

Use Case

Quality Control - Primary Battery Manufacturing

Customer Leading Manufacturer of Primary Batteries

- Need** The customer needed a solution to detect defective batteries at several stages during manufacturing, specifically batteries that used to pass final inspection but discharge within minutes when used. They also wanted defect classification capabilities to aid root cause analysis.
- Challenge** The high speed of manufacturing line requires an OK/NOK call and a defect classification to be made every 50 milliseconds. In addition, the client required a very high degree of accuracy.
- Solution** We implement a four-camera system that collects data of critical stages in manufacturing for each production line. We then used an AI-model to analyze images, detect defects and automatically notify the PLC to scrap defective units.
- Process** We collected 1,000s of images and classified the defects with the help of internal experts. We then used that image library to train first an OK/NOK model and then a defect classification model. After deployment, we use the built-in reclassification tool of the AI-Bot for continuous training of model to improve accuracy further.
- Outcome** Significantly increased accuracy at currently at 99.996% with room for further improvement. The algorithms found new, previously undetected defect categories that allow better diagnosis of upstream production issues. AI models are not only able to inspect 100% of all batteries at the current line speed but also accommodate further increase in production (higher speed), which the legacy machine vision system couldn't. Powerful AI models make it possible to use significantly cheaper cameras than the legacy system reducing equipment cost by over 85%. The AI algorithms are highly flexible and can readily compensate for changing conditions, e.g. lighting conditions on the shop floor, which the legacy system couldn't.

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