A chief executive officer's journey into warehouse mapping and machine learning.

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Artificial Intelligence, deep learning, machine learning—whatever you're doing if you don't understand it—learn it. Because otherwise you're going to be a dinosaur within 3 years.

- Mark Cuban

Artificial intelligence (AI) and machine learning (ML) have fundamentally changed how businesses operate. These transformational technologies automate and streamline once-prohibitively complex, time-consuming big data analysis and providing access to actionable intelligence in minutes or seconds instead of days or weeks.

Crave InfoTech Co-Founder and Chief Executive Officer Shrikant Nistane sees enterprise asset management and supply chain management activities as fertile ground for exploiting both AI and ML. He focuses his company's innovation agenda on leveraging them to help SAP users enhance control over mobile and immovable assets, from trucks on the road and forklifts in a warehouse to generators powering a utility tower.

Shrikant's story shows how Crave InfoTech carved a niche in the ERP space through the adoption of ML, data collection, geospatial data and mapping technologies to develop applications that augment SAP's asset and warehouse management capabilities.

Leader profile

Earning an MBA in entrepreneurship, management & information gave Shrikant the confidence to start a business. His 20-plus-year relationship with SAP and a track-record of leading technological change across a range of industries defined the company he started - Crave InfoTech.

Early on, a senior manager for one of Crave InfoTech's largest customers told Shrikant that his company's greatest strengths lie in its ability to keep pace with new technology, its agility and its capacity for innovation. That affirmation became Shrikant's guiding principle. He infuses his company's culture with an entrepreneurial mindset, one that rewards risk-taking and continuous learning.

"Our customers may ask, what have you done in machine learning? In geospatial technology? In AI? But essentially, they're asking us to explain how those technologies might contribute to their core business and provide solutions that improve operational efficiency. I see my role as aligning this company with all the changes in the technology market-place, building innovation into our DNA and staying one step ahead of what customers are looking for."

Beginning the journey

From its inception, Crave InfoTech's value proposition lay in identifying and solving for common customer pain points not fully addressed by SAP's ERP solution. Shrikant and his team provide SAP users with pre-packaged, purpose-built digital applications that can be rapidly deployed, reducing total cost of ownership and speeding time-to-value. The applications are configurable; customers are free to add or remove fields and change the user interface and workflows without having to modify the core application.

While Crave InfoTech's business remains SAP-focused, Shrikant has raised his company's profile in the larger digital transformation space. He's extending the company's mission to helping organizations, large and small, utilize disruptive technologies, like real-time location and geospatial enablement, to improve asset tracking, enterprise asset management and warehouse management. "We started integrating location technologies from HERE with what we already had and worked mainly in the tracking, location and geospatial areas." According to Shrikant, the transition from Crave InfoTech's existing mapping solution API to HERE API took just hours and the cost for geospatially enabling HERE API was 80 percent lower than other competing products he'd evaluated.

Shrikant believes the maturation of data capture devices - they've gotten smaller and cheaper – is leading an increasing number of organizations to view real-time indoor and outdoor location tracking as the next frontier in operational efficiency. "Most large organizations in manufacturing, utilities, retail and distribution use ERP, but now they want to utilize real-time location, geo-positioning and mapping solutions, especially in the supply chain and warehouse operations side," he says. "We've successfully integrated the digital enterprise expertise of SAP ERP, the geospatial technology from HERE and data capture capabilities at-the-source from another partner, Zebra Technologies. That's how we got to the stage we are today."

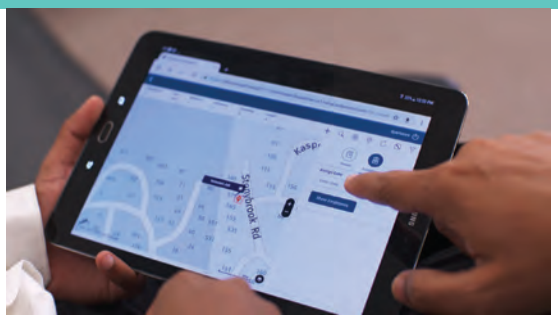
Providing end-to-end solutions

Shrikrant points to Crave InfoTech's warehouse management, asset tracking and enterprise asset management applications as the embodiment of that integration. "We're combining our innovation with the innovations of partners, like HERE Technologies, Zebra Technology, and SAP to provide an end-to-end solution for customers."

For instance, Crave InfoTech's warehouse management application, cWarehouse, integrates HERE's indoor mapping technology with SAP's warehouse management functionality (such as 'pick-and-put' processes or bin-to-bin transfers) which are tracked through Zebra mobile devices. One scenario might be a company that needs to manage the real-time movements of hundred forklifts in an immense indoor warehouse. "That has traditionally been very difficult because GPS technology doesn't work indoors. That's where the indoor map comes in." Shrikant says. "Or there may be a case where a forklift won't fit into a narrow warehouse aisle. We can enter that information into the indoor map's routing algorithm, which would provide that information to the forklift driver through a handheld device."

Organizations also need to keep their assets healthy. Crave InfoTech's enterprise asset management application, Field Service Manager (cFSM), integrates geospatial, tracking and routing technologies with its customers' ERP solution's asset maintenance module to ensure they are able to locate assets for scheduled or preventive maintenance. "From a field service perspective, it's very important to understand what work needs to be done, where the asset is located, how the technician is going to do the work and how they are going to capture the information," Shrikant says. "We're able to efficiently combine the routing and navigation information from HERE Technologies and, using Zebra hardware, facilitate access to that information in the field.

Crave InfoTech's Connected Assets and IoT application, cTrack, tracks any asset, both fixed, like a machine on the production floor, and mobile, from company-issued laptops to commercial vehicles. "For the commercial vehicles, it's important to understand things like the capacity of the road, like how much weight they can carry, bridge heights or even if they're allowed on a specific street," Shrikant says. "We're able to combine these parameters with business parameters, like the priority of the job, the location of the job, the customer, and the urgency of the job to create one solution customers can use for commercial vehicles, non-commercial vehicles, or any other assets." Shrikant goes on to say that Crave InfoTech customers have reported a 60 percent reduction in their manual tracking activities and a 30 percent increase in operational efficiency due to field mobility and location tracking.



Building an machine-learning feedback loop

Central to his strategy of positioning Crave InfoTech as a digital transformation partner, Shrikant deepened his company's involvement in machine learning (ML) and artificial intelligence (AI), embedding those technologies into Crave InfoTech's applications. He says his customers want to take their data strategies to the next level, utilizing AI and ML to create a sophisticated feedback loop that analyzes and exploits the decision-making value of the data they've been collecting.

"IoT, ERP and supply chain solutions have historically overwhelmed companies with data points, so we're developing ML strategies focused on creating data models, especially around asset management, to support reliability-centered maintenance, predictive analytics, and so forth," Shrikant says. ML and AI have been assuming a larger role in day-to-day operations for a while now, with bots taking over many routine, repetitive, 'swivel chair' tasks. However, cognitive computing is now moving higher into the value chain to replace more complex functions.

Lessons learned

Shrikant has staked Crave InfoTech's future on aligning his company's offerings with the continuing evolution of technology and his customer's increasingly sophisticated business needs. "Customers are looking for end-to-end solutions, not one siloed solution that solves for only part of a problem," he says, emphasizing that enterprise-wide integration is key.

"Twenty years ago, the big initiative was data collection, and now companies have so much data, they don't know how to use it. Our apps help them exploit that data effectively within the four-walls of their operation and in the field. First, we're integrating real-time IoT, geolocation, indoor mapping and routing technologies with their SAP enterprise software. Second, we're utilizing mobile technology, and third, we're taking it to the next level by leveraging AI and ML for advanced, predictive analytics, analyzing patterns, creating decision-trees and data modeling."

As the concept of digital transformation gains an even firmer foothold in the marketplace and companies seek operational efficiencies beyond mere automation, Shrikant has successfully molded Crave InfoTech into a digital transformation partner. "Customers want to make better decisions faster, so they can provide better service to their customers and excel at their core business," he says. "They expect us to be agile. They expect us to be on the cutting edge and to deliver operational efficiency, and that's what we do as a digital transformation partner."

Reflections from HERE

The entrepreneurial drive that inspires innovators like Shrikant makes Crave InfoTech an exciting partner for HERE. Crave's desire to take the digital transformation one step further by pushing the SAP ecosystem beyond mere automation is an inspiring use-case for location technology.

Crave's approach to leveraging the best-of-breed technologies and maximizing their combined potential facilitates continuous innovation in a traditionally conservative supply chain industry. The company helps its customers outpace the industry's evolution by enabling them integrate new technologies with their existing ERP investment. Crave removes barriers to entry, eliminates siloed systems and allows its customers to realize the value of a single-source-of-truth.

By leveraging HERE location technology as an integral part of this single-source-of-truth, Nistane is able to focus Crave on its core expertise. Our partnership with Crave promises to heighten the value-add both companies deliver in the future.

About HERE Technologies

HERE, the Open Location Platform company, enables people, enterprises and cities to harness the power of location. By making sense of the world through the lens of location we empower our customers to achieve better outcomes – from helping a city manage its infrastructure or an enterprise optimize its assets to guiding drivers to their destination safely. To learn more about HERE, including our new generation of cloud-based location platform services, visit **360.here.com** and **here.com**