

Table of Contents

Part I General Theory and Overview

A Knowledge-based System for Redundant and Multi Sensing
in Intelligent Robots

J. T. Tou 3

An Overview of Visual and Tactile Sensor Technology

A. Pugh 21

Part II Biological Aspects

Highly Redundant Sensing in Robotics - Analogies from Biology:
Distributed Sensing and Learning

M. Brooks 35

Part III Specific Data Fusion Approaches and Examples

The Multisensory System of the KAMRO Robot

J. Raczkowsky, U. Rembold 45

Multi-Sensor Integration for Fine Manipulation

M. Bergamasco, P. Dario, A. Bicchi, G. Buttazzo 55

Hierarchical Robot Multi-Sensor Data Fusion System

R. C. Luo, M.-H. Lin 67

A Phenomenological Approach to Thermal and Visual Sensor Fusion

N. Nandhakumar, J. K. Aggarwal 87

Tools for Multisensor Data Fusion in Autonomous Robots

S. Y. Harmon 103

High Speed Trinocular Stereo for Mobile-Robot Navigation

C. Hansen, N. Ayache, F. Lustman 127

Part IV Circuits and System Design

- Using VLSI Circuits for Optimal Signal Handling in Multisensorial
Robotic Systems
P. Röjder, A. Lauber 149

- Compact Pyramidal Architectures
V. Cantoni, M. Ferretti, M. Savini 157

Part V Control Concepts

- On the Phenomenon of High Redundancy in Robotic Perception
A. Meystel 177

- Self-Organizing Sensory Systems
G. Beni, J. Wang 251

- Structural Solution of Highly Redundant Sensing in Robotic Systems
J. G. Balchen, F. Dessen 263

- Control Concepts for Industrial Robots Equipped with Multiple
and Redundant Sensors
J. Wahrburg 277

- A Variable Structure Control Algorithm for Robot Manipulators
Using Acceleration Feedback
J. A. Tenreiro Machado, J. L. Martins de Carvalho 293

- A Multi-Sensor Distributed System for a Flexible Assembly Cell
*A. de Almeida, H. Araujo, J. Dias, L. de Sa, M. Crisostomo,
U. Nunes, V. Silva* 311

- List of Lecturers and Participants** 321