How the Intelligent Supply Chain Broke and AI Is Fixing It

Pandemic-related shortages in labor and materials and rampant inflation are forcing businesses to rethink logistics by harnessing the power of NVIDIA AI to create new solutions across stores, warehouses and routes.

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Let's face it, the global supply chain may not be the most scintillating subject matter. Yet in homes and businesses around the world, it's quickly become the topic du jour: empty shelves; record price increases; clogged ports and sick truckers leading to disruptions near and far.

The business of organizing resources to supply a product or service to its final user feels like it's never been more challenged by so many variables. Shortages of raw materials, everything from resin and aluminum to paint and semiconductors, are nearing historic levels. Products that do get manufactured sit on cargo ships or in warehouses due to shortages of containers and workers and truck drivers that help deliver them to their final destinations. And consumer pocketbooks and paychecks are getting squeezed by rising prices.

The $9 trillion logistics industry is responding by investing in automation and using AI and big data to gain more insights throughout the supply chain. Big money is being poured into supply-chain technology startups, which raised $24.3 billion in venture funding in the first three quarters of 2021, 58 percent more than the full-year total for 2020, according to analytics firm PitchBook Data Inc.

Behind these investments, businesses see technology and accelerated computing as key to finding firmer ground. At Manifest 2022, a logistics and supply chain conference taking place in Las Vegas, the industry is discussing how to refine supply chains and create cost efficiencies using AI and machine learning. Among their goals: address labor shortages, improve throughput in distribution centers, and route deliveries more efficiently.

Take a box of cereal. Getting it from the warehouse to a home has never been more expensive. Employee turnover rates of 30 percent to 46 percent in warehouses and distribution centers are just part of the problem.

To mitigate the challenge, Dematic, a global materials-handling company, is evaluating software from companies like Kinetic Vision, which has developed computer vision applications on the NVIDIA AI platform that add intelligence to automated warehouse systems.

Companies like Kinetic Vision and SF Technology use video data from cameras to optimize every step of the package lifecycle, accelerating throughput by up to 20 percent and reducing conveyor downtime, which can cost retailers $3,000 to $5,000 a minute.

Autonomous robot companies such as Gideon, 6 River Systems and Symbotic also use the NVIDIA AI platform to improve distribution center throughput with their autonomous guided vehicles that transport material efficiently within the warehouse or distribution centers.

And with NVIDIA Fleet Command , which securely deploys, manages and scales AI applications via the cloud across distributed edge infrastructure, these solutions can be remotely deployed and managed securely and at scale across hundreds of distribution centers.

Improving layouts of stores and distribution centers also has become key to achieving cost efficiencies. NVIDIA Omniverse , a virtual world simulation and 3D design collaboration platform, makes it possible to virtually design and simulate distribution centers at full fidelity. Users can improve workflows and

throughput with photorealistic, physically accurate virtual environments.

Retailers could, for example, develop a solution on the Omniverse platform to design, test and simulate the flow of material and employee processes in digital twins of their distribution centers and then bring those optimizations into the real world.

Digital human simulations could test new workflows for employee ergonomics and productivity. And robots are trained and operated with the NVIDIA Isaac robotics platform , creating the most efficient layout and workflows.

Kinetic Vision is using NVIDIA Omniverse to deliver digital twins technology and simulation to optimize factories and retail and consumer packaged goods distribution centers.

While manufacturers, supply chain operators and retailers each will have their own approaches to solving challenges, they're leaning in on AI as a key differentiator.

Successfully implementing AI-enabled supply-chain management has enabled early adopters to improve logistics costs by 15 percent, inventory levels by 35 percent and service levels by 65 percent, compared with slower-moving competitors, according to McKinsey.

With some experts predicting the global supply chain won't return to a new normal until at least 2023, companies are moving to take measures that matter most to the bottom line.

For more on how NVIDIA AI is powering the most innovative AI solutions for the supply chain and logistics industry attend the following talks at Manifest :

A fireside chat, "Bringing Agility and Flexibility to Distribution Centers with AI," on Wednesday, Jan. 26, at 2 p.m. Pacific, in Champagne 4 with Azita Martin, vice president and general manager of AI for retail at NVIDIA, and Michael Larsson, CEO of North America region at Dematic.

A presentation "The Next Frontier in Warehouse Intelligence" on the same date, at 11:30 a.m. Pacific, in Champagne 4 with Azita Martin and Omer Rashid, vice president of Solutions Designs at DHL Supply Chain, and Renato Bottiglieri, chief logistics officer at Eggo Kitchen & House.

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