



BRAINE Use Case 4: Optimizing Semiconductor Wafer Yields using AI

Objectives

- More accurate process control of gate thickness and width, exposure resistance, yields and supply and turn it into an automatic process with the support of BRAINE.
- Integrate the BRAINE EMDC federated distributed platform as an appliance that deploys big data and AI tools to complement Arrowhead for the benefit of semiconductor supply chains and supply chains containing semiconductors.

Requirements

- High compute performance required because data collected from manufacturing and supply chain data sources ranging from nanosecond and nanometre to years and thousands of kilometres. Also, solutions for optimizing manufacturing need to be computed accurately and in real time.
- Securely connecting manufacturers devices both locally and to the EMDC is paramount for customers to take up the connected service offering.

Implementation

- Collect process data and transform it into Qualified Synthetic Data (QSD) to use for the AI training model.
- Develop an algorithm as a microservice which will use the AI model to predict and optimize manufacturing parameters in real time.
- Use machine data to predict SPC parameters, yields, and therefore supply, supported by wireless sensors with Arrowhead and BRAINE.

Impact

- Improve the current state of decision making for gate width, directly leading to optimal yields for chip production.
- Improve the development of secured edge-to-cloud connection-enabled applications; these can range from fabrication monitoring up to situational awareness, by leveraging AI and machine learning algorithms.