ICARCV '90

INTERNATIONAL CONFERENCE ON AUTOMATION, ROBOTICS AND COMPUTER VISION

19-21 September 1990

PROCEEDINGS

ORGANISED BY

School of Electrical and Electronic Engineering
Nanyang Technological Institute, Singapore

The Institution of Engineers, Singapore

McGraw-Hill Book Co
Singapore New York St. Louis San Francisco Auckland Bogotá
Caracas Colombo Springs Hamburg Lisbon London Madrid Mexico
Milan Montreal New Delhi Oklahoma City Panama Paris San Juan
São Paulo Sydney Tokyo Toronto
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B. J. Henley
Boustead
SINGAPORE

### 3.2 A New Camera Calibration Method For Robotic Vision 906
Louis Paquette, Robert Stampfier
Universite du Quebec a Trois-Rivieres
CANADA

### 3.3 An Efficient Robot Vision System For 2D Object Recognition 911
Yong-Long Liu, Li-Chen Fu
National Taiwan University
ROC

### 3.4 Automatic Quality Inspection Of Welding Image 916
Zhixiang Xu, Siqun Huang, Hong Lu, Ying Lu
Shanghai University of Science and Technology
PRC

### 3.5 Design, Implementation And Performance Evaluation Of A Dynamically Reconfigurable, Integrated Parallel Computer Vision System 921
Ashok Samal
University of Nebraska-Lincoln
USA

### 3.6 Flow And Separation Control System Applied To Parcel Separation 926
H. Oiry, H. Nicotra, J.C. Salome
SRTP (French Post Technical Research Department)
FRANCE

### 3.7 Optimal Filtering For Robot Vision Using Multiresolutional Foveal Images 931
Fong Aik Meng
Japan-Singapore Technical Institute
SINGAPORE

### 3.8 A Real-Time Visual Servo Control Scheme For Robot Manipulator 936
Cao Bai-lin, Wang Xu, Chen Hui-tang, Zhan Yue-dong, Xu Hong-qing
Xiamen Jiaotong University
PRC

### 3.9 Spatial Invariant Robotics Vision With A New Neural Network 940
Senmao Lin, Caisheng Chen, Xiamen University
PRC

### 3.10 An Empirical Study Of The Strength Of The Epipolar Line Constraint For Stereo Matching 943
Kap Luk Chan, Andrew K. Forrest
Imperial College of Science, Technology & Medicine
UK

### 3.11 Visual Perception For Task Interpretation 947
Lim Kah Bin
National University of Singapore
SINGAPORE

### 3.12 Application Of Linescan Vision System : Industrial Case Studies 952
G. Ginter
IA-Vision (SEA) Pte Ltd
Singapore

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### SESSION CV-4 : IMAGE PROCESSING I

**Thursday, 20 Sep. 1990**

**9:20am to 12:00pm**

**Chairperson : M. R. Kabuka**
University of Miami, USA

**Co-Chairperson : Eddie M. C. Wong**
NTI, Singapore

### 4.1 Graph Matching With A Sorted Table: A Suboptimal Method That Is Effective & Allows Problem Partitioning (Invited Paper) 956
Richard E. Blake
University Of Trondheim-NTH
NORWAY

### 4.2 A Simple Method For Real-Time Image Contouring 961
A. Asundi, M.F. Kan, K.H. Yung
University of Hong Kong
HONG KONG

### 4.3 Speed Up Techniques For Image Object Recognition 965
Alan L. Harvey
Royal Melbourne Institute Of Technology
AUSTRALIA

### 4.4 Segmentation Algorithm In Container ID Number Recognition System 969
Lee Chun Mong, Gao Fang
National University of Singapore
SINGAPORE

### 4.5 A Linear Array Of Rings For Local Operations In Processing 973
H. Schroder, M. Schimmeler, M. Kunde, A. Maeder
University of Newcastle
AUSTRALIA

### 4.6 Dyadic Symmetry And Transform Coding Of Images 978
S.J. Huang, S.N. Koh, H.K. Tang
Nanyang Technological Institute
SINGAPORE

### 4.7 An Edge And Shading Encoding And Compression Technique 983
P.S. Toh, A.K. Forrest
Imperial College Of Science, Technology & Medicine
UK

### 4.8 Fast Image Segmentation 988
Peter I. Corke
CSIRO Division Of Manufacturing Technology
AUSTRALIA

**Helen L. Anderson**
University of Pennsylvania
USA
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Thursday, 20 Sep. 1990
1:30pm to 4:00pm

Chairperson: Richard E. Blake
University of Trondheim-NTH, Norway
Co-Chairperson: Eric Sung
NTI, Singapore

5.1 Symmetry Axes For Segmentation 1003
A. Laird, J. Miller
University of Strathclyde
UK

5.2 Shape Invariants Of Rotational Symmetry From Elliptic Fourier Descriptors Under Orthographic Parallel Projection 1007
Kit-Kuen Yip Raymond, Peter Tam
Hong Kong Polytechnic
HONG KONG

5.3 An Automated Vision System For Inspection Of Surface Mount PCBs 1012
Teoh Earn Khwang, D.P. Mital, B.W. Lee, L.K. Wee
Nanyang Technological Institute
SINGAPORE

5.4 A Concurrent Topdown Analysis Scheme And Its Application To Human Face Images 1017
Yuzhi Ohta, Yasushi Sumi
University of Tsukuba
JAPAN

5.5 A Multistreaming RISC Architecture For Image Processing 1022
Choe Swee Yew, Chan Choong Wah, Chua Hong Chuek
Nanyang Technological Institute
SINGAPORE

5.6 Extracting And Combining Edges Using Gradient Vector 1026
Mutsuhiro Terauchi, Noriaki Yokota, Koji Ito,
Tosho Tsui
Hiroshima University
JAPAN

5.7 Edge Detection And Reinforcement Using Hierarchical Neural Networks 1031
Siwei Lu, Anthony Szeto
Memorial University of Newfoundland
CANADA

SESSION CV-6: VISION SYSTEMS AND ARCHITECTURE I

Thursday, 20 Sep. 1990
1:30 to 4:00pm

Chairperson: M. Atiquzzaman
King Fahd University of Petroleum & Minerals, Saudi Arabia
Co-Chairperson: Daniel T. H. Tan
NTI, Singapore

Performance Characteristics Of A Special VLSI Convolution Architecture For A Computer Vision System 1043
D.D. Haute, A.S. Majowany
McGill University
CANADA

A System For Generation And Modification Of Stereo Disparity In Images 1049
Kent A. Stevens, Allen Brooks
University of Oregon
USA

Laser Range Finder With Intensity Imaging 1054
H.T. Tsui
Queensland University of Technology
AUSTRALIA
D.W. Chan
The Chinese University of Hong Kong
HONG KONG

Jun'ichi Yamaguchi, Masato Nakajima
Keio University
JAPAN

Systolic Architectures For One-Dimensional (1-D) And Two-Dimensional (2-D) Discrete Fourier Transforms 1064
Janusz S. Lipowski
Nanyang Technological Institute
SINGAPORE
Ewa A. Lipowska Nadolska
Electrotechnical Institute
POLAND

A Concurrent Architecture For Fast Real Time Image Feature Detection 1069
K. K. Fung, A. Ginge, N. J. Carmody
University of Technology
Australia
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Thursday, 20 Sep. 1990
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Chairperson: Harcharan Singh
NTI, Singapore
Co-Chairperson: Daniel T. H. Tan
NTI, Singapore

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Kazuo Nakazawa
Keio University
JAPAN

7.2 Knowledge Representation And Organisation Within The VAP Vision System 1091
J. Illingworth, J. Kittler, J.P. Schmidt, H.K. Yuen
University of Surrey
U K

7.3 Proposed Extension To The VME-Bus For Multiprocessor-Based Vision Systems 1096
Koh Liang Mong, Eddie Wong Moon Chung
Nanyang Technological Institute
SINGAPORE

7.4 A Study Of An Axial Stereovision System 1101
Cesar Camonal, Alain Ayache
E.N.S.E.E.I.H.T
FRANCE

7.5 A Comparison Of Different Data Loading Schemes In Multiprocessors For Image Processing 1107
M. Abuzzaman
King Fahad University of Petroleum & Minerals
SAUDI ARABIA

7.6 Vision System For Recognition Of Regular Object 1113
Al-Towaig Ali
University Of Ljubljana
YUGOSLAVIA

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Friday, 21 Sep. 1990
9:20am to 12:00pm

Chairperson: A. C. Kak
Purdue University, USA
Co-Chairperson: Teoh E. K.
NTI, Singapore

8.1 Range Data From Stereo Images Of Edges Points 1132
Hong Seh Lim
IBM Corporation
USA

8.2 Recognition Of Range Data Using Distance Measure Of Attributed Graphs 1137
Hon-Son Don, Chong-Huah Lo
State University of New York
USA

8.3 High Resolution 3-D Profiling By Silt Illumination 1142
V. Srinivasan, Y.T. Teo, S.H. Ong
National University of Singapore
SINGAPORE

8.4 Surface Extraction From Pictorial Drawings Of 3-D Objects 1146
Kuo-Chin Fan
National Central University
ROC

8.5 A Fast Procedure For The Calibration Of Stereo Cameras For The General Model 1151
Eric Sung, Daniel Tan, Tan Boon Wah
Nanyang Technological Institute
SINGAPORE

8.6 A 3D From 2D Recognition Method Using Projective Invariants 1156
Hadj Batata, Alain Ayache
ENSII/HT "Laboratoire de vision par calculateur
ANDRE-BRUEL" FRANCE
8.7 Determining 3-D Position Of Object Using Monocular Computer Vision 1161
Din-Chang Tseng, Hsuan-Cheng Chou
National Central University
ROC

8.8 Reconstruction Of 3-D Figure From Only One 2-D Perspective Figure With Plane Symmetric Property 1166
Yoshikiko Suzuki, Yoshuya Watanabe
Yamanashi University
JAPAN

8.9 3-D Surface Solution Using Structured Light And Image Features 1170
Xiang-Shu Wei, Qing-yun Shi, Min-De Cheng
Information Science Centre of Peking University
PRC

8.10 A Global-Based Stereo Image Matching Method 1175
Hu Chao, Zheng Nanning
Xian Jiaotong University
PRC

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Friday, 21 Sep. 1990
1:30pm to 4:00pm
Chairperson : Richard E. Blake
University of Trondheim-NTH, Norway
Co-Chairperson : G. Ginter
IA Vision, Singapore

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C.W. Moon
Northeastern University
USA

9.2 Object-Oriented CAD Model Reconstruction Using Range Images 1182
S.H. Bok, A.Y.C. Nee, S.L. Lee
Nabonal University Of Singapore
SINGAPORE

9.3 An Approach To Information Fusion Of Tracking Algorithms For Space Applications 1187
Raffaele Mugnolo, L. De Caro, S. Losito
Italian Space Agency
ITALY

9.4 Finding And Characterizing Signal Edges In Blurred Images And Range Data By Energy Minimization 1192
Pirooz Vatan
Tufts University
USA

9.5 Textural Features From Coocurrence Matrices Based On Singular Value Decomposition 1197
Indian Institute of Technology
INDIA

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1:30pm to 4:00pm
Chairperson : V. Srinivasan
National University of Singapore, Singapore
Co-Chairperson : H. C. Lui
Institute of System Science, Singapore

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Myungsook Klassen
Chinese University of Hong Kong
HONG KONG

10.2 Recognition Of Cursive Writing - A Method Of Segmentation Of Words Into Letters 1211
M. Loroux, J.C. Salome
SRTP (French Post Technical Research Dept.)
FRANCE

10.3 Recognition With Correlation Of Sampled Boundary Distances 1216
David T. Wang, Yoke Ngor Hew, Ching-Song Wei, Shy-Shyan Chen, I-Hsin Lin
New Jersey Institute of Technology
USA

10.4 Character Recognition Based On Outline Matching 1221
Y.S. Moon, T.Y. Shin, S.Y. Lam
Chinese University of Hong Kong
HONG KONG

10.5 Elimination Of Least Desirable Features And Dimensionality Reduction For Pattern Recognition Applications 1228
D. Suchanra, K. Chidananda Gowda, P. Nagabhushan
S.J. College of Engineering
INDIA

10.6 Recognition Of Occluded Industrial Parts: A New Feature Extraction Approach 1229
Yan Bai
Huazhong University of Science & Technology
PRC

10.7 Design Of Decision Tree Based On Fuzzy Entropy Maximisation And Its Application To Recognition Of Handprinted Devnagari Characters 1232
S.S. Mehta
University of Jodhpur
INDIA

10.8 Cursive Script Recognition Using Neural Nets 1237
P.V.S. Rao
Tata Institute of Fundamental Research
INDIA
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Friday, 21 Sep. 1990
4:00pm to 6:00pm

Chairperson: Zhixiang Xu
Shanghai University of Science & Technology, P.R.C.
Co-Chairperson: G. Ginter
IA Vision, Singapore

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Enrico Grosso, Giulio Sandini
DIST University of Genoa
ITALY

11.2 Design Of A Moving-Object Counter Using Linear-CCD And DSP 1247
Tang Hung Kei
Nanyang Technological Institute
SINGAPORE

11.3 The Integration Of An Automated Inspection System 1253
Edy B. Soepadmo, Teo Ming Yeong, Eddie M. C. Wong
Nanyang Technological Institute
SINGAPORE

11.4 Detecting Specular Highlights And Determining Illuminant Spectral Distribution 1258
Toh Peng Seng
Imperial College of Science, Technology & Medicine
UK

11.5 Operator-Assisted Knowledge-Based On-Line Machine Vision Systems 1263
M. G. Rodd, J. Chen, Q. M. Wu
University of Wales
UK