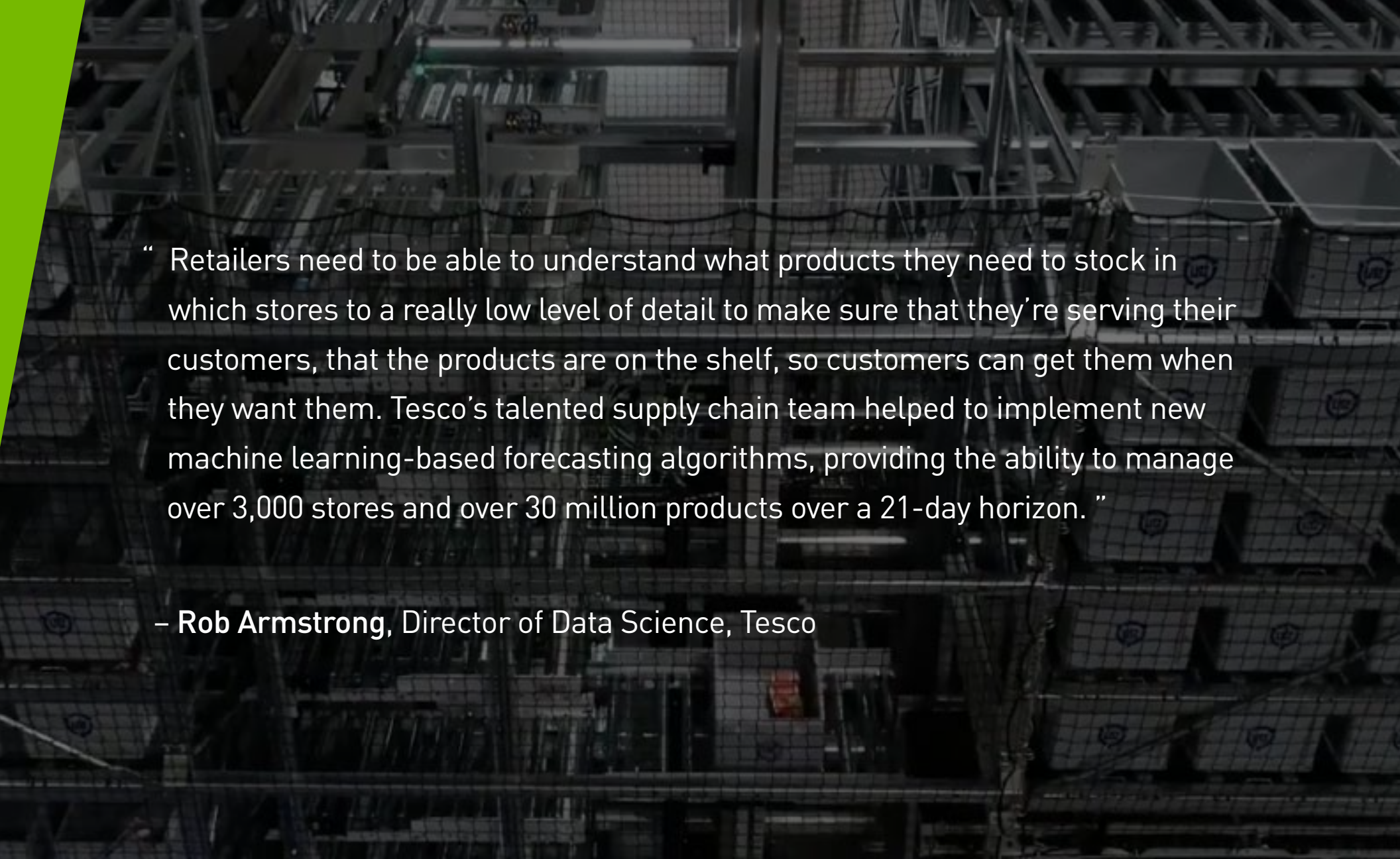
NVIDIA

INTELLIGENT SUPPLY CHAIN



“ Retailers need to be able to understand what products they need to stock in which stores to a really low level of detail to make sure that they’re serving their customers, that the products are on the shelf, so customers can get them when they want them. Tesco’s talented supply chain team helped to implement new machine learning-based forecasting algorithms, providing the ability to manage over 3,000 stores and over 30 million products over a 21-day horizon. ”

– **Rob Armstrong**, Director of Data Science, Tesco

Forward-thinking retailers are optimizing the management of supply chains by harnessing the power of AI. With intelligent video analytics (IVA), data science, and robotics, they're deploying critical solutions for forecasting, digital twins and simulation, intralogistics, streamlined inventory management, package lifecycle tracking, last-mile delivery, and more.

Explore real-world examples of these cutting-edge technologies and how retailers are using them to enhance every step of the supply chain process.

FORECASTING AND INVENTORY MANAGEMENT

WALMART

Improving demand forecasts.

Using machine learning to improve forecast accuracy has a significant impact on optimizing the supply chain. Walmart has trained their machine learning algorithms 20X faster with RAPIDS™ open-source data processing and machine learning libraries. Built on NVIDIA® CUDA-X AI™ and leveraging NVIDIA GPUs, RAPIDS has enabled Walmart to get the right products to the right stores more efficiently, react in real time to shopper trends, and realize inventory cost savings at scale.

Learn how Walmart is enhancing business with AI and accelerated computing here.

PRODUCT INSPECTION IN FULFILLMENT CENTERS

KINETIC VISION

Reinventing intelligent fulfillment and distribution centers with digital twins.

Intelligent fulfillment and distribution centers are at the core of the modern retail supply chain's transformation through digitization and AI. Successfully implementing a network of intelligent stores and fulfillment centers needs robust information, data, and operational technologies to enable innovative edge computing and AI solutions like real-time product recognition. One method is based on creating a photorealistic virtual version—or digital twin—of a fulfillment or distribution center to train and optimize a classification model that's then deployed in the real world. This powers faster, more agile product inspections and order fulfillments.

See how Kinetic Vision is using digital twins to streamline product inspections here.

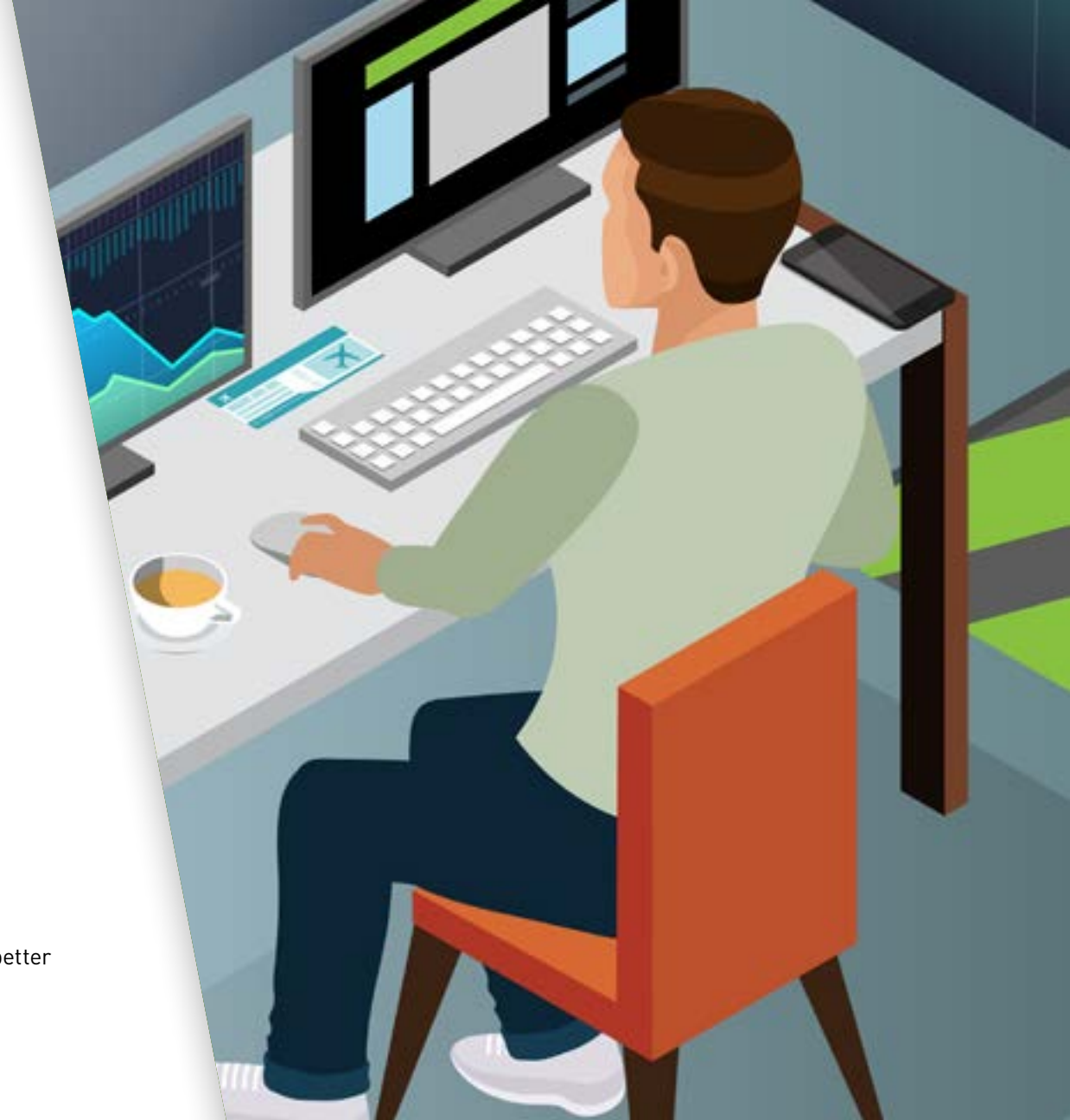
FORECASTING AT QUICK-SERVICE RESTAURANTS (QSRS)

QUANTIPHI

Building large-scale forecasting solutions to optimize operations.

Quick-service restaurants (QSRs) are susceptible to extremely volatile demand patterns and run on thin profit margins. Variations in demand patterns across locations and huge shifts in online orders challenge them to become more efficient, whether by minimizing food waste, planning for special events, scheduling sufficient staff, projecting correct working capital, or ordering the right quantities. Quantiphi has delivered a forecasting engine that leverages deep learning on NVIDIA GPUs. It improves forecasting accuracy for Quantiphi's customers and allows for feature engineering, scenario forecasting, and Day 1 forecasts for newly introduced items and newly opened stores. Their business intelligence tool enables visualization, analysis, alerts, and the establishment of control variables.

Explore how Quantiphi is helping QSRs predict the future with better accuracy here.



INTRALOGISTICS AND NAVIGATION IN WAREHOUSES

KION GROUP

Managing and scaling AI deployments at the edge to improve intralogistics.

Reinforcement learning is an important technology in intralogistics, because it can be applied to teach robots mapless navigation or other specific patterns and help solve issues with autonomous driving, one of the biggest challenges in warehouses. KION Group is applying state-of-the-art reinforcement learning algorithms in an intralogistics setting using PyTorch, OpenAI Gym, and the NVIDIA Isaac SDK™. With AI, they're learning the motion behavior of robots in warehouses, as well as managing and navigating robots to target areas based solely on lidar or camera data, completely without the use of a map.

See how KION Group is teaching robots to safely navigate warehouses here.

SUPPLY CHAIN OPTIMIZATION

EVO PRICING

Improving sales forecasting with instant learning that transforms the performance of supply chains.

In the United States alone, more than $2 trillion are invested in inventories—more than $1.43 for every $1 in sales, or enough to cover almost 1.5 years of business, on average. Sales forecasting at a granular level is hard. But machine learning gives retailers the ability to independently interpret "items" and monitor demand in real time. By using hyper-tagged, real-time demand data and GPU-powered machine learning on billions of products, people, and locations, Evo Pricing has improved sales forecasting with instant learning. This has transformed the performance of their customers' supply chain, from purchasing to warehouse transfers, production planning, and shipments.

Learn how Evo Pricing is optimizing every step of the supply chain here.

QUALITY CONTROL

DATA MONSTERS

Reducing packaging defects at the world's largest brewer.

One of the world's largest brewers is tackling the most challenging supply chain inspection problems—detecting defects on beverages packaged in aluminum cans being processed on high-velocity conveyor belts. There are about 50 billion aluminum cans processed each year in the U.S. on high-speed belts. It's a challenging problem given the line speed, defect variability, condensation, vibration, can placement, and frequently changing package design, not to mention Internet bandwidth. But it's a challenge well-suited for AI.

Data Monsters, an NVIDIA Metropolis partner, developed an AI application for the brewing company that uses GPU-accelerated, real-time AI vision inference and edge re-training capability with specifically designed self-supervised learning algorithms in the loop.

PACKAGE SORTING

UNITED STATES POSTAL SERVICE

Using AI to improve delivery and processing on billions of packages.

The USPS operates the world's highest-volume logistics operation, processing and delivering 146 billion pieces of mail each year, including more than 6 billion packages. USPS is using AI and NVIDIA Metropolis to process package data 10X faster and with higher accuracy, greatly improving package-sorting site productivity.

Complex feature data is extracted on approximately 20 million packages per day to enable fast package search and maintain package safety. GPU-enabled servers are deployed at all 192 USPS package-sorting sites, running real-time video analytics using NVIDIA Triton™ Inference Server and NGC™ containers.

Read about USPS package handling here.

PERSONALIZING RECOMMENDATIONS AND LAST-MILE DELIVERY

POSTMATES

Using maching learning to create personalized recommendations to improve fleet efficiency.

To create personalized feeds and recommendations, Postmates is using machine learning architecture and building blocks, along with models they've developed in production, model optimizations to align with business objectives, and an in-house inferencing framework they built to serve the models. They are also using machine learning for search ranking, dynamic pricing, and customer acquisition and retention.

For their dispatching system, they're creating models to estimate prep and delivery times to improve fleet efficiency. Postmates Serve is the first socially aware delivery robot, powered by NVIDIA JetPack™ and NVIDIA TensorRT™ on NVIDIA Jetson Xavier™.

Watch Serve—Postmates' autonomous delivery robot—in action here.

NVIDIA SOLUTIONS AND PERFORMANCE

NVIDIA's GPU-powered AI solutions deliver a level of consciousness to the supply chain.

With intelligent video analytics, robotics, automation, and management, operations become more efficient, process throughput accelerates, and warehouse robots deliver end-to-end visibility, increasing the accuracy of orders picked, packed, and shipped.

Learn more about **NVIDIA's AI solutions for retail.**

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