AI/ML : Steroid of choice for smart warehouses

By Virender Aggarwal

A SURGE in online orders during the stay-at-home restrictions due to Covid-19 may have marked the dawn of a new era on e-commerce, but it has also sparked two intensive logistics "foot races" – within the warehouse and in the last mile of delivery.

All data points to record online orders in the first half of 2020, propelled by the pandemic that forced much of the world's urban population to stay at home.

South-east Asia's leading e-commerce platform Lazada's grocery arm Redmart reported "unprecedented demand" during the pandemic, as orders of food staples surged between four and ten times. Orders on Singapore-based e-commerce platform Shopee more than doubled to 429.8 million in the first quarter of 2020 compared to 203.5 million a year ago.

The volumes may rise further. Cities have resumed lockdowns for fear of a resurgence in infections. Air travel and hotel bookings have plunged. Department stores that still operate are rushing to shore up e-commerce channels to make up for the loss of in-store sales.

While e-commerce has surged, the supply chain has been rocked by the speed and volume of order flow. Online platforms and payment gateways may have been able to scale. But for those along the supply chain, especially small- to medium-size third-party logistics (3PL) players, the nightmare has only just begun.

The rush to order online prompted record complaints – 34,000 in April and May alone – to the Federal Trade Commission, the watchdog agency regulating e-commerce in the United States. In Asia, the culture and processes of such complaints are less mature and, hence, data is incomplete.

Across the world, face masks hide grim expressions of customers frustrated by orders that never arrived, or which reached them late and at times damaged. Beyond the compensation that stores and e-commerce platforms must make lies the greater cost of reputational damage and the stress imposed on over-worked 3PL workers.

Battle lines have been dramatically redrawn for two important parts of the supply chain. How rapidly and decisively 3PL managers adopt artificial intelligence and machine learning (AI/ML) on their current digital platforms will determine the victors.

The first is within the warehouse where workers must grapple with multiple orders at high speed. The current layout and configuration may force a worker to clock several kilometres a day to meet orders. Warehouses that utilise robots can automate up 70 per cent of tasks. But many have yet to implement automation due to the high cost of investment and legacy issues of the layout and management structures.

AI/ML can speed up and increase the number of picks per hour with less travel by workers. This is achieved by optimising travel path to the pick locations, locating fastest-moving items nearer and clustering ordered items next to each other by analysing order patterns to predict trends – all in real time.

Over time, the warehouse can conduct deep learning in order to optimise picking and sorting. Velocity of order flow, powered by AI/ML, will soon determine how and where the products should be stored. This can help to slash internal traffic by up to 70 per cent with almost no capital expenditure.

REPLACED BY ROBOTS

Such smart warehouses will soon supersede current default operations which depend on the skill and experience of operators. Such complex set-ups often have rigid positioning of stocks and inflexible process modelling and engineering. They cannot handle indirect variables and take longer to process data and make decisions.

The velocity of orders experienced recently positions AI/ML as the steroid of choice. AI/ML has the advantage of being able to predict and optimise tasks by analysing data streams without the need for upfront engineering. Managers need not be held ransom to the average value model currently used for planning. They can now anticipate resources and equipment to move packages while remaining flexible to change when needed.

Nearly 30 per cent of warehousing jobs can be replaced by robots. But on the flip side, this automation will create new skilled jobs enable business operations to scale up, thus creating a multiplier effect to open new job opportunities.

In the second battlefront, last-mile deliveries now rely on transportation systems that were not designed to handle e-commerce. The delivery business had relied mostly on cost efficiencies focused on long-distance travel, with little need to address speed and fluctuating demand.

Last-mile delivery companies have learned painfully during the pandemic that profitability is determined by two main factors – route density (number of packages delivered on each run) and drop size (number delivered at each stop). Customers do not want to pay much for shipping, with half of them abandoning their carts if delivery costs seem excessive.

Again, AI/ML can make a major difference by analysing trends and suggesting delivery paths after factoring order flow, traffic patterns, GPS and even weather. Optimised routes will save time, manpower and fuel. Over time the system can even recognise shapes and sizes of packages and predict orders with greater sensitivity. Such optimisation will also contribute to sustainability by reducing air pollution and carbon footprint.

Early-mover adoption of AI/ML for this second foot race will prepare players for the next wave in e-commerce. Even without a fresh pandemic, the accelerated pace of these two races augur a brave new world which will encompass blockchain-enabled security, dynamic pricing and adoption of drones and driverless vehicles for delivery.

Indeed, Covid-19 has just pushed the fast-forward button for the global supply chain down to the last mile.

❚ *The writer is CEO of Ramco Systems, a global provider of innovative enterprise solutions*

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