quantiphi
Solving What Matters

Visual Quality Inspection

Automated Visual Quality Inspection is a computer vision framework that uses deep learning to learn the features, like sharpness, contrast, outline, shape, and many more to identify a defect in product images. We developed a defect detection model for a Big 3 Auto Manufacturer with **99%+ accuracy** & generating **~$4M annual savings.**

Challenges & Resolutions

Camera & Lighting Conditions

Start with a basic camera setup and collect images such that all variations are captured in the training data

Lack of Defective Images

Data Augmentation techniques can be used to increase the dataset

Latency and Network Outages

Build a hybrid solution such that inference happens on prem, model training and storage happens on cloud

Security and Redundancy

Use Kubernetes and Anthos to ensure high availability, develop a scalable and secure solution

Assembly and Cosmetic inspection applies to various industries

Automotive

Press shop inspection (scratch,dents, cracks, staining)

Foundry engine block **inspection** (cracks, deformation, anomaly)

Body shop welding seam inspection

Paint shop **surface inspection**

Semiconductors

Wafer level anomaly and defect localization

Die crack inspection

Pre-Place inspection

SoC packaging inspection

Board assembly inspection

Electronics

PCB missing components (screw, spring, foam, connector,shield, etc.)

PCB soldering and **gluing** (insufficient solder, Icicle, shift, exceeding tin, etc.)

Product surface check (glue spill, mesh deformation, scratches, bubbles, etc.)

Others / Industrial

Packaging and label inspection

Fabrics inspection (mesh, tear, yarn)

Metal and **plastic welding** seam **inspection**

Surface inspection

Our Visual Inspection Platform UI Functionalities

Dynamic Inference

Settings within the model can be changed based on the operator's requirements. The model is designed to be flexible based on the client's requirements

Active Learning

The ML model is constantly learning based on the changes made by the operator. The supervisor can then retrain the model as required

Version Control

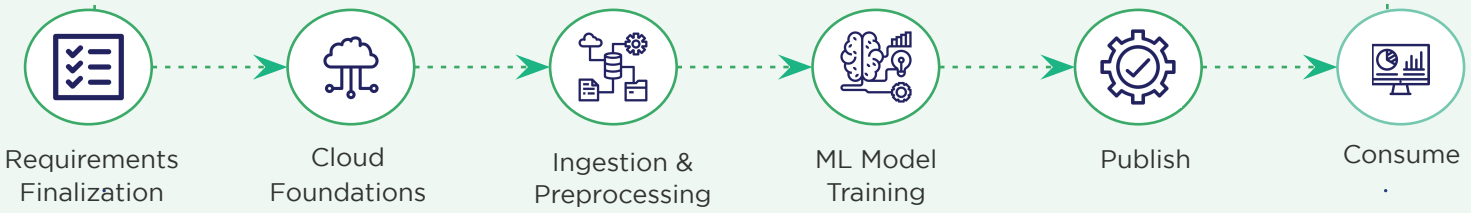
The platform has a functionality to reset back to the previous versions of the model. This can be done by the Supervisor

Search / Audit

Check the confidence level of the model and audit if retraining is necessary to develop accuracy

POC Package

Approach



OUTCOMES

- Reduced Manual Effort
- Quicker Inspection
- Improved Quality
- Savings due to reduced rework

DELIVERABLES

- Trained VQI Model
- UI for model inference
- Deployment on cloud

TIMELINE (POC)

~12 Weeks

Single subsystem, single model, limited # of dashboards