

Using OSIsoft Cloud Services to Fuel Cognitive Computing and Machine Learning

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Overview

- Machine Learning
- The Data
- Overview of OCS
- Combining OCS & Cascadence
- Examples
- Summary



Toumetis

Tout: *fr* Everything
Metis: *gk* Wisdom

Bringing forward-thinking companies unique approaches to predictive analytics and machine learning.

Toumetis' mission is to deliver intelligence that can transform business operations and enable new revenue generation for the Industrial IoT via the application of machine learning.



Don't Believe the Hype ...



Some Definitions ...



Data Science: The process of obtaining knowledge or insight from data.



A.I.: Simulation of human intelligence processes by machines/computer systems.



Machine Learning: A set of software technologies that enables rules to be determined and generalised from data without the need to explicitly program them.



Deep Learning: A family of machine learning algorithms based on multi-layer neural networks



Cascadence - Applied Machine Learning

We use these processes and technologies because they work at solving real world industrial problems.



Planning & Forecasting



Ranking



Knowledge Building

But ...



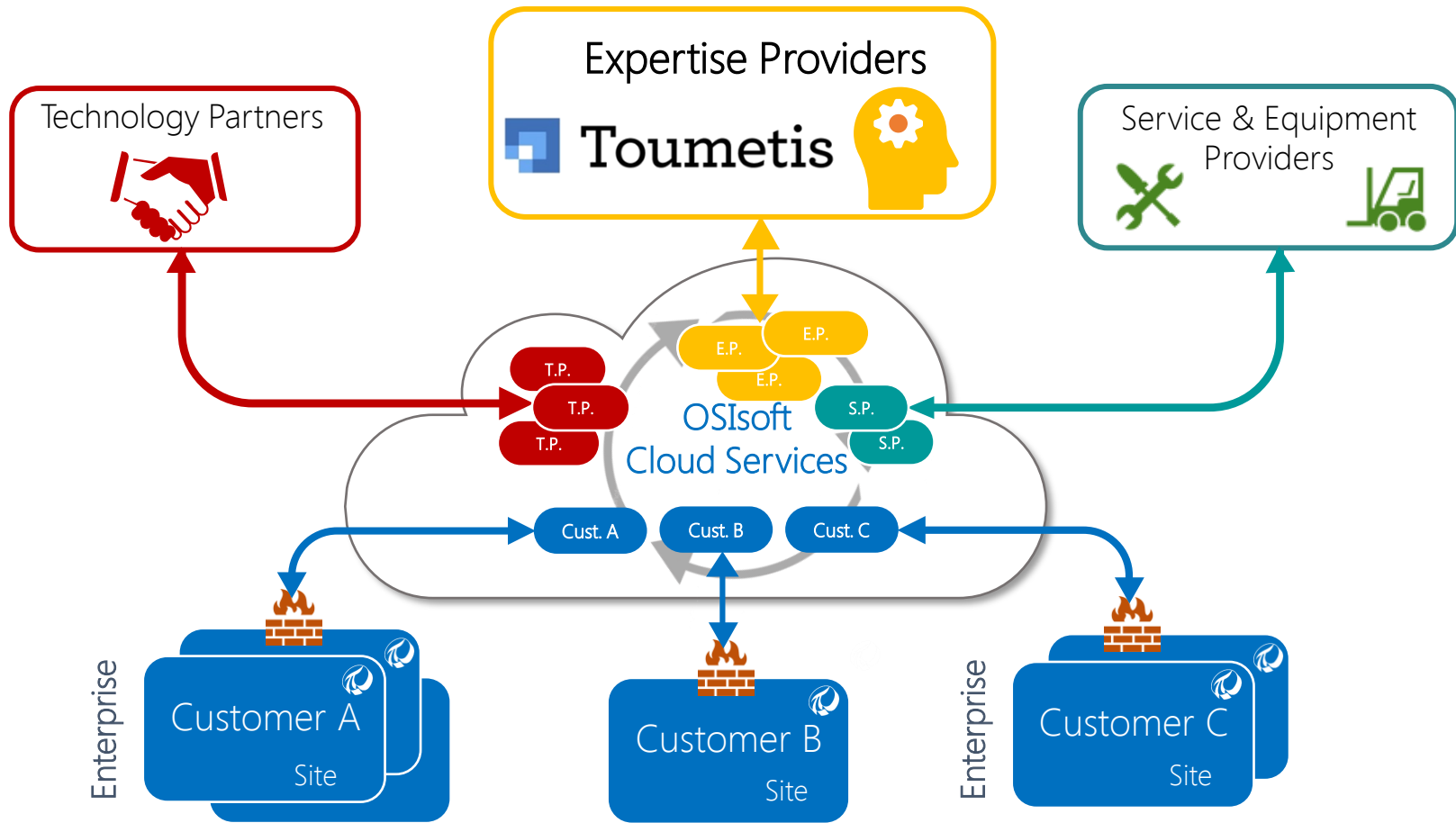
- Machine learning needs fuel, that fuel is data, often a large amount of data.
- Machine learning workloads involve
 - training models using large scale historical data sets.
 - using these model to make new predictions.
- ML requires secure, robust & scalable data services.

Requirements For Data Services to Support Industrial ML Workloads

- Enable our clients to confidently store and manage access to their data. Secure, trusted and high quality support.
- Comprehensive set of APIs, consistent with python & modern web technologies.
- Data services are able to carry out routine heavy lifting
- Rich extensible data models
- Ingest & egress performance
- Batch and streaming workloads

OSIsoft Cloud Services Vision

Develop & maintain an
operational data ecosystem
that connects **you** (the customer)
with **best-in-class Analytics** and
your community of **vendors & partners.**

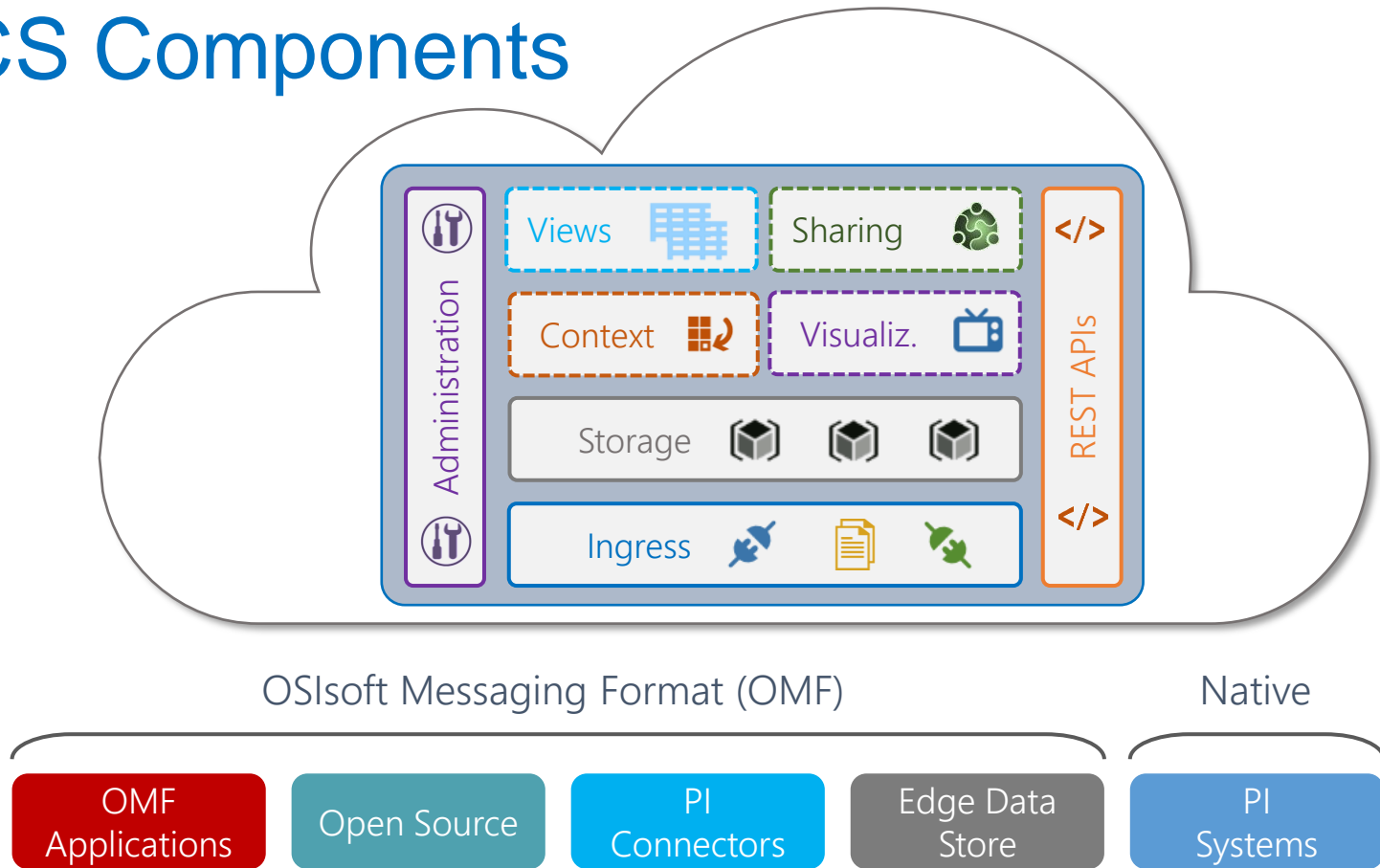


OCS Overview

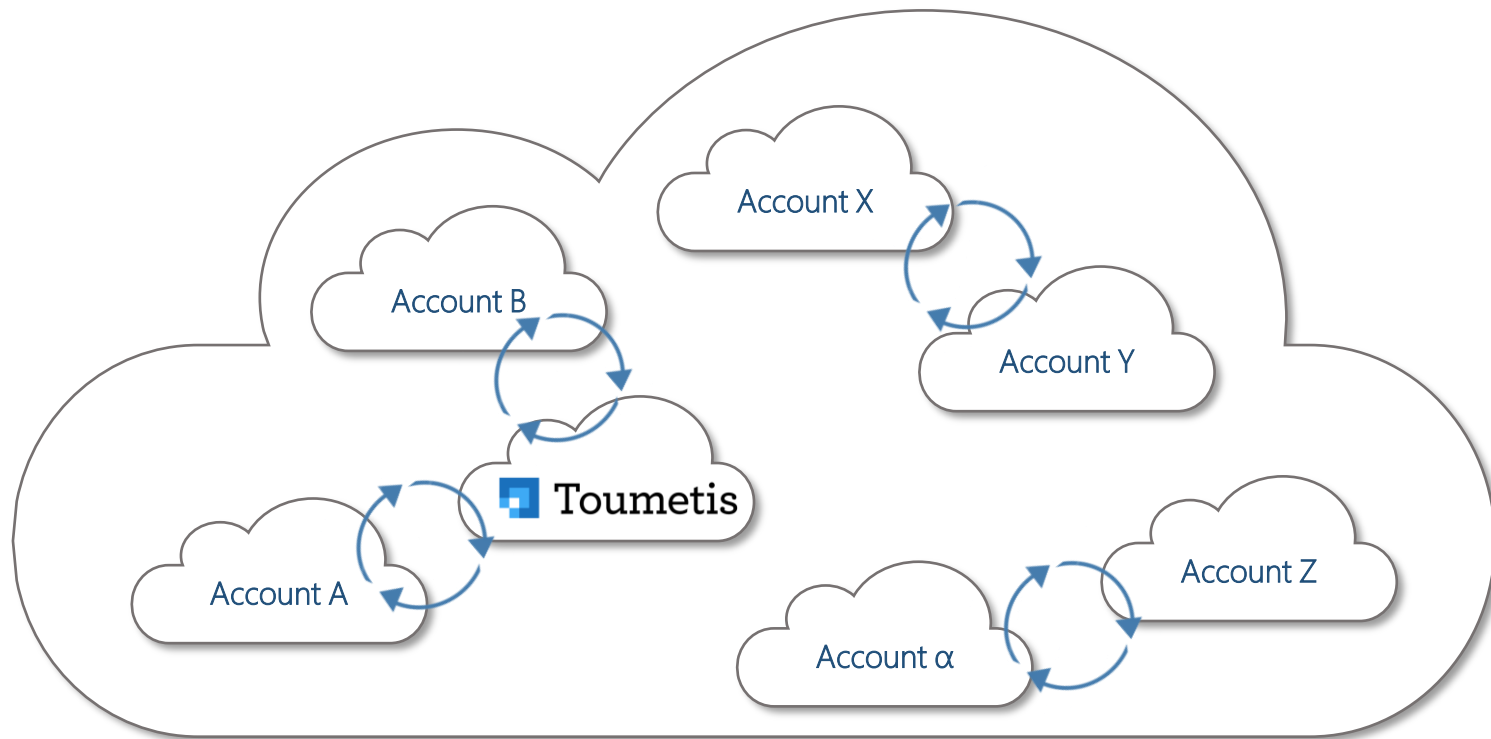
- Managed, secure, data platform
 - Multi-tenant
 - PaaS & SaaS
- Built on Microsoft Azure
- High speed, scalable data ingress
- Flexible, scalable, resilient data storage
- Modern, secure APIs
- and more...



OCS Components



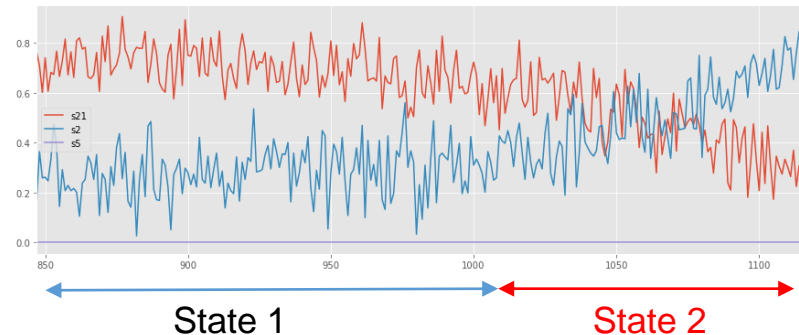
Data Sharing within OCS



The Human Attention Bottleneck

ML needs fuel and that fuel is data, often a very large amount of data.

- Raw data is not enough, what is required is labelled data.
- Labelled data is expensive and generally requires humans in the loop.
- Use unsupervised machine learning and modern UI technologies to massively reduce the workload.





Cascadence & OCS – Manufacturing POC

- Scenario – A high tech manufacturer is having production quality challenges. Need to identify what the issue is and put in place a production solution to identify problematic batches.
- Uses OCS to share data with Toumetis
- Cascadence solution developed using machine learning technology to help manufacturing engineers identify the characteristics of faulty batches
- Algorithms put into production that can identify problematic batches in new data streaming to OCS.
- Enable corrective action to be taken to mitigate the problem

Welcome

Datasource

Asset Selection

Data Select

Cluster View

Subsequence Visualisation

Tenant

.....

✓

Address

https://qi-data.osisoft.com

✓

Resource

https://qhomeprod.onmicrosoft.com/ocsaapi

✓

Authority

https://login.windows.net/ffa693b7-9a8b-4cb0-8672-5fc5e9e0e464/oauth2/token

✓

Clientid

.....

✓

ClientSecret

.....

✓

Namespace

activity_namespace

✓

Back

Next

Connect to OCS to obtain training data



Welcome



Datasource



Asset Selection



Data Select



Cluster View



Subsequence Visualisation

Select Training Data

Search	Q
Sensor 1	
Sensor 2	
Sensor 3	

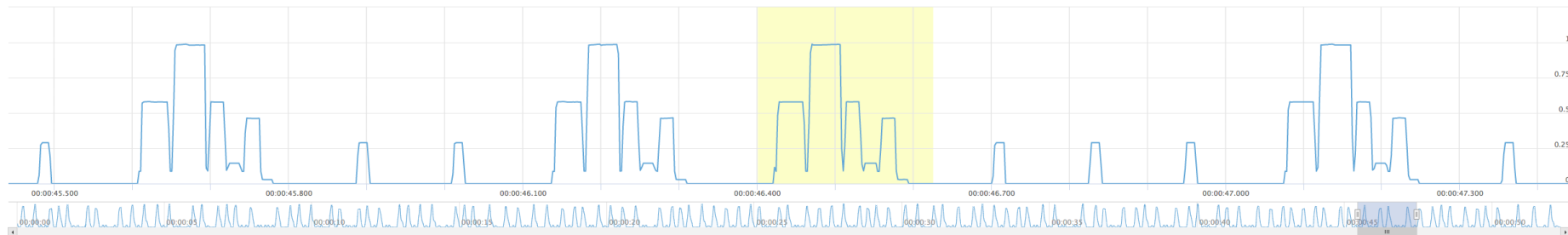
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Next

Select sensors

First Step - Select a Subsequence

Click and drag over desired pattern on graph below to select a subsequence.

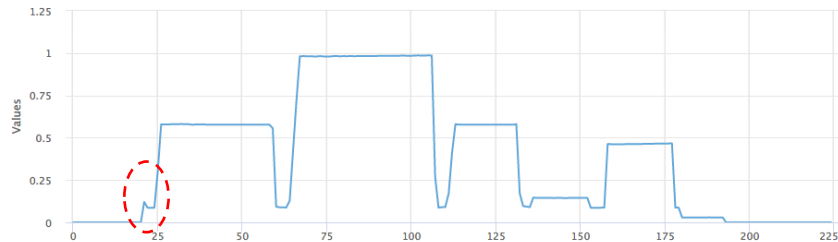
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Select subsequence related to problem recipe.

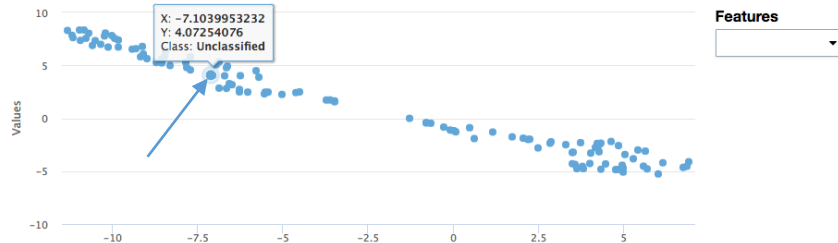
You can now label data groups by selecting a cluster

Hover over a point in the Clusters chart to show its corresponding time series in the time Series Chart

Time Series



Clusters



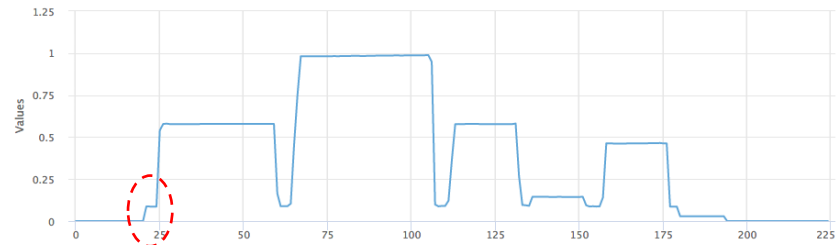
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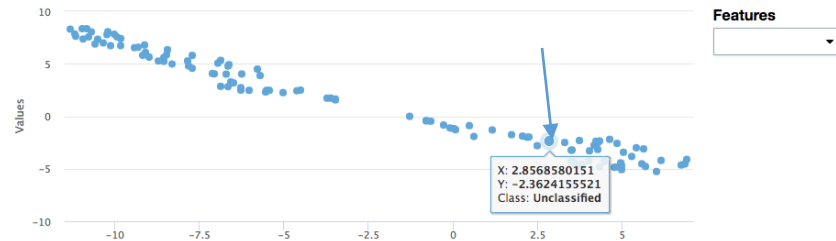
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Time Series



Clusters



Back

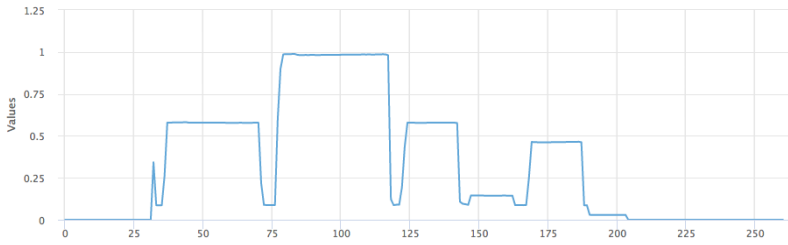
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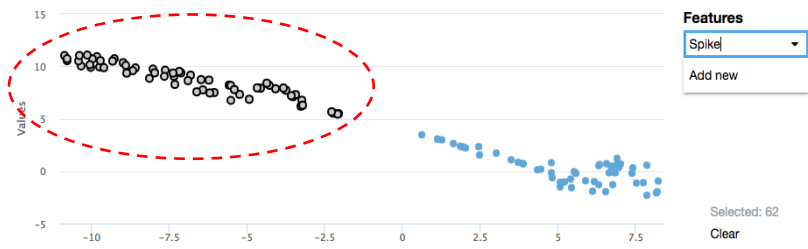
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Time Series



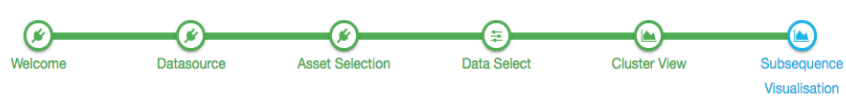
Clusters



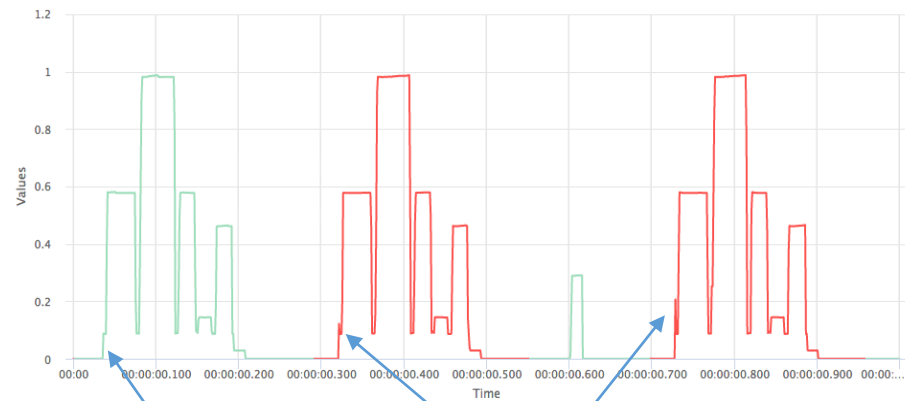
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Label Data and train Classifier to detect faulty batches



Subsequence Visualiser



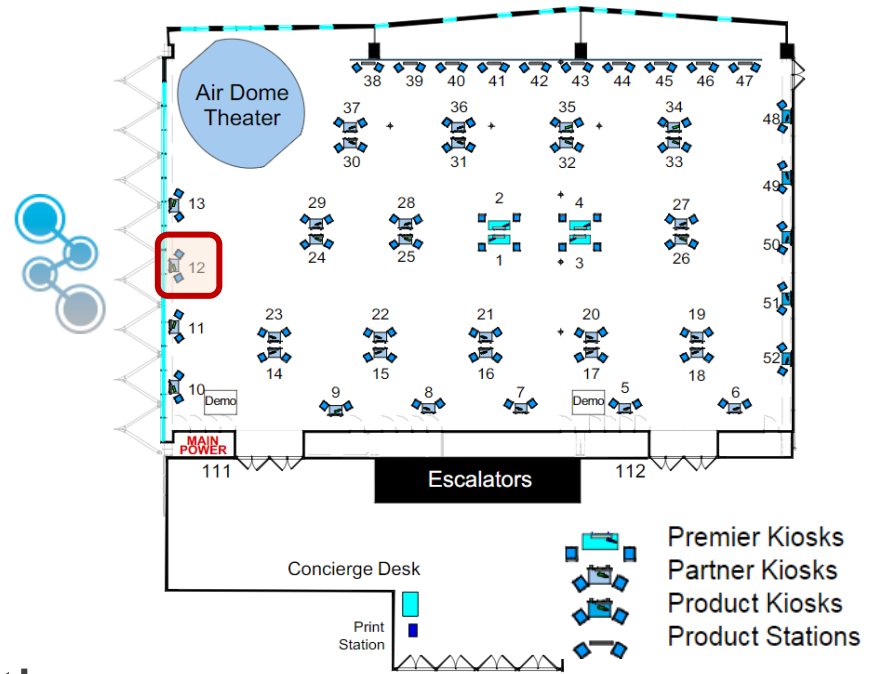
Back

Deploy Algorithm to process data streaming in real time from OCS

Detect Faulty batches and enable team to take mitigating actions to correct

Summary

- Machine Learning
- Data Requirements
- OCS Integration
- Cascadence & OCS in action



Contact us for more information...



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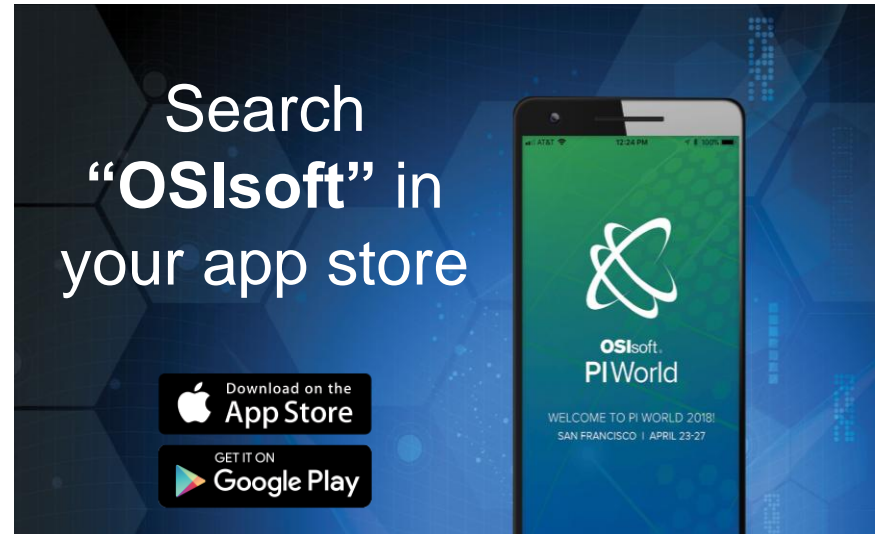
Questions?

Please wait for
the **microphone**

State your
name & company



Please rate this session in the mobile app!



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 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES
 OBRIGADO شڪرا SALAMAT
 DANKON TANK TAPADH LEAT
 KÖSZÖNÖM DANKIE TERIMA KASIH GRACIES
 СПАСИБО MULTUMESC
 PAKMET CIZGE FAAFETA
 GO RAIBH MAITH AGAT ESKERRIK ASKO
 БЛАГОДАРЯ GRACIAS HVALA ХВАЛА ВАМ
 ТЕШЕККÜR EDERIM
 TI БЛАГОДАРАМ MAHADSANID
 TAK DANKE
 RAHMAT MERCI
 HATUR NUHUN
 DANK JE ΕΥΧΑΡΙΣΤΩ GRATIAS TIBI
 AČIŮ SALAMAT MAHALO IĀ 'OE TAKK SKALDU HA
 GRAZZI PAKKA PĒR
 PAXMAT CAĞA
 FALEMINDERIT
 ありがとうございます
 SIPAS JI WERE TERIMA KASIH
 UA TSAUG RAU KOJ
 TI БЛАГОДАРАМ
 СИПОС
 CẢM ƠN BẠN
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THANK YOU



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25