Signed, Sealed, Delivered: NVIDIA AI Achieves World Record in Route Optimization

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Promising more timely deliveries for consumers around the globe, NVIDIA's cuOpt real-time route optimization software has set records on a key route optimization benchmark.

NVIDIA cuOpt set three new records on the widely followed Li & Lim pickup and delivery benchmark.

Last-mile delivery is the most expensive part of the logistics industry, representing over 40% of overall supply chain cost and carbon footprint, according to Gartner. Nearly 150 billion parcels are shipped every year, according to Pitney Bowes .

AT&T; is using cuOpt to optimize routes for 30,000 technicians. "With cuOpt, AT&T; can find a solution 100x faster and update their dispatch in real time," said NVIDIA CEO Jensen Huang, during his keynote at NVIDIA's GTC technology conference Tuesday.

AT&T; is also testing digital assistants built with NVIDIA Omniverse Avatar Cloud Engine to enhance the customer service experience and improve its employee help desk. Additionally, the company is accelerating its data-processing workflow using NVIDIA RAPIDS Accelerator for Apache Spark , a suite of libraries that enable GPU acceleration of data-science pipelines.

"AT&T; has adopted a full suite of NVIDIA AI libraries," Huang said.

Better solutions to the pickup and delivery problems result in lower costs for manufacturers moving goods and services across the globe, quicker disaster relief and hotter, fresher pizza, among other benefits.

Introduced in 2021, NVIDIA cuOpt offers enterprises the ability to adapt to real-time data to optimize delivery routes by analyzing billions of feasible moves per second.

cuOpt is now at the center of a thriving partner ecosystem of system integrators and service providers, logistics and transportation software vendors, optimization software specialists and location service providers.

Route optimization is one of the most critical industrial computing problems of our time.

While the problems involved in route optimization are simple to understand — what's the most efficient way to visit the most places — the computation required to determine the most efficient routes stacks up, fast, as the number of delivery vehicles, customers and delivery destinations increases.

That's made the benchmarks for pickup and delivery problems set forth in 2001 by Hiabing Li at the New Jersey Institute of Technology and Andrew Lim at the Hong Kong University of Science and Technology — who introduced a collection of 300 datasets by which a route's efficiency can be measured — a widely watched global standard.

Researchers have been proposing best route plans for these benchmarks for more than two decades, inventing algorithms that set and reset the world's best-known solutions, with past winners focusing on making small tweaks to previous routes.

The route cuOpt created, by contrast, looks unlike the routes created by previous winners. It was able to find an entirely new approach to the problem, delivering three world-record solutions in the largest instances of the Li & Lim benchmark suite. They include 1,000 pickup and delivery locations.

The benchmark's top objective is to minimize the fleet size first, and the total distance traveled next. Nevertheless, cuOpt was able to cut the distance traveled by as much as 0.8% to 1,000 pickup and delivery locations.

By relying on the parallel computing capabilities of NVIDIA A100 Tensor Core GPUs , cuOpt is able to search for routes more deeply and more broadly.

The result: cuOpt delivered an improvement 7.2x higher than the improvement over the previous record on the benchmark and 26.6x higher than the improvement gained by the record-setting effort before that.

cuOpt for production environments is available with NVIDIA AI Enterprise , the software layer of the NVIDIA AI platform. With enterprise support for over 50 production-ready frameworks, pretrained models and development tools included, NVIDIA AI Enterprise is designed to accelerate enterprises to the bleeding edge of AI, while also simplifying AI to make it accessible to every enterprise.

Enterprises can also work with NVIDIA service delivery partners including Deloitte and Quantiphi to integrate cuOpt solutions into their business.

Explore what cuOpt can do for your business, stay up to date on the latest news for cuOpt and join us at GTC .

Resources to learn more:

cuOpt Product Page

cuOpt Cloud Service Early Access Program

Route Optimization AI Workflow (powered by cuOpt)

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