Series in Automation — Volume 2

IMAGE UNDERSTANDING IN UNSTRUCTURED ENVIRONMENT

Editor
Su-shing Chen

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PREFACE

In the development of autonomous sensory controlled systems, image understanding of sensory data is a difficult but important topic. Due to the unpredictable and uncertain nature of environment, current image processing and computer vision approaches are not adequate to provide the capabilities needed by the systems. Thus, new approaches are required in the overall system design, including sophisticated reasoning processes, uncertainty management and adaptable architectures. This general issue is addressed by Thomas M. Strat and Grahame B. Smith in the first chapter, "A knowledge-based information manager for autonomous vehicles". In the remaining chapters, several specific areas are presented. Although it is impossible to survey an emerging and growing field, these papers represent some important ideas and approaches. In Chapter 2 ("Plausible reasoning in classification problem solving"), Lashon B. Booker discusses the Bayesian approach in plausible reasoning for classification of complex ship images based on incomplete and uncertain evidence. Dynamic scene analysis is treated by Seetharaman Gunasekaran and Tzay Y. Young in Chapter 3, entitled "A region correspondence approach to the recovery of 3-dimensional motion and structure in dynamic scenes". In Chapter 4, a spherical perspective approach ("Spherical analysis in computer vision and image understanding") is introduced to overcome some limitations of the current vision systems by Michael Penna and Su-shing Chen. Finally, Markov image models and their pixel-level approaches are extended to global approaches through Dempster-Shafer and other techniques, by Mingchuan Zhang and Su-shing Chen in "Spatial information processing: understanding remote sensing imagery".

Su-shing Chen

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