

In August 1982 a conference on Robotics and Industrial Automation (Proc. SPIE 360, D. P. Casasent, ed.) elicited a tremendous response, with standing room only at nearly all presentations. This was followed in August 1983 by a Critical Review of Technology conference on Robotics and Robot Sensing Systems (Proc. SPIE 442, D. Casasent and E. L. Hall, eds.). Beginning in November 1983 a permanent conference time and site were established. Future annual SPIE meetings in this field will be held in the fall in Cambridge, Massachusetts.

The November 1983 conference, Intelligent Robots: Third International Conference on Robot Vision and Sensory Controls RoViSeC3 (Proc. SPIE 449, D. P. Casasent and E. L. Hall, eds.), contained over 100 papers from 13 countries, with nearly 400 participants. This special issue of *Optical Engineering* consists of a representative selection of some of the present U.S., Canadian, and European research on intelligent robots reported at the Cambridge conference, as well as papers on other new work being done in this field.

The first three papers in this issue address various object recognition algorithms. O. R. Mitchell and T. A. Grogan discuss the use of Fourier descriptors and Fourier-Mellin correlations for computer vision of complete and partial objects. D. Casasent and V. Sharma detail various feature extraction algorithms for two case studies using a uniquely sampled amplitude and phase 2-D Fourier space. G. Gindi and A. Gmitro then describe the use of Radon transforms for various feature extraction applications. All of these papers consider the vital issue of achieving object recognition in the face of geometrical distortions between the input and reference object.

The fourth paper, by K. Melchior et al., describes a general system for sensor equipment and industrial automation being used in the Federal Republic of Germany. The next three papers present systems for specific applications. P. Saraga et al. describe a robot computer vision system for unpacking and mounting TV deflection units. G. Bégin et al. discuss IR vision systems for welding applications, and R. Ray and J. Wilder describe visual and tactile sensors for the "bin of parts" problem.

The three concluding papers consider various 3-D object issues. H. Chen et al. describe a new "septree" volumetric representation for 3-D objects. H. Nishihara then describes the MIT stereo-matching system PRISM. Finally, M. Fuhrmann and T. Kanade describe new 3-D image acquisition sensor systems being fabricated at Carnegie-Mellon University's Robotics Institute.

The next SPIE conference in this field, Intelligent Robots and Computer Vision (Cambridge, Massachusetts, November 5-8, 1984), is expected to document more recent results in pattern recognition, artificial intelligence, image understanding, systems, algorithms, and applications.

Guest Editorial

Robot Vision

David P. Casasent
Carnegie-Mellon University
Department of Electrical and
Computer Engineering
Pittsburgh, Pennsylvania 15213