



Machine learning productization in Azure

Products of Axora

JUNE 2023



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01

Basic Use-Case and POC

The use-case to solve (originally)

BASIC USE-CASE AND COMPLICATIONS

Basic Use-Case

Rocks are extracted and crushed into:

- rocks that we like
- rocks that we don't like
- other things with various effects

Let's support this person with CV and ML based auto-detection



Contaminant removal



Results of crushing coming out



on a Conveyor belt



operator

Standard sized ore rocks only



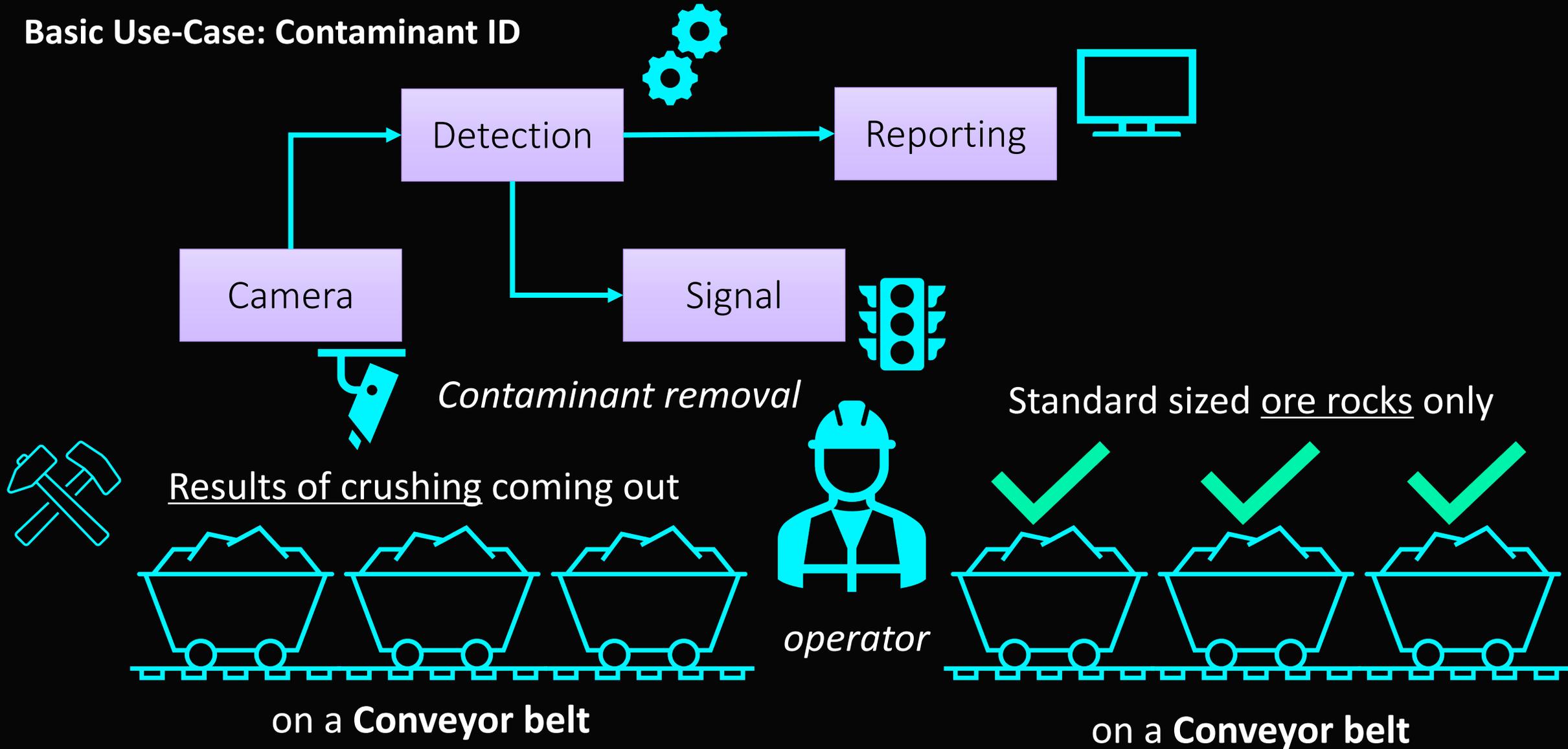
on a Conveyor belt

02

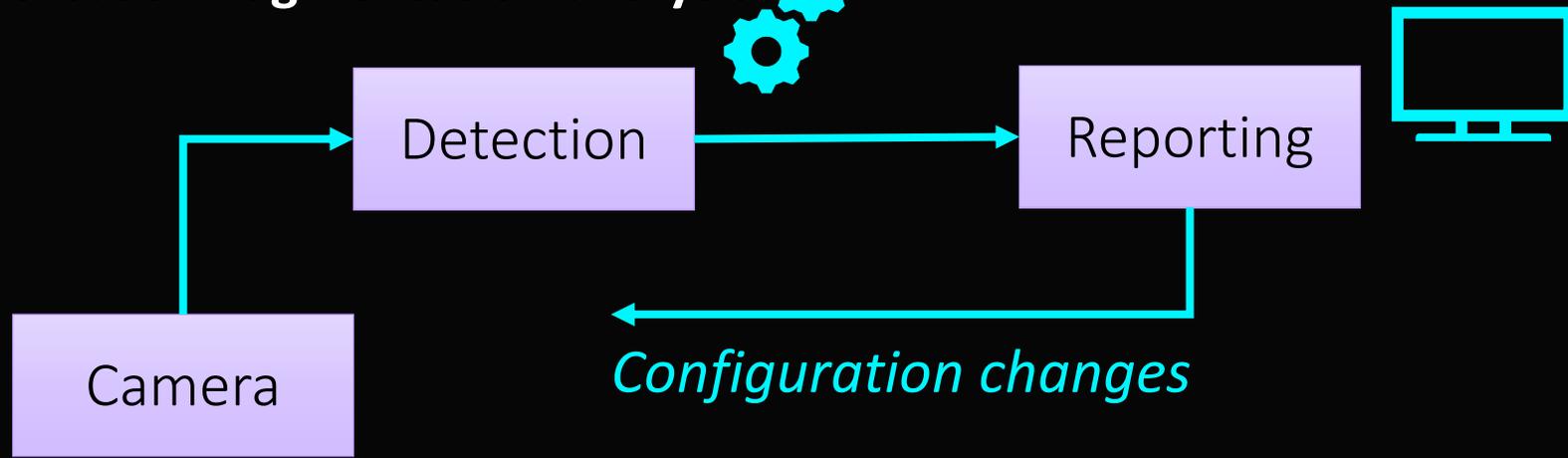
Business Products

Use-case specifics

Basic Use-Case: Contaminant ID



Tuning Use-Case: Fragmentation analysis



Results of crushing coming out



on a Conveyor belt

Standard sized ore rocks only



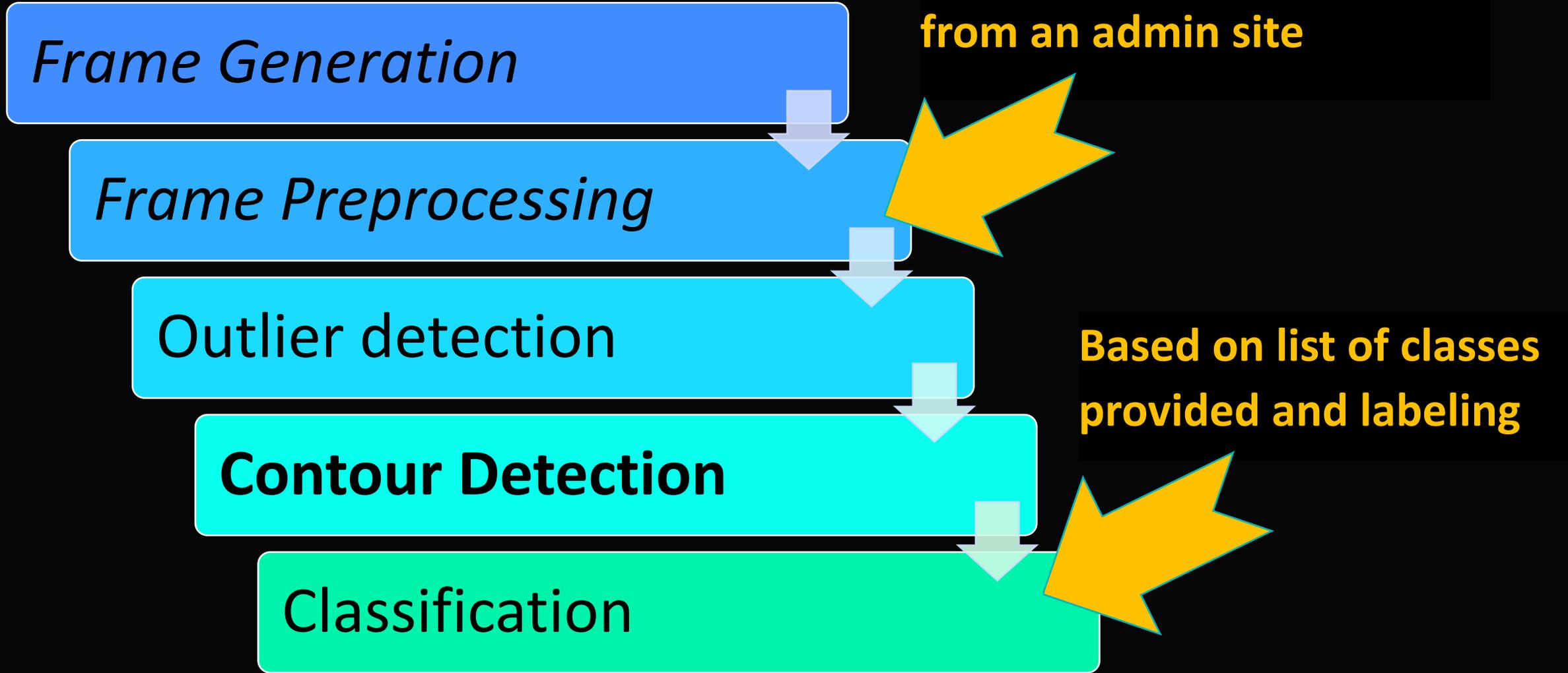
on a Conveyor belt

03

ML design

Machine Learning details
(without disclosing the algorithms themselves)

Machine Learning design (Contaminant ID)



Machine Learning design (Fragmentation Analysis)

Frame Generation

Frame Preprocessing

Contour Detection

Calculations

Averaging

Based on preproc settings from an admin site

Based on... well... maths (mainly)

04

Component design

Microservice architecture

Pain Points and Complications

Amounts of data required

Cameras could be set up similarly, but still, the material in question will be very different for each.

To properly study the generalisation power and opportunities.

POC for independent sites only

POC design was only considering one independent deployment, no shared information between plants and/or Axora.

War in Ukraine and implications

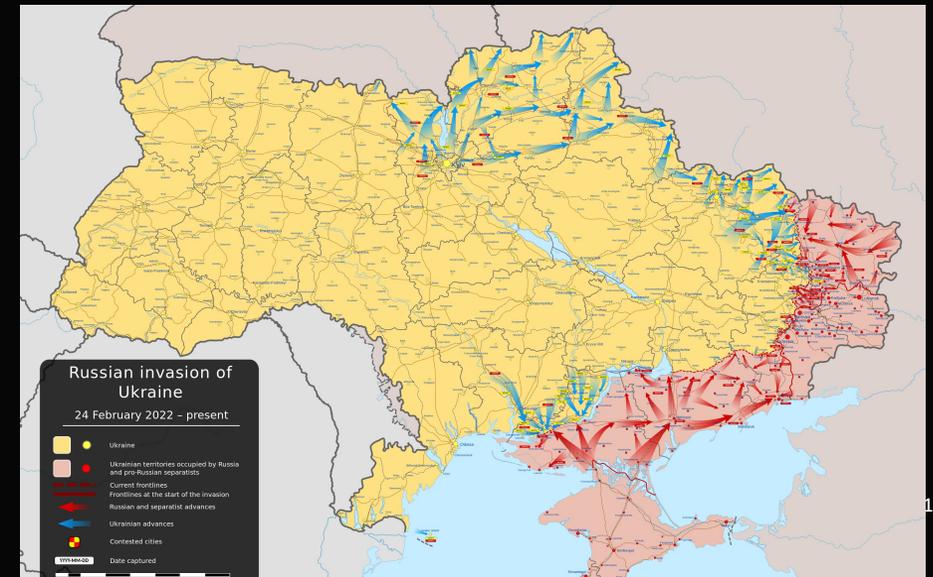
The war in Ukraine caused some real complications for both Axora and EPAM.

Axora's test bed and original data were in/from Russian mines.

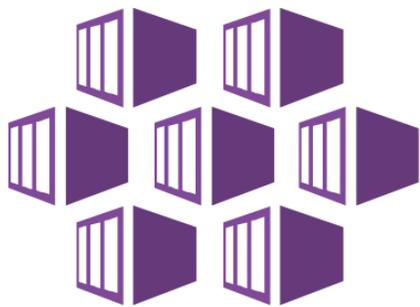
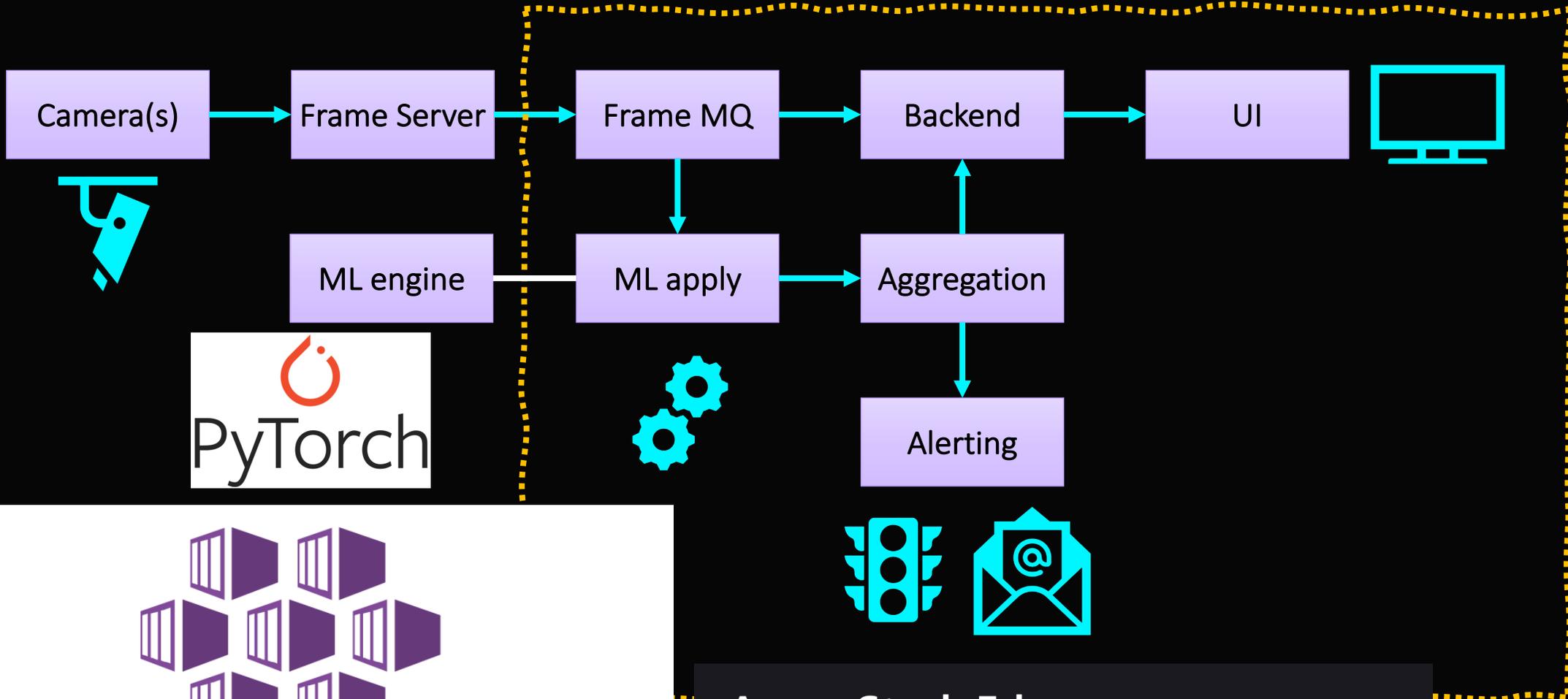
Many EPAMers from Russian office (which got closed).

New customer, new use-case

The new primer customer was looking for an analytical system instead of a detection system.



Component design (single site)



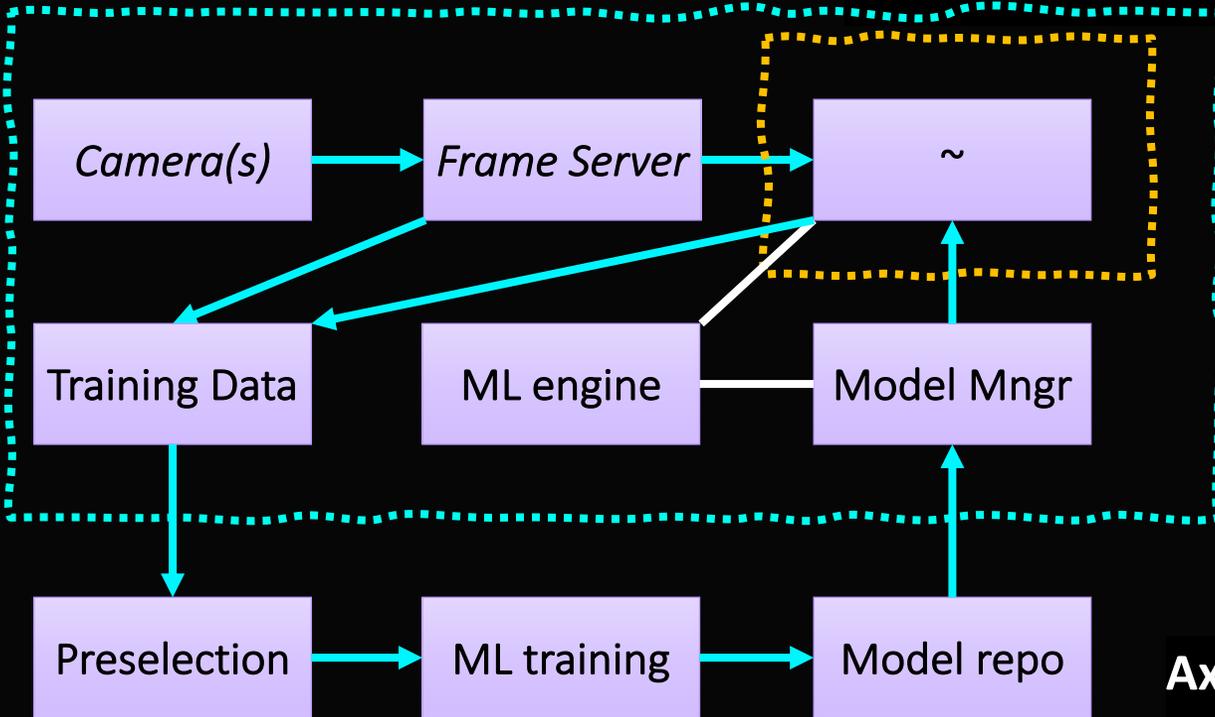
Azure Kubernetes Service (AKS)

Azure Stack Edge

An Azure managed device that brings the compute, storage, and intelligence of Azure to the edge.

Component design (multi-site)

Can be replicated
in cloud



Azure Stack Edge
device with GPU



Axora Cloud
Account



Disclaimer

A special thanks to Axora for the chance to work together on these interesting products and letting us do this presentation about it.

Contact: ally.gale@axora.com for sharing permissions.

Thank you!

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