



Robot skill learning for industrial robots.

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Industrial robots are reliable machines for manufacturing tasks such as welding, painting, assembly, palletizing or kitting operations. They are traditionally programmed by an operator using a teach pendant in a point-to-point scheme with limited sensing capabilities such as industrial vision systems and force/torque sensing. Today, robots can react to environment changes specific to their task domain but are still unable to learn skills to effectively use their current knowledge. The need for such a skill in unstructured environments where knowledge can be acquired and enhanced is desirable so that robots can effectively interact in multimodal real-world scenarios.



In this talk, we present an alternative approach based on Artificial Neural Networks to embed and effectively enhance knowledge into industrial robots working in manufacturing scenarios namely assembly and welding operations. During learning, the robot uses its sensorial capabilities resembling a human operator to successfully accomplish the requested operation. An important part of the work relies on the effective use of Artificial Intelligence embedded into Industrial Robots working in collaboration with either humans or other industrial robots.

Dr. Lopez-Juarez is graduated with a BEng in Mechanical and Electrical Engineering from The National Autonomous University of Mexico (UNAM) in 1991. He obtained an MSc degree in Instrument Design and Application from The University of Manchester Institute of Science and Technology (UMIST), U.K. in 1996 and a PhD in Intelligent Robotics from The Nottingham Trent University, U.K. in 2000. His areas of interest are in Instrumentation, Self-adaptive Industrial Robots, Neural Networks and Machine Vision. Dr Lopez-Juarez has published over 160 papers, 10 book chapters, has supervised seven PhD thesis to completion, 12 MSc thesis and 7 BEng students. He has two patents and has been responsible for several technological projects and technology transfer within the industry. He is member of the National Researchers Systems in Mexico (SNI), level II. He was the founder and leader of the Mechatronics and Intelligent Manufacturing Systems Research Group at CIATEQ, Advanced Technology Centre A.C. during 2000-2006. Founder of the Robotized Welding Laboratory at COMIMSA during a Postdoctoral stay in the period 2008-2010. He was appointed as Visiting Researcher at the National Centre for Food Engineering (NCFE) at Sheffield Hallam University in the UK during 2015-2016. Currently, he is the leader of the Intelligent Manufacturing Laboratory and Academic Coordinator (from August 2016) for the Robotics and Advanced Manufacturing Systems Research Group at CINVESTAV in Mexico.

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