Arendai Resolves Mixed Mode Robotics Fleet Through Edge Intelligence and Interoperability Support

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Due to the increasing demands, logistics providers are adopting heterogeneous robotics solutions, which include collaborative robotics arms, Automated Guided Vehicles (AGVs), autonomous forklifts, tuggers, and other mobile robots, to augment their productivity. However, this comes with high deployment complexity and cost. The insight discusses Arendai's approach to introducing robotics intelligence and interoperability. The company has partnered with giant chip manufacturer Intel to bring robotics intelligence and interoperability through Intel's unique solution in distributed computing.

ARENDAI HARMONY 1.0

Labor shortage and better-than-expected post-pandemic recovery have led to significant constraints in the logistics sector. Customers are spending and expecting more, and logistics vendors face difficulty meeting those demands. The vendors are adopting hybrid automation solutions, including collaborative robotics arms, Automated Guided Vehicles (AGVs), and Automated Mobile Robots (AMRs), such as forklifts, tuggers, and picking platforms, in their warehouses to cope with the challenge, but these led to high deployment costs and limited scalability.

In October 2022, US-based Arendai launched Harmony 1.0, a software solution for automating logistics and warehouse operations. The software can be integrated with end users' Enterprise Resource Program (ERP) and Warehouse Execution System (WES)/Warehouse Management System (WMS) in the cloud. Such integration enables Harmony to act as the master controller, managing AGVs and AMRs from different vendors through its workflow manager and fleet orchestrator. The platform also features simulation and digital twin capabilities for operation optimization and predictive maintenance. In addition, end users can access the analytics, task planner, and reporting functions in a single plane of glass and make data-driven decisions.

On top of that, Arendai can introduce expanded Artificial Intelligence (AI) capabilities through edge computing infrastructure to AGVs and AMRs from different vendors. These capabilities, such as computer vision and visual Simultaneous Localization and Mapping (vSLAM), help to create and implement a safe environment for robot-and-human collaboration in warehouse operations.

FOCUS ON ROBOTICS INTELLIGENCE AND INTEROPERABILITY

The Harmony platform is based on two key infrastructures. Cloud computing resources enable Arendai to integrate traditional warehouse processes with computing-intensive workloads, such as workflow optimization and simulation using AutoCAD and AI model training. The company also offers a data lake for improved operations, forecasting, and predictive analytics. At the same time, Arendai has partnered with Intel to leverage the company's distributed and edge computing capabilities, namely the Edge Insights for Autonomous Mobile Robots (EI for AMR) on the AMR platforms and Intel Smart Edge on on-premise servers and gateways.

The partnership with Intel is critical, as Intel's x86 CPU remains popular among major mobile robotics vendors. Edge Insights for AMR is a software development kit for building and deploying end-to-end mobile robot applications based on the open-source Robot Operating System 2 (ROS 2). Since ROS 2 is specifically designed for large-scale fleet management and orchestration, Arendai can deliver Over The Air (OTA) updates for various robotics functions, including computer vision, manipulation, and navigation. In addition, Intel Smart Edge is a distributed computing platform for deploying and managing container-based workloads in edge infrastructure. The platform features Intel's hardware with a highly optimized Kubernetes engine for edge infrastructure, hardware-based security, and smart power management functions. Other major robotics clients include Blue White Robotics in agriculture.

Like most companies supporting interoperability in robotics, Arendai also supports VDA 5050. Announced in 2017, the standard was born out of Germany's automotive sector, one of the largest user bases for AGVs and AMRs. Over the years, the robotics industry has worked hard to adopt and adhere to this open standard. For example, InOrbit, a robotics operation platform vendor, has partnered with Clearpath Robotics and OTTO Motors to connect VDA 5050 to ROS 2. Nonetheless, it is still early days for the standard. According to Arendai, VDA 5050 is rather simplistic and mainly designed for AGVs. BlueBotics, a key navigation solution provider, echoes this sentiment. The current VDA 5050 is limited to communicating commands to AGVs, vehicle status sharing, and sending actions, but more updates are on the way in the next two to three years.

INTEROPERABILITY IS A BIG MARKET OPPORTUNITY

Therefore, making robots more intelligent and resolving interoperability remain major industry pain points. Arendai now joins its peers, such as Formant.IO, InOrbit, Meili Robotics, and Sorian Fleetware, to address this growing robotics software market, which is expected to reach US$10 billion by 2030, according to ABI Research's industrial and commercial robotics market data (MD-CIROBO-107). As more and more third-party logistics vendors and warehouse operators are actively adopting robotics solutions from various brands, ABI Research foresees more partnership between robotics software companies and infrastructure and other software vendors to be forged moving forward.

In late 2021, InOrbit has announced its partnership with Meili Robots to mobile robots operators to orchestrate their entire fleet from a single, centralised platform. Format.IO has ongoing partnership with the likes of Boston Dynamics, NVIDIA, PickNik, Ouster, and Carnegie Robotics. Arendai was the first robotics software company that established an exclusive partnership with Intel, allowing the company to tap into Intel's expertise in edge computing and robotics. Coupled with its software capability, the company is confident that more and more logistics customers need heterogeneity and interoperability, thus enabling Arendait to be a preferred software partner with key logistics players.