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Robotic systems for inspecting infrastructure

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Robotic systems are at forefront for doing dull, dangerous and dirty tasks in place of humans. The days of employing humans to risk their lives for inspecting infrastructure are numbered. In this presentation, the author will talk about the laser optics technology he has developed in his research lab for: (1) Inspecting tubulars in Evraz, one of the largest pipe manufactures in the world, (2) Non-intrusive 3D profiling of the deposited material in pipes for cleaning purposes, and (3) In-motion image-based 3D modeling of the vehicles passing through a smart inspection station. The common tread among all the aforementioned projects is the use of imaging sensors and structured light (i.e., collimated laser fringes) for metrology and inspection. A guideline for design of an omni-directional imaging system yielding optimal spatial resolution using a Catadioptric camera and a laser ring will be provided. This will fit into the image-based QC of tubular at a high resolution with a very modest budget. Furthermore, author will provide details on 3D profiling of the deposited material in pipes and also in-motion image-based 3D modeling of vehicles using a perspective camera and two collimated laser lines.

Biography

Mehran Mehrandezh has completed his PhD and MASc in Mechanical Engineering at the University of Toronto and Queens in 2000 and 1995, respectively. He has spent two years at Simon Fraser University in Canada as a Post-doctorate from 2000 to 2002. He has joined the Faculty of Engineering and Applied Science at the University of Regina in Canada in 2002, where he is currently a Full Professor. He has been a Member of IEEE since 1993 and was the Vice President of IEEE (South Saskatchewan) from 2004 to 2006. He has published over 80 papers in refereed journals and conference proceedings. His invention called Regina Pipe Crawler (RPC) was highlighted in the Popular Mechanics Magazine with a worldwide readership as one of the 5 high-tech fixes to infrastructure in 2009. His research revolves around robotics, control, computer vision and mechatronics.

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