Multi-Agent Systems for Healthcare Simulation and Modeling: Applications for System Improvement

Raman Paranjape University of Regina, Canada

Asha Sadanand University of Guelph, Canada

Medical Information Science MEDICAL INFORMATION SCIENCE REFERENCE

Hershey · New York

Table of Contents

| Foreword | xii |
|---|-----|
| Preface | xiv |
| Acknowledgment | xvi |
| Section 1 | |
| Overview of Healthcare System Issues | |
| Chapter 1 | |
| Current Practices in Select Healthcare Systems | 1 |
| Venkat Sadanand, University of Saskatchewan, Canada | |
| Chapter 2 | |
| Economic Efficiency and the Canadian Health Care System | 13 |
| Asha B. Sadanand, University of Guelph, Canada | |
| Chapter 3 | |
| A Review of Recent Contribution in Agent Based Health Care Modeling | 26 |
| Simerjit Gill, University of Regina, Canada & TRLabs Regina, Canada | |
| Raman Paranjape, University of Regina, Canada & TRLabs Regina, Canada | |
| Section 2 | |
| Healthcare Modeling Systems | |
| Chapter 4 | |
| Agency in Health Care System Modeling and Analysis | 45 |

Raman Paranjape, University of Regina, Canada & TRLabs Regina, Canada Simerjit Gill, University of Regina, Canada & TRLabs Regina, Canada

Chapter 5

| Operating Room Simulation and Agent-Based Optimization | 69 |
|---|----|
| Q. Peng, University of Manitoba, Canada | |
| Q. Niu, University of Manitoba, Canada | |
| Y. Xie, University of Manitoba, Canada | |
| T. ElMekkawy, University of Manitoba, Canada | |
| Chapter 6 | |
| Building a Health Care Multi-Agent Simulation System with Role-Based Modeling | 90 |
| | |

Xiaoqin Zhang, University of Massachusetts Dartmouth, USA Haiping Xu, University of Massachusetts Dartmouth, USA Bhavesh Shrestha, University of Massachusetts Dartmouth, USA

Section 3 Physician/Patient Support Systems

Chapter 7

| HeCaSe2: A Multi-Agent System that Automates the Application of Clinical Guidelines David Isern, University Rovira i Virgili, Italy Antonio Moreno, University Rovira i Virgili, Italy | 113 |
|--|-----|
| Chapter 8 | |
| An Agent-Based Modeling System for Wellness | 137 |
| Luigi Benedicenti, University of Regina, Canada | |
| Chitsutha Soomlek, University of Regina, Canada | |
| Chapter 9 | |
| Using Probabilistic Neural Network to Select a Medical Specialist Agent | 164 |
| Vijay Kumar Mago, DAV College, India | |
| M. Syamala Devi, Panjab University, India | |
| Ajay Bhatia, CT1M&1T, India | |
| Ravinder Mehla, Mehta Childcare Center, India | |
| Chapter 10 | |
| A Multi-Agent Simulation of Kidney Function for Medical Education | 178 |
| Kin Lik Wang, University of Hawaii, USA | |
| Nancy E. Reed, University of Hawaii, USA | |
| Dale S. Vincent, University of Hawaii, USA | |

Section 4 Population Modeling Systems

| Chapter 11 | |
|---|-----|
| Role of Multi-Agents System in Creation of Collaborative Environments within Mental Health Domain | |
| | |
| Darshan S. Dillon, Curtin University of Technology, Australia | |
| Chapter 12 | |
| Multi-Agent Systems in Developing Countries | 215 |
| Dean Yergens, University of Manitoba, Canada, and University of Calgary, Canada | |
| Julie Hiner, University of Calgary, Canada | |
| Jorg Denzinger, University of Calgary, Canada | |
| Chapter 13 | |
| Projecting Health Care Factors into Future Outcomes with Agent-Based Modeling | 234 |
| Georgiy Bobashev, RTI International, Russia | |
| Andrei Borshchev, XJ Technologies, Russia | |
| Compilation of References | 257 |
| About the Contributors | 276 |
| Index | 282 |