SIMULATING MEASLES IN CALIFORNIA

Derek Gatherer

A few of us are old enough to actually have had measles as children in the pre-vaccination era – it really wasn’t pleasant at all, in fact probably the sickest I’ve ever felt in my life. Back then, in the early 1970s, measles was a major global killer. Around 2.5 million children died every year, mostly in poorer parts of the world where secondary complications like encephalitis could not easily be treated in hospital. To put that figure into perspective, it is roughly the same number of people dying globally of AIDS each year at the height of the HIV-1 pandemic in the middle of the last decade. It seems rather astonishing to think of measles as being as serious a problem as AIDS, but it was. Happily, one of the great public health successes of the last four decades has been the reduction in global annual measles mortality from 2.5 million to around 150,000. Measles is the most infectious disease known (in a susceptible population, each case produces something like 15 others), and like most viruses there is essentially no treatment other than symptomatic care. The defeat of measles is down to one single factor – vaccination.

But, unfortunately, it turns out that measles hasn’t been defeated after all. Resistance to vaccination, and the breakdown of vaccination programmes in regions affected by conflict and/or economic collapse, or with medical systems devastated by other diseases (such as Ebola in West Africa) has allowed measles to make a comeback. In the first 2 months of 2015, 23,000 cases of measles strain D8 were reported in the World Health Organization’s European Region with 7,000 of those in Kyrgyzstan. In the same period, 121 cases were reported in the USA, 12 in Canada and 2 in Mexico. Brazil has been struggling with a longer outbreak since 2013, now reaching a total of 942 cases.

In May’s edition of BMC Public Health, a team from University of California and that state’s Department of Public Health have reported the results of an agent-based model of measles transmission using large scale synthetic population data as its raw material, incorporating social interactions and vaccination (http://www.biomedcentral.com/1471-2458/15/447). The synthetic
population was made more realistic by applying characteristics derived from California census and public government data. The conclusion is that >95% vaccination coverage is necessary for prevention - unfortunately still largely a dream in today’s vaccine-phobic world. Lower levels of vaccination coverage require superhuman levels of public health worker intervention in contact tracing.

Agent-based social simulation is increasingly moving from demonstration or proof-of-principle systems to data sets that are, as in this California study, doppelgangers of real populations. Public health will be one of the main beneficiaries of this trend.

Book Review

A REVIEW OF “AN INTRODUCTION TO AGENT-BASED MODELING: MODELING NATURAL, SOCIAL, AND ENGINEERED COMPLEX SYSTEMS WITH NETLOGO”

Miklos Szilagyi

I developed a Netlogo-based course on Agent-Based Simulation for seniors and graduate students ten years ago and have been teaching this course continuously since that time. I chose Netlogo because of its extremely good documentation and simplicity to learn its basics. Naturally, I have read the new book “An Introduction to Agent-Based Modeling: Modeling Natural, Social, and Engineered Complex Systems with Netlogo” by Uri Wilensky and William Rand with great interest.

The book thoroughly explains all aspects of Agent-Based Modeling (ABM): how to create, explore, and extend such models; how to analyze them; what are their components; how to verify, validate, and replicate ABM models; advanced topics and applications. In addition, they provide 28 carefully selected models to illustrate these aspects. This is an excellent textbook for Agent-Based Modeling courses.

Professor Wilensky is a world figure in ABM. He is the creator and developer of the Netlogo language and has conducted ABM research, development, and teaching with Netlogo for over twenty years. Netlogo is a language with “low threshold, no ceiling.” Indeed, my students have had no difficulty learning its basics very fast. They have created a large number of simple but meaningful simulations using this language.

Therefore, the authors are right to assume that the reader is familiar with the introductory material in the Netlogo manual. This is followed through the first chapters of the book. Then, I was surprised to read 19 pages of painstaking explanation of virtually every command of an elementary predator-prey simulation in Chapter 4. I thought that the authors had decided to abandon their prerequisite command of an elementary predator-prey simulation in Chapter 4. This, however, does not happen. Difficult codes in the following models are explained only superficially.

The authors recognize this and write on p. 391: “While this textbook is not meant as a Netlogo instructional manual, there are a few advanced computational methods in Netlogo that are useful in ABM and merit discussion here.” It is unfortunate that only 9 pages of excellent discussion of some advanced methods follow this important statement. My experience shows that the students need much more explanation of these and other advanced methods.

I will make this book the required text in my class and recommend it to my colleagues elsewhere but emphatically ask the authors: please write a continuation of this textbook devoted entirely to the explanation of advanced Netlogo computational methods.
BIG DATA MEETS CLOUD AND VIRTUALIZED ENVIRONMENT

The 2nd International IEEE Workshop on “BIG DATA meets CLOUD and VIRTUALIZED ENVIRONMENT” (BigCVEn’2015) will be collocated with the 11th International Conference on SIGNAL IMAGE TECHNOLOGY & INTERNET-BASED SYSTEMS (SITIS’15), to be conducted November 23-27, 2015, in Bangkok, Thailand.

There is a growing interest in virtualized environments and their applications, raising several challenges. Many trends are emerging to address these issues. In this respect, Cloud computing provides a powerful model to connect users to information resources from anywhere in the world. It has become a significant technology with several advantages including cost savings, access to greater computing resources, high availability, and scalability. In addition, the advent of Semantic Web has raised new opportunities and challenges. In this context, Big Data and Linked Data are being an integral part of the web infrastructure, where massive amounts of connected or possibly interconnectable data, addressable via URIs/IRIs, are available. These technologies are paving the way of the Web of Data.

The aim of the BigCVEn Workshop is to provide a forum to bring together scientists, researchers and practitioners interested in these emerging architectures and methodologies for capturing, storing, managing and analyzing massive, dispersed, interconnected data over the Web. It also aims to discuss the connection and/or interaction between Web of Data/Linked Data and Big Data/Cloud Computing.

As stated above, the BigCVEn Workshop is part of the SITIS 2015 conference, which will include keynote addresses, tutorials, and regular and workshop sessions. We invite submission of high quality and original papers on the topics listed above. Papers must be up to 8 pages and follow IEEE double columns publication format. All submitted papers will be peer-reviewed by at least two reviewers for technical merit, originality, significance and relevance. Papers must be submitted by September 6, 2015. Authors will receive notifications on October 15, 2015. Accepted papers will be included in the conference proceedings and published by IEEE Computer Society and referenced in IEEE explore and major indexes. SITIS-2015 online submission system is located at http://www.easychair.org/conferences/?conf=sitis2015.

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This news item is contributed by Gayo Diallo.