

Improving accuracy and speed of production lines with Visual Inspection AI

LG Corporation is a multinational conglomerate headquartered in Seoul, South Korea, with 140 locations globally. In 2019, LG had revenues of 62.3 trillion KRW (US\$53 billion). LG CNS is a subsidiary of LG Corporation that provides information technology services including consulting, system integration, network integration, business process outsourcing, and IT outsourcing.

The challenge

At LG Chem, part of LG CNS, the company's most senior engineers worked on improving model accuracy for glass substrate used for manufacturing LCD TV panels. Inspection was labor-intensive and time-consuming with every production line having 5–6 inspection processes to check the quality of production.

The solution

LG partnered with Google Cloud to develop a Visual Inspection AI solution built on GCP for manufacturing quality control processes. The solution detects production defects in everything from LCD screens to automotive fabrics on the assembly lines. Google Cloud IoT services, AI/ML, and edge-computing capabilities drive operational optimization across the factory.



Adopted edge technology for performance in the factory

Due to bandwidth constraints it was not possible to connect to the cloud every time a machine learning model inference is required in a manufacturing setting. To solve for this, LG leveraged Google Cloud edge offerings (TPUs) to run models for defect detection in the factory, with minimal latency and at scale.



Created an easier way to train ML models

With Google Cloud, LG could automatically train customized machine learning models with a minimal amount of manual image-labeling effort. This allowed LG to efficiently acquire images, label them, and deploy models at production lines, inspecting 200 images in 0.8 seconds. Also, LG benefited from refreshing its cloud ML models continuously, leveraging new data collected at production lines.

Why Google Cloud

LG selected Google Cloud because of its advanced machine learning and edge-computing solutions. Google Cloud machine learning image solutions are built for scalability and ease of use, which would allow LG to train high-quality defect detection models efficiently within weeks with the highest level of accuracy. Google Cloud edge-computing solutions, like TPU hardware, would enable LG to inject machine learning into its shop floor operations.



The results



Reduced costs

Saved **\$20 million** per year using Google Edge TPUs and Google Cloud AI. Saves **\$1 million** per year per production line.



Improved quality

Automated the defect detection process with **99.9% accuracy**, a **60% increase** from a previous solution.



Increased throughput

Increased throughput by accelerating the Visual Inspection process.



Google AI and Edge TPU with LG CNS data analytics solution, DAP, will provide a great value for our customers in the smart factory arena.”

Sungwook Lee (성욱 이)

Vice President, AI/Big Data Unit of LG