🏭 **Case Study: Manufacturing QA Automation**  
**Computer Vision for Zero-Defect Assembly Lines**

**The Challenge**  
A mid-sized electronics manufacturer faced high defect rates due to human error in visual quality checks. Minor faults—misaligned components, missing screws—often slipped through manual inspection, resulting in product returns, rework costs, and brand damage.

**Our Approach**  
We deployed an **Edge-based Computer Vision System** trained on real production footage. Features included:

* Real-time video feed analysis to flag defective units on the assembly line
* Detection of micro-level inconsistencies using transfer learning from pre-trained models
* Integration with conveyor belt PLCs to auto-reject faulty products
* A no-code dashboard for QA leads to retrain models using new defect images

Latency and lighting variability were solved via hardware-optimized models running on NVIDIA Jetson devices.

**The Outcome**  
✅ Reduced visual defect escape rate from 8.2% to under 1.3%  
✅ Cut manual inspection time by 70%  
✅ Increased first-pass yield by 19% in 60 days  
✅ Built an internal “defect library” for future predictive maintenance use

This wasn’t just quality control—it was quality assurance powered by real-time vision intelligence.

🏬 **Case Study: Smart Retail Analytics**  
**CV-Powered Insights From In-Store Footage**

**The Challenge**  
A high-end retail chain wanted to understand in-store customer behavior but had no way to quantify what was happening on the floor. Heatmaps, footfall, engagement—everything was anecdotal. Existing CCTV footage was underutilized.

**Our Approach**  
We built a **CV Analytics Layer** on top of their existing camera infrastructure:

* Detected and tracked anonymized customer movement in real time
* Identified zones with high engagement vs. cold zones
* Measured dwell time, product pickup rates, and queue lengths
* Triggered alerts when overcrowding or unattended children were detected

Privacy was maintained through on-device anonymization and no facial recognition.

**The Outcome**  
✅ Boosted sales by 11% in optimized product display zones  
✅ Reduced average checkout wait time by 24%  
✅ Enabled weekly layout experiments with A/B testing data  
✅ Created a competitive edge with data-driven visual merchandising

With zero new hardware, the client turned passive surveillance into a strategic asset.

🚜 **Case Study: AgriTech – Crop Health Monitoring at Scale**  
**Aerial CV That Sees What the Human Eye Can’t**

**The Challenge**  
A precision agriculture startup needed to monitor crop health over hundreds of acres using drone footage. Traditional methods were labor-intensive and reactive, often missing early signs of disease or irrigation failure.

**Our Approach**  
We delivered a **Deep Learning-Powered CV Pipeline** to process aerial images:

* Semantic segmentation of crops, soil, water bodies, and anomalies
* NDVI (Normalized Difference Vegetation Index) modeling to detect stress
* Alert generation for pest signs, fungal patches, or irrigation leaks
* Scalable via batch uploads from drone partners or direct UAV integration

Built with a combination of PyTorch, OpenCV, and cloud inference APIs.

**The Outcome**  
✅ Detected early-stage disease patches with 91% accuracy  
✅ Saved up to ₹12 lakhs/season in reduced pesticide and fertilizer usage  
✅ Improved yield by 14–18% across pilot farms  
✅ Enabled custom farm reports for over 50+ clients

From pixels to productivity—vision made tangible impact in fields, not just files.