

Automation, Collaboration, & E-Services

Volume 2

Series editor

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The Automation, Collaboration, & E-Services series (ACES) publishes new developments and advances in the fields of Automation, collaboration and e-services; rapidly and informally but with a high quality. It captures the scientific and engineering theories and techniques addressing challenges of the megatrends of automation, and collaboration. These trends, defining the scope of the ACES Series, are evident with wireless communication, Internetworking, multi-agent systems, sensor networks, and social robotics – all enabled by collaborative e-Services. Within the scope of the series are monographs, lecture notes, selected contributions from specialized conferences and workshops.

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Revolutionizing Collaboration through e-Work, e-Business, and e-Service

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This book is dedicated to our colleagues of the PRISM Center and PRISM Global Research Network for their invaluable contributions in revolutionizing collaboration through engineering augmentation.

Foreword: Augmenting Us to Collaborate Better for Further Progress

We know the difference between communication and collaboration. When we communicate --- we hope somebody is listening to us and paying attention: Our family, friends, students, co-workers, our boss, the BIG boss...and they probably expect the same from us on the other end of the (wireless) connection.

When we collaborate --- well, now, there is some work to be done, some efforts resulting in expected outcomes. And with farther reach, scaled-up networks, more parties and team-workers and customers and partners, there are more information, bigger data, more work. Deluge of expectations. Where are the limits? We have forever been trying to collaborate better. We learned to collaborate with machines, as drivers of vehicles; as pilots of planes; as operators of equipment. Trusting them and their built-in automation, and at the same time (even unknowingly) also collaborating with the many scientists, engineers, technicians and programmers that teamed up to create and maintain them.

But collaborating with other people is still a challenge. Through the ever larger communication pipelines, technology enables greater communication flows, deeper inter-networking, closer than ever and faster interactions, all promising so much, yet we are swamped and overloaded. This calls for engineering solutions to also automate and improve the collaboration support systems, significantly by cyber with intelligent control algorithms.

So there come the engineered augmentation of collaboration, and this book. Many useful contributions, conferences and workshops have added up to enable this movement. Among them, and from our perspective, we remember the NATO Advanced Research Workshop on Integration: Information and Collaboration Models (Il Ciocco, Italy, 1993), where we evaluated emerging theories of collaboration from earlier years; the EURO XIV meeting in Jerusalem, Israel (1995), the first time we presented recent developments of collaborative e-Work; and the first time we presented CCT, the Collaborative Control Theory, at the 2002 IFAC World Congress: Challenges of a New Millennium, in Rotterdam, The Netherlands. And there are many other inventive contributors and innovations, many of them included in this book.

The evolving tools and techniques of augmenting collaboration, which are the subject of this book, have been developed and applied in multiple industries and applications, with proven success. Generations of research students and scholars in our PRISM Center at Purdue University, and many colleagues over the PRISM

Global Research Network, are partners in pioneering, developing and implementing this exciting field of knowledge. We thank all of them. In particular, we would like to thank our PRISM Center former and current research students, (in addition to co-authors Jose Ceroni, Wootae Jeong, and Mohsen Moghaddam): Chwee Beng Ang, Pornthep Anussornnitisarn, Jorge Avila Soria, Pat Banerjee, Thomas Bellocchi, Radhika Bhargava, Glenn Candranegara, Daniel Castro Lacouture, Abhijit Chaudhury, Jianhao Chen, Xin Chen, Tze Chao Chiam, Caludia Chituc, Surejan De, Prabhu Devadasan, Yael Edan, Keyvan Esfarjani, Ed Fisher, Yashuharu Fujii, Gavin Furtado, Richard Gurecki, Daud Hanna, Chin Yin Huang, Sunjay Jayaram, Ezhil Kanagaraju, Howard Kang, Nitin Khanna, Chang Ouk Kim, Hoo Sang Ko, Hong Li, Marco Lara, Hanan Lechtman, Doo Young Lee, Geoffrey Lenart, Jiaxi Li, Hee Jong Lim, Yan Liu, Oded Maimon, Diana Milner, Amit Mukherjee, Richard Nash, Yukiko Nishibori, Engin Ozsoy, Karianne Prytz, Anurag Puranik, Jose Peralta, Colleen Phillips, Ignacio Puig, Venkat Rajan, Parbati Ray, Rodrigo Reyes Lavalle, Benhard Rembold, Robert Remski, Andrew Robinson, Pierre Sauvaire, Manuel Scavarda, Cristy Sellers, Hyesung Seok, Michael Shaw, Karna Singh, Itshak Tkach, Lina Uribe, Nitin Vallapuneni, Juan Velasquez, Graeme Warren, Neal Widmer, Robert Wiegner, Robert Wilhelm, NaRaye Williams, James Witzerman, Tetsuo Yamada, Chao Lung Yang, Sang Won Yoon, Lu Zhang, Hao Zhong, and the many post docs and visiting scholars. We are also grateful to Dr. Tom Ditzinger, who has patiently guided us throughout the development and completion of this book.

In the future, requirements will continue to intensify for more effective, timely, and trustworthy collaboration; it is essential for addressing scientific, technological, and social challenges, advance and sustain our life quality. We need to continue collaborating well for further progress. The collaboration revolution is a vital capacity of civilization's vision with the cyber and knowledge revolution. May this book and the ACES book series serve as a contribution in this exciting journey.

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Contents

1	Definitions, Scope, and Significance.....	1
1.1	Why Do We Collaborate?	1
1.2	Definitions and Scope	3
1.3	e-Work, e-Systems, and e-Activities	3
1.4	Collaborative e-Work vs. Automation, Tele-Work, and Robotics.....	7
1.5	Collaboration vs. Coordination and Cooperation	9
1.6	Fundamentals of Collaborative e-Work	10
1.6.1	Wheel 1: e-Work	10
1.6.2	Wheel 2: Integration, Coordination, and Collaboration.....	13
1.6.3	Wheel 3: Distributed Decision Support.....	17
1.6.4	Wheel 4: Active Middleware.....	19
1.7	Examples	21
1.7.1	Example 1: Holonic Manufacturing Systems (HMS).....	21
1.7.2	Example 2: e-Production & e-Logistics	22
1.7.3	Example 3: Virtual Factory	23
1.7.4	Example 4: e-Models in e-Commerce and e-Service	24
1.8	Significance and Summary.....	26
	References	28
	Review and Challenge Questions	29
	Lab Questions.....	31
2	Design with Collaborative Control Theory	33
2.1	CCT Design Principles for Collaborative e-Work.....	33
2.1.1	Collaboration Requirement Planning (CRP)	35
2.1.2	e-Work Parallelism (EWP).....	38
2.1.3	Keep It Simple, System (KISS).....	45
2.1.4	Error Prevention and Conflict Resolution (EPCR).....	46
2.1.5	Collaborative Fault Tolerance (CFT)	49
2.1.6	Association and Dissociation (AD)	50
2.1.7	Emergent Lines of Collaboration and Command (ELOCC).....	54
2.1.8	Best Matching (BM).....	56

2.1.9 Collaborative Visualization and Comprehension (CVC)	60
2.1.10 Design e-Criteria and Evaluation e-Measures	63
2.2 Emerging CCT Design Principles	63
2.2.1 Bio-inspired Collaboration	63
2.2.2 Learning, Adaptation, and Evolutionary Collaboration.....	66
2.3 Collaboration Support Systems	68
2.3.1 Example 1: e-Surveillance Systems.....	69
2.3.2 Example 2: e-Operating Rooms	70
2.3.3 Example 3: Software Development Life Cycle	70
2.4 Emerging Trends and Challenges.....	72
References	72
Review and Challenge Questions	74
Lab Questions.....	75
3 Rationalization.....	77
3.1 Operational Strategy.....	78
3.2 Traditional Economic Rationalization.....	79
3.2.1 Pre-cost-Analysis.....	80
3.2.2 Cost-Analysis	82
3.3 Value Mapping and Technology-Based Rationalization	85
3.3.1 Value Stream Mapping (VSM).....	85
3.3.2 Value Network Mapping (VNM)	86
3.3.3 Technology-Based e-Work.....	87
3.4 Multicriteria Rationalization	89
3.4.1 AHP	91
3.4.2 DEA.....	94
3.4.3 e-Work Portfolio Selection: A Case Study.....	97
3.5 Challenges, Advantages and Benefits for Rationalization.....	102
3.6 Emerging Trends and Challenges.....	110
References	111
Review and Challenge Questions	112
Lab Questions.....	113
4 Optimization and Control.....	115
4.1 Emerging Impacts of Agents	115
4.2 Basic Architectures.....	121
4.2.1 Agent-Based Optimization	121
4.2.2 Agent-Based Control	124
4.3 Emerging Bio-inspired Solutions	130
4.3.1 Swarm Intelligence: Ant Systems.....	133
4.3.2 Theory	135
4.3.3 Evolution: Natural Selection	142
4.4 Optimal Design of Protocols and Workflows.....	147
4.4.1 Protocol Optimization	148
4.4.2 Workflow Optimization.....	156

4.5	Emerging Trends and Challenges.....	157
	References	159
	Review and Challenge Questions	164
	Lab Questions.....	165
5	Tools for e-Work.....	167
5.1	Decision Support Systems.....	168
5.1.1	Characteristics of DSS.....	169
5.2	Decision Support Information System	170
5.2.1	Categories of DSS	173
5.2.2	Design of DSS	175
5.3	Communication Protocols	178
5.3.1	Industrial Communication Protocols	179
5.3.2	Virtual Automation Networks	180
5.3.3	Wired Industrial Communication Networks.....	182
5.3.4	Wide Area Communication Networks.....	183
5.3.5	Wireless Communication Networks	185
5.3.5.1	WLAN.....	186
5.3.6	Wireless Sensor/Actuator Networks.....	187
5.4	Software Agents	189
5.5	Reactive Agents.....	190
5.6	Interface Agents	191
5.7	Information Agents.....	192
5.8	Collaborative Agents.....	193
5.9	Hybrid and Mobile Agents	193
5.10	Emerging Trends and Challenges.....	195
	References	197
	Review and Challenge Questions	200
	Lab Questions.....	200
6	e-Work in Product and Service Development.....	203
6.1	PLM (Product Lifecycle Management) Systems for Product and Service Development.....	203
6.2	Technology Support in PLM Systems.....	208
6.3	Collaborative e-Work Support for Product and Service Development	211
6.3.1	Collaborative Processes.....	212
6.3.2	Requirements of Collaborative Processes	215
6.3.3	Framework for Collaborative Processes.....	218
6.3.4	Facilitating Collaborative Processes.....	220
6.3.5	Enabling Collaborative Processes	220
6.4	Case Illustrations with Collaborative Processes.....	222
6.4.1	Centralized vs. Distributed Coordination	222
6.4.2	Collaboration in Distributed Design and Manufacturing.....	223

6.5	Integrated Optimization.....	224
6.6	Analysis Results	225
6.6.1	Variable Production Networks	226
6.7	Collaborative Intelligence (CI).....	227
6.8	CI-Based Optimization Model	229
6.9	Emerging Trends and Challenges.....	231
	References	232
	Review and Challenge Questions	234
	Lab Questions.....	235
7	e-Logistics, e-Production, and e-Supply Networks	237
7.1	Material Handling for e-Work.....	238
7.1.1	Concept and Configurations	238
7.1.2	System Architecture	240
7.1.3	Material Management System.....	243
7.1.4	Material Handling Problems.....	247
7.1.5	Bio-inspired Solutions.....	259
7.2	e-Supply and e-Production Networks.....	261
7.2.1	Supply Network Planning.....	261
7.2.2	e-Production Planning and Control	263
7.2.3	e-Logistics Execution Systems.....	264
7.2.4	RFID-Based e-Supply Networks.....	265
7.3	Emerging Trends and Challenges.....	266
	References	268
	Review and Challenge Questions	270
	Lab Questions.....	271
8	Factory Sensors and RFID Networks	273
8.1	Sensors	273
8.1.1	Sensing Principles	274
8.1.2	Types of Sensors	276
8.2	Sensor Networks.....	282
8.2.1	Multi-sensor Data Fusion Methods	283
8.2.2	Design Considerations.....	287
8.2.3	Architectures	288
8.2.4	Protocols.....	290
8.2.5	Facility Sensor Networks	293
8.3	RFID Networks	294
8.3.1	RFID-Based Automation.....	296
8.3.2	Physical Asset Management.....	299
8.3.3	Warehouse Management	301
8.3.4	Information Interchange	303
8.3.5	Work-in-Process Tracking.....	306
8.4	Emerging Trends and Challenges.....	307

References	309
Review and Challenge Questions	312
Lab Questions.....	313
9 e-Service Industry.....	315
9.1 e-Work in Service Industry	315
9.2 Tasks and Features of Service Industries	321
9.2.1 Financial e-Services.....	322
9.2.2 Power e-Systems	323
9.2.3 Healthcare e-Services	324
9.2.4 Transportation e-Services	325
9.2.5 Space Exploration e-Services	327
9.2.6 Cleaning Automation e-Services	328
9.2.7 Library e-Services	329
9.3 Service Performance.....	330
9.3.1 Performance Monitoring	332
9.3.2 Performance Analysis and Optimization	334
9.4 Task Administration Protocols for e-Service	337
9.4.1 Task Requirement Analysis Protocol (TRAP).....	339
9.4.2 Shared Resource Allocation Protocol (SRAP)	340
9.4.3 Synchronization and Time-Out Protocol (STOP).....	341
9.5 Collaborative ESP Design	342
9.5.1 CRP (Cooperation Requirement Planning) Function	344
9.5.2 ELOCC (Emergent Lines of Collaboration and Command) Function	346
9.6 Error Prevention and Conflict Resolution in e-Service	347
9.7 Emerging Trends and Challenges.....	353
References	353
Review and Challenge Questions	354
Lab Questions.....	356
10 e-Learning and e-Training.....	357
10.1 Automation and e-Work in Learning and Training	357
10.2 Learning via Computer Experiences and Games.....	361
10.2.1 Management Enterprise Resource Planning (MERP).....	363
10.2.2 e-Strat	366
10.3 Collaborative e-Learning Design and Applications.....	367
10.3.1 Grid Collaborative Learning e-Lab	368
10.3.2 CLEV-R: Collaborative Learning Environment with Virtual Reality	370
10.3.3 Blended Learning in Cyber Manufacturing.....	372
10.4 Collaborative e-Training Design and Applications	375
10.4.1 Collaborative e-Training in State DOTs.....	375
10.4.2 e-Training for Manufacturing Managers	379
10.4.3 Collaborative Problem Solving in Military e-Training.....	381

10.5 Performance Impacts, Monitoring, and Evaluation..... 383

10.6 Emerging Trends and Challenges..... 387

References 388

Review and Challenge Questions 389

Lab Questions..... 390

11 Emerging Trends and Research Challenges 391

11.1 Computer and Communication Security 391

 11.1.1 Information Assurance 393

 11.1.2 Ethics 394

 11.1.3 Error Detection, Reduction, Prevention, and Recovery..... 396

 11.1.4 Sustainability 397

 11.1.5 Ability to Collaborate More Effectively..... 398

 11.1.6 Incentive-Based Collaboration 399

 11.1.7 Multi-cultural Interactions..... 402

 11.1.8 Cost Reduction in Service Processes..... 404

 11.1.9 Summary and Classification 406

11.2 Theoretical Issues in Collaborative e-Work, e-Business,
and e-Service 407

 11.2.1 Network Physics and Bio-Inspired Techniques..... 407

 11.2.2 Collaborative Computing 409

 11.2.3 Complexity Handling 409

 11.2.4 Automation Lifecycle Planning..... 410

11.3 Research Challenges..... 412

 11.3.1 HUBs and HUB-CI..... 412

 11.3.2 New Ways of Interacting in the World with e-Work..... 416

References 416

Review and Challenge Questions 419

Index 421