

CONTENTS

Chapter 1 – An Introduction to Expert Systems	1
Expert systems: A review 3	
D. T. Pham and P. T. N. Pham (University of Birmingham, UK)	
Expert systems: Perils and promise 19	
D. G. Bobrow, S. Mittal and M. J. Stefik (Xerox Palo Alto Research Center, USA)	
A survey of expert system development tools 43	
J. van Koppen (Volleman Computer BV, The Netherlands)	
Chapter 2 – Expert Systems in Process Engineering	59
Some expert system experiments in process engineering 61	
K. Niida, J. Itoh, T. Umeda (Chiyoda Chemical Engineering and Construction Co., Japan), and S. Kobayashi and A. Ichikawa (Tokyo Institute of Technology, Japan)	
AI application for process regulation and servo control 78	
N. R. Sripada, D. G. Fisher and A. J. Morris (University of Alberta, Canada)	
The application of expert system techniques in on-line process control 99	
J. C. Taunton and D. W. Haspel (Sira Ltd, UK)	
An expert system approach to CAD and analysis of alternate chemical process networks 112	
P. K. Goel (University of Waterloo, Canada)	
Chapter 3 – Expert Systems in Civil Engineering	129
PROLOG-based expert systems in civil engineering 131	
S. Alim (National Engineering Services Pakistan Ltd) and J. Munro (Late Professor at Imperial College, UK)	
Expert systems for structural design 147	
M. L. Maher (Carnegie Mellon University, USA)	
Expert interactive design of R/C columns under biaxial bending 162	
R. Sacks (Ben-El Structural Engineers, Israel) and O. Buyukozturk (Massachusetts Institute of Technology, USA)	
Expert systems in construction: Initial experiences 175	
L. Koskela, R. Hynynen, K. Kahkonen, J. Salokivi and K.-J. Seren (Technical Research Centre of Finland)	
Surface condition expert system for pavement rehabilitation planning 189	
S. G. Ritchie, C.-I. Yeh (University of California, Irvine, USA), J. P. Mahoney	

(University of Washington, USA) and N. C. Jackson (Washington State Dept. of Transportation, USA)

Expert systems and geographic information systems: Review and prospects 203

V. B. Robinson (University of Calgary, Canada), A. U. Frank (University of Maine at Orono, USA) and M. A. Blaze (Columbia University, USA).

Chapter 4 – Expert Systems in Electrical and Electronic Engineering 215

ASDEP: An expert system for electric power plant design 217

J. J. Jansen (Virginia Polytechnic Institute and State University, USA) and H. B. Puttgen (Georgia Institute of Technology, USA)

A distributed expert system for fault diagnosis 235

E. Cardozo and S. N. Talukdar (Carnegie-Mellon University, USA)

Reasoning about fault diagnosis with LES 248

T. J. Laffey, W. A. Perkins and T. A. Nguyen (Lockheed Missiles & Space Company, Inc., USA)

Synapse: An expert system for VLSI design 261

P. A. Subrahmanyam (AT&T Bell Laboratories, USA)

Use of expert systems programming techniques for the design of lead-lag compensators 282

J. R. James (United States Military Academy, USA), D. K. Frederick (Rensselaer Polytechnic Institute, USA) and J. H. Taylor (GEC Corp, USA)

SEISIS: A rule-based system for interpretation of seismic images 300

Z. Zhang and M. Simaan (University of Pittsburgh, USA)

Chapter 5 – Expert Systems in Mechanical Engineering 313

A chain-drive design expert system and CAD system 315

Q. Wang, J. Zhon, and J. Yu (Huazhong University of Science and Technology, China)

Type selection of robot and gripper kinematic topology using expert systems 324

A. G. Erdman, T. Thompson and D. R. Riley (University of Minnesota, USA)

Expert systems for a class of mechanical design activity 334

D. C. Brown (Worcester Polytechnic Institute, USA) and B. Chandrasekaran (Ohio State University, USA)

DOMINIC: A domain-independent program for mechanical engineering design 361

A. Howe, P. Cohen, J. Dixon (University of Massachusetts, USA) and M. Simmons (GEC, USA)

Modularity and user initiative in an expert system for fracture analysis 372

R. A. Fjellheim, G. Coll and B. Johanson (Computas Expert Systems A/S, Norway)

Chapter 6 – Expert Systems in Manufacturing Engineering 385

Expert systems in industrial engineering 387

S. R. T. Kumara (Pennsylvania State University, USA), S. Joshi, C. L. Moodie, T. C. Chang and R. L. Kashyap (Purdue University, USA)

An adaptive knowledge-based system for selecting robot grippers	408
D. T. Pham and S. J. Yeo (University of Birmingham, UK)	
Development of a forging expert system	425
P. Hartley, C. E. N. Sturgess, T. A. Dean, G. W. Rowe and A. J. Eames (University of Birmingham, UK)	
A knowledge-based system for the selection of hole-making processes	444
K. K. B. Hon and H. Ismail (University of Dundee, UK)	
A rule-based system to schedule production	452
G. Bruno, A. Elia and P. Laface (Politecnico di Torino, Italy)	
Authors' organisations and addresses	467
Source of material	471
Further reading	475