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A Data Clustering Approach for Blister Detection in Coordinate Metrology of Casting Products

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Abstract: Blisters are among the common defects found on the casting parts due to trapped gas porosities under high pressure near the surface of the casting. Existence of blisters on some exterior surfaces of the products or on the critical surfaces that are used as a datum or interface for the downstream assembly processes can be considered as major defects that need to be detected by inspection. Digital coordinate metrology is used as a fast and automated approach in the mass-production lines to control the geometric and dimensional accuracies of the casting products. However, using coordinate metrology data to defect some local defects, such as blisters, on the surface of the products is not seen often in the common practice. This paper presents an intelligent approach to extracts blisters directly from the digital coordinate metrology data captured using laser scanner installed on the production line A methodology is developed that uses a data clustering approach considering the manufacturing characteristics of the casting surfaces to detect the possible blisters on the surfaces. The developed algorithm is fast, reliable, an intelligent that can be employed by variety of coordinate metrology systems for online-inspection of the casting products.

Biography: Ahmad Barari is an Associate Professor at the Department of Mechanical and Manufacturing Engineering, and director of Advanced Digital Design, Manufacturing, and Metrology (AD2MLabs), at Ontario Tech University. Dr. Barari is an expert in digital design, manufacturing, and inspection. He

developed process control methodologies for various design, manufacturing, and inspection technologies, software solutions, new machines and processes, graduate course curriculum, and over 150 publications in highly ranked journals and conference proceedings. Dr. Barari has closely collaborated with various industries in projects funded by over 40 sources of funding including funding programs from NSERC, OCE, FedDev, and other as the sole or a team member in the project lead. Dr. Barari has been the member in international scientific committees for various organizations including American Society of Mechanical Engineering (ASME), International Federation of Automatic Control (IFAC), and Coordinate Metrology Society (CMSC). He organized, chaired, or administrated 14 academic national or international events, conference topics, invited sessions, and seminars. Dr. Barari has been the chair of IFAC's 13th international workshop on Intelligent Manufacturing Systems. He is currently appointed as the vice-chair academic Technical Committee on Manufacturing Plant Control and the chair of Intelligent Manufacturing Systems Working Group in IFAC.

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