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Complex Adaptive Systems Modeling

BOOK REVIEW Open Access

An introduction to agent-based modeling modeling natural, social, and engineered complex systems with NetLogo: a review

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Book details

Uri Wilensky and William Rand *An Introduction to Agent-Based Modeling; Modeling Natural, Social, and Engineered Complex Systems with NetLogo;* The MIT Press, Cambridge, Massachusetts London, England (2015), 504 pages, E-book ISBN: 9780262328111, Hardcover ISBN: 9780262731898.

Keywords: Agent-based modeling (ABM), Complex systems, NetLogo, Agents

Overview

The advent of fast and widespread computational resources has enabled the work on rather new field of knowledge "complex systems" and to analyze them. In order to study the complex systems, a methodology called agent-based modeling has arisen. Although there is considerable diversity in the domain of computational modeling, there are only a handful of books in this area. Existing relevant books include (Railsback and Grimm 2011; Salamon 2011; Niazi and Hussain 2012; Banos et al. 2015; Hamill and Gilbert 2015; Secchi and Neumann 2015; Arifin et al. 2016; Namatame and Chen 2016; Paolucci and Sacile 2016).

This book is really a welcome edition not only for the researchers but also for the graduate students for the development of new agent-based models for the complex systems, and the validation of their existing models using agent-based modeling technique.

In this book, authors have started with the introduction to ABM and its purpose. Then the idea is given how to develop your first agent-based model. Finally, the techniques of analyzation of ABMs and their utilization are described.

Review

In terms of organization, the book is sectioned in the following three parts and an appendix.

Part I

The main theme of this part is to provide the reader an idea why and what the ABM is. This part consists of the first two chapters of the book. Chapter 0 gives the idea that why ABM does provide with a powerful and unique insight into complex systems whereas Chapter 1 tells what ABM is and how it can be used.

Part II

This part gives the insight for the development of the agent-based models (ABMs). Chapters 2–5 are included in this part. Chapter 2 provides the details how to build simple ABMs where Chapters 3–4 gives the idea to extend the model. Chapter 5 is devoted to narrate the techniques to identify the basic components of an ABM.

Part III

The part consists of three chapters where the main goal of this part is to let the readers know about the utilization of the ABMs to answer their complex questions. Chapter 6 describes how to analyze ABMs, Chapter 7 describes the way to verify ABMs, their validation and replication, whereas the final chapter tells the reader how to use advanced features of ABMs including using external data sources.

Price

The book can be purchased in both e-form and hardcover making an easier choice for the readers. The price is very reasonable not only for the libraries but for the individuals as well making it an economical buy.

Conclusions

After reading the book, my opinion is that the book really covers important and lot of material, and is an excellent compendium for the researchers, tutors and graduate students. This is an excellent book as a starting point to develop a new ABM in many areas of knowledge.

Competing interests

The author declare that there is no competing interests.

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References

Arifin SMN, Madey GR, Collins FH (2016) Spatial agent-based simulation modeling in public health: design, implementation, and applications for malaria epidemiology. Wiley, New York
Banos A, Lang C, Marilleau N (2015) Agent-based spatial simulation with NetLogo. Elsevier, Amsterdam
Hamill L, Gilbert N (2015) Agent-based modelling in economics. Wiley, New York
Namatame A, Chen S-H (2016) Agent based modelling and network dynamics. Oxford University Press, Oxford
Niazi MA, Hussain A (2012) Cognitive agent-based computing-I: a unified framework for modeling complex adaptive systems using agent-based & complex network-based methods. Springer Science & Business Media, Berlin
Paolucci M, Sacile R (2016) Agent-based manufacturing and control systems: new agile manufacturing solutions for achieving peak performance. CRC Press, Boca Raton
Railsback SF, Grimm V (2011) Agent-based and individual-based modeling: a practical introduction. Princeton University Press, Princeton
Salamon T (2011) Design of agent-based models. Eva & Tomas Bruckner Publishing, Řepin
Secchi D, Neumann M (2015) Agent-based simulation of organizational behavior: new frontiers of social science research. Springer, Berlin