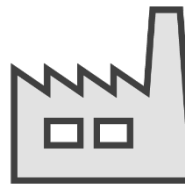
Water temperature



Power plant core heat



Plane engine health



Production line data



Drone sensor data



Any consistent data
sequence with timestamp is
time series data.



Data Anomaly

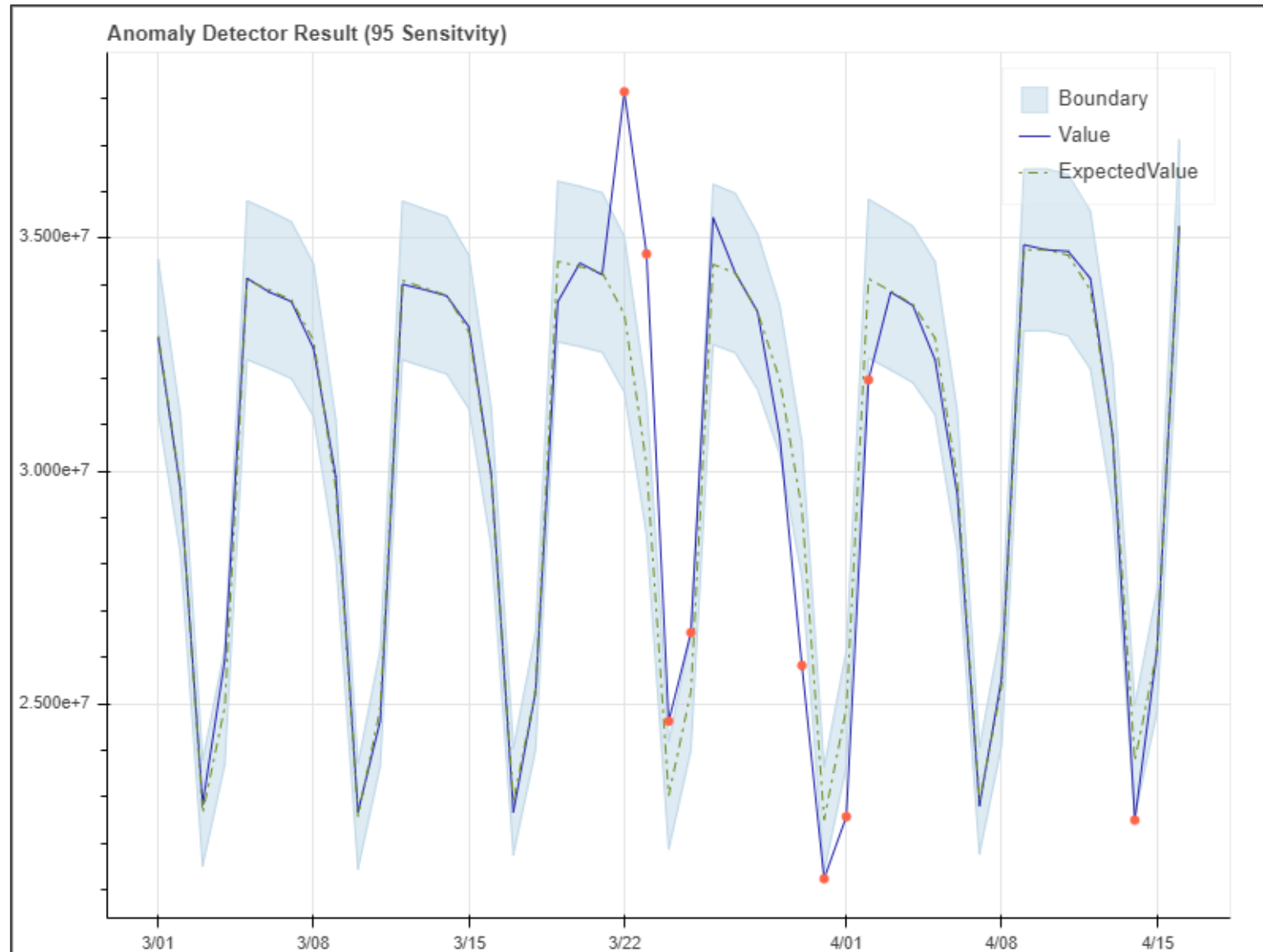


Data Anomaly

Is outlier data which doesn't fit within expected boundaries.



Data Anomaly



Data Anomalies

Plane engine
speed drops
below the normal

Power plant core
temperature
exceeds the allowed
limit

Online banking
user logs in from a
different country

Stock prices drop
below the
expected limit

Access from a new
network to an Azure
SQL Database

etc.



Data Anomalies

A trending article in your website

Trending news in Twitter

Spike in product demands

Your stock price spikes



It is vital to detect and
quickly act upon data
anomalies.



Detecting Data Anomalies Using Machine Learning



Detecting Data Anomalies

Manual

Automated



Manually Detect Data Anomalies

Writing an application to check for statistically normal data points

Send an alert when the temperature exceeds 100 degrees, new IP

Not efficient for complex scenarios, does not learn from new data



Automatically Detect Data Anomalies

**Microsoft Azure uses a tool,
Anomaly Detector API**

**Detects abnormalities in time
series data with machine
learning**

**Doesn't require any prior
experience in machine
learning**

**Automatically adapts and
learns from new data**



Microsoft has been using
the Anomaly Detector API
internally.



Azure SQL Database
Advanced Threat Detection
is one of the services using
the Anomaly Detector API.



Azure Cognitive Services Anomaly Detector



Azure Cognitive Services Anomaly Detector

Enables customers to use the Anomaly Detector API for their own custom time series data.



Activity

<https://docs.microsoft.com/en-us/azure/cognitive-services/anomaly-detector/overview>



Demo



Cognitive Services Anomaly Detector in Action



Summary



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