

Improve forensic identification with Azure AI



Challenge

A leading technology company specializing in AI solutions for law enforcement faced a significant challenge. They aimed to develop an AI-based system that could analyze two bullet shell images and determine the probability that they were fired from the same gun.

This new solution sought to replace their outdated pixel-to-pixel system, which necessitated intricate preprocessing steps such as rotation, alignment, and extraction of relevant image areas.

These complex processes hindered efficiency and accuracy, highlighting the need for a more streamlined and effective approach.

Solution

Fractal addressed this challenge by developing an innovative solution capable of autonomously comparing shell casings for various calibers, including 9mm, .40, .45, and .380 cartridges.

Leveraging the power of **Azure AI** and **Azure ML**, along with **NVIDIA hardware** acceleration, this solution significantly enhanced the forensic identification process. Furthermore, Fractal integrated their **Production Yield Optimization (PYO) with Autonomous AI solution**, ensuring seamless implementation and optimal performance.

This robust combination of technologies provided the company with a cutting-edge tool to improve accuracy and efficiency in forensic analysis.

Result

The implementation of the new AI-based solution yielded remarkable results. It outperformed the legacy system by up to **33%** in matching bullet shell casings with a circular firing pin aperture shape, which is the most common type.

Additionally, the new solution simplified the company's pipeline, eliminating the need for complex preprocessing steps. As a significant advantage, the AI-based system is capable of continuous improvement with the availability of more training data, unlike the old system, which lacked this adaptability.

Overall, the new solution provided a more efficient, accurate, and scalable method for forensic identification, reinforcing the company's position as a leader in AI-driven law enforcement technology.