

Vision-Driven Adaptive Welding Solutions for the Top Three Challenges in Welding Fabrication

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With experience spanning over 100 robotic deployments in pipe prefabrication and maintaining a decade-long dedication to welding automation, we've pinpointed the key challenges, notably fit-up variation, tack adaptation, and live seam tracking. We engineered an innovative adaptive welding solution that integrates the perceptual and cognitive abilities of welders into articulated robots. This system dynamically responds to real-time welding scenarios, effectively tackling associated challenges. Unlike existing methods reliant on pre-scanning or laser readings before welding, our vision-based adaptive welding technology operates instantaneously, replicating the expertise of proficient human welders. The outcome is a consistent delivery of high-quality welds. Given the widespread advancement of AI, the heart of the adaptive welding system must skillfully manage diverse welding conditions, covering different joint preparations, types, positions, thicknesses, materials, and beyond. Addressing the necessity of training the AI core requires navigating through diverse practical challenges in deployments. Leveraging our expertise in deploying various methodologies, we ultimately provide an efficient solution for training the welding AI, primed for widespread deployment across high-mix low-volume applications. This solution incorporates a data tracing and monitoring platform across deployments, enhancing ERP (Enterprise Resource Planning) functionality, and providing insights into welding operations, historical performance analytics, and problem tracking with proactive improvements.

Presenter Bio:



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Mahyar is the Vice President of Innovation at Novarc Technologies, directing smart welding technologies using industry 4.0 platforms, machine learning, intelligent vision systems, digital twins, IIoT, and simulation tools for welding automation and autonomy. His industry-leading work has resulted in more than 110 published papers and significant awards from the International Institute of Welding, the Canadian Welding Bureau, The American Society of Mechanical Engineers, and Canada's Natural Sciences and Engineering Research Council. Mahyar has a Ph.D. in Computational Weld Mechanics and high-profile experience applying his knowledge to the automotive, aircraft, marine, medical devices, energy, oil & gas, and heavy machinery industries. He holds a Professional Engineering Licence, PMP certificate, IWE designation, ASME FFS, Digital Twins, and Machine Learning Certificates. He is also an adjunct professor in the Materials Department at the University of British Columbia, teaching a signature course on "Welding and Joining of Materials."