INTECH Helped a Leading Retailer Hit 25-30 Deliveries Per Trip

Summary

A leading retailer struggled with growing delivery volumes, delayed shipments, and underutilized vehicle fleets. INTECH stepped in with an AI-powered Auto Trip Creation System that automated trip planning, optimized routes, and improved load efficiency. Within weeks, the retailer saw faster deliveries, better vehicle use, and a scalable system ready to support growth.

About the Client

The client is one of India's largest retail chains, known for its wide range of home essentials and competitive pricing.

With a growing network of fulfillment centers and delivery points, the business runs on tight delivery schedules and consistent customer service. Each delayed order and each inefficient route risks eroding customer loyalty and profitability.

Timely and accurate deliveries are not just operational goals; they're a brand promise.

To stay competitive, the client needed to evolve its delivery operations into something more intelligent, efficient, and ready to scale.

Client Challenges: From Delivery Bottlenecks to Burnout

The delivery process was starting to break under pressure.The client relied on manual trip planning across multiple fulfillment centers as order volumes increased.

Operations teams spent hours every day trying to cluster shipments, assign routes, and juggle delivery modes.

But this reactive approach couldn't keep up with the pace of growth, and as a result:

Trip planning took hours of manual effort
Dispatch teams had to sort through shipment lists, group orders by location, and assign vehicles without any intelligent assistance. This consumed valuable time and delayed vehicle departures every single day.

Delivery routes were inefficient and inconsistent
With no system to calculate optimal paths, drivers often doubled back, visited the same areas multiple times, and faced unexpected traffic, leading to missed delivery slots and higher fuel costs.

Vehicle capacity was underused
Without automated clustering or load balancing, trucks left warehouses with extra room that could have been filled. This increased the number of trips required and drove up per-delivery costs.

Fulfillment teams couldn't handle surges in volume
As order volumes spiked, especially during sales and the festive season, the system crashed. Manual coordination between fulfillment centers and last-mile logistics teams led to confusion, bottlenecks, and failed handovers.

Growth plans were constantly held back
The delivery model couldn't scale. Leaders were forced to hold off on expanding into new zones because the existing infrastructure couldn't handle more complexity.

That's when the client turned to INTECH to move from manual chaos to intelligent automation.

INTECH's Solution: AI-Powered Auto Trip Creation System

INTECH began with a simple goal: turn a manual delivery model into a self-optimizing system that could plan, adapt, and scale on its own. We worked closely with the client's logistics and operations teams to understand day-to-day workflows, pain points, and delivery constraints.

Together, we defined the three core objectives:

- Eliminate manual planning with AI-led automation
- Maximize vehicle load efficiency without human intervention
- Ensure scalable routing that adapts in real time to growing volume

From there, INTECH designed and implemented an AI-powered Auto Trip Creation System, tailored to the client's needs, delivery patterns, and fulfillment model.

Here are the key features of the solution:

AI Clustering Engine

- INTECH deployed a custom machine learning engine to group shipments intelligently based on delivery proximity, time windows, and fulfillment mode. This allowed for logical trip formation.

Dynamic Route Optimization

- The system calculated optimal delivery paths using real-time data. Whether planning a single trip or coordinating hundreds across multiple zones. The AI constantly adjusted for road conditions, delivery windows, and hub locations to save time and fuel.

Dual Delivery Mode Handling

- Whether the order was headed to a home or a pickup point, the system treated it as part of a unified delivery flow. Fulfillment modes were seamlessly factored into route planning, removing the need for manual separation or dispatch juggling.

Load Balancing Algorithm

- Vehicles were automatically loaded up to ideal capacity, hitting 25 to 30 deliveries per trip on average. This helped reduce the number of trips, lower the cost per order, and make the most of available vehicle assets.

Real-Time Processing at Scale

- The system used $O(n^2)$ complexity algorithms to ensure fast execution, even at peak times. Whether it was 100 or 10,000 shipments, the AI could process, group, and assign deliveries in near real time without system lag.

Implementation Process

To bring this AI-powered system to life, INTECH followed a structured implementation process, carefully balancing technical precision with the client's operational needs.

The implementation followed an agile, collaborative process:

1. **System Architecture and Optimization Logic**
   INTECH defined core optimization rules based on geography, order volume, and delivery time windows. The goal was to keep shipments in each trip close together, make each trip cover a smaller area, and fit as many shipments as possible into fewer trips.
2. **Clustering Model Testing**
   Multiple agglomerative clustering models were tested—single linkage, complete linkage, average linkage, and centroid-based—to determine the best fit for the client's density patterns and load profile.
3. **API Integration and Real-World Testing**
   INTECH integrated the system with the client's existing fulfillment software using REST APIs.

   Pilot tests were conducted in controlled delivery zones to validate performance, fine-tune parameters, and ensure handoff between systems was seamless.
4. **Full Rollout and Live Optimization**
   INTECH rolled out the system across all fulfillment zones, with Kafka-based event handling to support real-time updates.

With the system fully deployed and running in live environments, the results were immediate and measurable.

Business Impact

The Auto Trip Creation System didn't just optimize routes. It redefined how the client's logistics teams operated, freeing them from daily firefighting and giving them control, speed, and clarity across delivery operations.

The key business impacts include:

Replacing manual processes with AI-driven decision-making.	Increasing operational efficiencies, resulting in significant cost savings.	Improving delivery timelines and reliability, enhancing customer satisfaction, and brand loyalty.

The results gave the logistics team a reliable trip-planning system, hitting 25-30 deliveries per trip.

Tools and Technologies Used

INTECH selected tools that could deliver performance at scale without compromising speed or stability.

- **Python:** Used for building the machine learning models and core optimization logic. It allowed rapid development and easy customization to the client's unique delivery patterns.
- **Apache Kafka:** Enabled real-time data streaming and event handling to support dynamic updates across the trip creation engine.
- **REST APIs:** Integrated the 'Auto Trip Creation System' with the client's existing logistics infrastructure for seamless communication between systems.
- **Flask:** Deployed as a lightweight, scalable framework to support fast application rollouts and minimal infrastructure overhead.

Every tool was carefully chosen to reduce complexity, improve performance, and ensure long-term maintainability.