

## Book Review

### Multi-Agent-Based Simulations Applied to Biological and Environmental Systems

Diana Francisca Adamatti

Advances in Computational Intelligence and Robotics Book Series

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#### Section I - Theoretical Models and Tools

#### Section II- Applications in Biological and Environmental Systems

Simulations and (discipline-) applications are the two major influences and reasons for the extensive applications of systems across domains. Multi-agent simulations are one of the significant technologies evolved in the last few years. Simulations change over time and effective models can able to track such changes. Since multi-agents are complex involving heterogeneous environments, simulations can enable to sense such complexities. Multi-agents are considered to have influence across domains and sectors and one such major influence is on biological and environmental domains. Realizing this value Diana Adamatti has brought this companion to aid the researchers and other users to keep record of the agent based simulations.

Under the first section on Theoretical Models and Tools, the authors *Magessi* and *Antunes* with a chapter on Ignition of Algorithm Mind have outlined how neurons ignite the algorithm formation. They explained how agents represent neurons where neurons depend on decisive algorithms. The characterization of neurons would lead to understand the formation of algorithms pertaining to it.

Costa in the second chapter on Ecosystems as Agent Societies, Landscapes as Multi-Societal Agent Systems has give descriptive architectures and structure of ecosystem and treated it as multiagent systems. The interaction of the ecosystems of a landscape is enumerated with details by the author.

Portegys and his co-authors in the third chapter on Morphozonic, Cellular automata with nested neighborhoods as metamorphic representation of morphogenesis have presented basically a cellular automation model. They have given an excellent introduction to morphogenesis which is essential to understand the biological intelligent agents and how these agents can work for the understanding of biological simulations. The cellular automation contributes to morphozoics; how the cellular automation emerges and what are the development and how they form are the few ingredients in this chapter. The wonderful list of references is quite amazing. We can realize the pain of the authors to develop a very exhaustive reference list which direct the user in the future research directions as well as to gain understanding.

In the fourth chapter on ‘A Scalable Multi-agent architecture for monitoring biodiversity scenarios’ the authors *Rocha* and *Brandao* have addressed the scalability issues in environmental and biodiversity tracking. According to the authors the Internet of Things in bio-environmental science is crucial for which the scalability is a key challenge. To aid the solution the researchers can make use of the proposed algorithms, architecture and solutions.

In the next chapter on ‘A Multi-agent-based environmental simulator’, the computational tools to analyze the environmental scenarios of land change was advocated by *Ralha* and *Abreu*. The agent based simulator they have developed is named as MASE, which is really a conceptual model based on real environmental cases, a reality-based one.

In the sixth chapter, the authors Ballet and his co-authors have outlined in details with enough background, the intuitive agent-based software for modeling and simulating complex systems in biology. While introducing this software they have detailed a good background and provided real time processing environment.

*Montagna* and *Omicini* in their contribution on Agent based modeling in multi-cellular systems biology have documented the content of multi-agent based simulation for modeling and simulating computational biology using well construct methodologies

and framework. They have codified the simulations in the multi-cellular biology and they developed the model using a case study which ensures some kind of reality. However no application details of the system is supported in the chapter.

In the section 2, seven chapters contribute to the applications in the biological and environmental systems. In the opening chapter of this application section the authors Andrade and Modesto with their work on Architecture with multi-agent for environmental risk assessment by chemical contamination enlightened the risk assessment in the environmental systems. They basically presented a comprehensive architecture for environmental risk assessment. The risk assessment model they provided is unique which normally may not be available in any literature except in hand books. The risk model and architecture they have presented would serve as supporting aid for the risk assessment researchers in computational biology.

Machado, Adamatti and Goncalves in their work on ‘Microbial Fuel Cells using agent-based-simulation’ have reviewed the agent based models for microbial fuel cells. Using simulation scenarios they presented the brief results. This is a condensed chapter with a good list of reading.

In the tenth chapter on Use SUMO Simulator or the determination of light times in order to reduce pollution, the authors Born et al., proposed simulations performed in urban mobility simulator using dispersion of pollutants and genetic algorithms. This study is based on a model and data which yielded very positive results as we read in the results part.

In the next chapter on ‘Multi-agent systems in three-dimensional protein structure protein’ the authors *Lima Correa* and *Dorn* have offered compendium of protein structure related to the application and implementation in multi-agent systems. The most important feature in this unit is the very exhaustive reference list. In the chapter on Biomass Variation Phytoplanktons using agent-based simulation the authors *Porcellis*, *Adamatti* and *Abreu* have demonstrated the variations of the phytoplankton biomass in the estuary of the Patos Lagoon. To implement it they initially proposed a well built model and conducted simulations. *Briot* and his co-authors using a chapter on Participatory Management of Protected Areas for biodiversity conservation and social inclusion have used multi-agents for participatory management of protected areas for biodiversity conservation and social inclusion. This chapter has a very detailed background and model.

In the fourteenth chapter on ‘Using Probability Distributions in Parameters of Variables at Agent-based simulations’, the authors *Moraes* et al initially modeled the growth of *Mycobacterium tuberculosis* with the help of the agents based simulations. They built the model using a strong architecture and validated the model with simulated data.

The potential features of this collected work is the reporting of sound background theory-based models and validation with real as well as simulated data. In this respect this book departs from conventional books which are mostly theory-confined ones. Many implementation models using agent-based simulations in biological sciences are presented extensively throughout this volume.

I would love to read it again which has influence in mind.

**Pit Pichappan**  
**Digital Information Research Labs.,**  
**India & UK**

**First International Workshop on “IoT and Antenna Design” (IoTAD)**  
**(Co-located with the Sixth International Conference on Future Generation Communication Technologies**  
**Irish Computer Society, Dublin**  
**Ireland**  
**August 21-23, 2017**  
**([www.socio.org.uk/fgct](http://www.socio.org.uk/fgct))**

Antennas have high impact in the radio frequency. Antennas are frequently deployed in major applications that include many such as mobile phones, satellite communications, garage-door openers and so on. Recently the antennas are able to connect less-obvious devices due to the Internet of Things. The connections emerge wireless, untethered to any cable. Thus antennas have profound applications both at macro and micro levels, visible as well as hidden, more obvious as well as less-obvious. The recent ultra-wideband (UWB) technology, printed slot antennas etc., have impact in the UWB communication systems. Antenna designs now go beyond normal way and able to connect many unconnected devices. Thus the proposed workshop can able to address the new applications and design views.

The workshop will discuss the themes not limited to-

- Bandwidth, Optimization
- Impedance
- Ultra wideband antennas
- Algorithm design and analysis
- Slot antennas
- Broadband antennas
- Microstrip antennas
- Ultra wideband antennas
- Ultra wideband technology
- Wireless LAN Feeds
- Dielectric resonator antennas
- Ultra wideband technology
- Bandwidth, Resonance
- Resonant frequency
- Loaded antennas
- Permittivity
- Dipole antennas
- Antenna radiation patterns

**Important Dates**

Submission of Papers : May 25, 2017  
Notification of Acceptance: July 01, 2017  
Camera Ready : August 01, 2017  
Registration : August 01, 2017  
Conference Dates : August 21-23, 2017

The selected papers after extension and modification will be published in many peer reviewed and indexed journals.

**Workshop Chairs**

Ricardo Rodriguez Jorge  
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Mexico

Submissions at <http://www.socio.org.uk/fgct/paper-submission/>  
Contact: fgct at socio.org.uk

**Deep Learning Applications**  
**(Co-located with the Seventh International Conference on Innovative Computing Technology (INTECH 2017))**  
**Luton, UK**  
**August 16-18, 2017**  
**([www.dirf.org/intech](http://www.dirf.org/intech))**

Deep Learning (DL) is an important component of computational intelligence which has the core domain machine learning research in it. It provides more efficient algorithms to deal with large-scale data in neuroscience, computer vision, speech recognition, language processing, biomedical informatics, recommender systems, learning theory, robotics, games, and so on. DL is gaining applications in many domains due to the availability of large amount of data coupled with machine learning algorithms. As the DL applications are on increasing trend a workshop on it will enable to identify the emerging trends in the domain.

The proposed workshop will address the below listed but not limited themes.

- Neural network architectures
- DL Applications to the Natural Sciences
- Visual Perception using Deep Convolutional Neural Networks
- Deep Learning for Computer Vision
- Deep Sequence Modeling: Historical Perspective and Current Trends
- Automatic Terminology Extraction
- Deep Learning of Behaviors
- Probabilistic Graphical Models Algorithms
- Deep Learning for Natural Language Processing
- Deep Learning Applications at the Enterprise Scale
- Multi-modal Deep Learning
- Deep Learning Security
- Neural Networks
- From Statistical Decision Theory and Deep Neural Networks
- Machine Learning and Deep Neural Networks
- Cognitive Architectures for Object Recognition in Video
- Learning Representations for Vision, Speech and Text Processing Applications
- Deep Learning in the Brain
- Deep Learning for Sequences
- Interpretable Deep Learning Models for Healthcare Applications
- Deep Learning for Video Games
- Data Processing Methods, and Applications of Least Squares Support Vector Machines
- Deep Generative Models and Unsupervised Learning
- Natural Language Understanding

### **Submissions**

Submissions should provide original and unpublished research results or ongoing research with simulations. The papers should be between 6 to 8 pages total in length in the IEEE format.

- \* All the accepted papers will appear in the proceedings published by IEEE and fully indexed by IEEE Xplore.
- \* Modified version of the selected papers will appear in the special issues of many peer reviewed and indexed journals.

**Important Dates**

Submission of papers : June 01, 2017  
Notification of Acceptance/Rejection: July 01, 2017  
Camera Ready : August 01, 2017  
Registration : August 01, 2017  
Conference : August 16-18, 2017

**Organizers**

Ricardo Rodriguez Jorge, Engineering and Technology Institute, Mexico  
Submissions at-<http://www.dirf.org/intech/paper-submission/>  
Contact- [intech@dirf.org](mailto:intech@dirf.org)

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## Call for Contributions

**Inform the Chair:** with the Title of your Contribution

**Submission URL:**

<https://www.iariasubmit.org/conferences/submit/newcontribution.php?event=SIGNAL+2017+Special>

Please select Track Preference as **5GSIGWAVE**

### Special track

#### **5GSIGWAVE: Signal Processing for Decentralized, Cognitive and Self-organised 5G Wireless Access Networks**

#### **Chair and Coordinator**

Dr. Ramiro Sámano Robles, CISTER Research Centre, ISEP - Instituto Superior de Engenharia do Porto –  
Porto, Portugal

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along with

#### **SIGNAL 2017, May 21 - 25, 2017 - Barcelona, Spain**

The Second International Conference on Advances in Signal, Image and Video Processing  
- from Sensing to Applications –

<http://www.iaria.org/conferences2017/SIGNAL17.html>

The number of wireless connections is growing exponentially around the globe. It is expected that up to 50 billion devices will be connected to the net by 2050. Most of these connections will involve wireless technologies. However, with current wireless standards it will be impossible to cope with this increase in traffic demand and different quality of service requirements. In addition, the signalling load needed for resource allocation and device coordination in such massive deployment will become prohibitively large. 5G wireless access networks will need to combine several innovative aspects of decentralized and centralized allocation looking for maximizing performance and minimizing signalling load.

Spectrum resources need to be dynamically shared using advanced cognitive radios and self-organization that will enable the maximum exploitation of opportunities with minimized interference and maximum quality of service satisfaction. Centralized architectures with cloud computing, context-aware, and big data processing will enable large and dense network deployments with high interference rejection, embedded security, and energy savings. Signal processing will be of paramount importance in future 5G networks to make efficient use of resources, resolve conflicts, reduce signalling load, improve transfer of information, improve security, make efficient use of energy consumption, reject interference, and enable efficient detection of spectrum opportunities.

**Contributing papers** are suggested to cover one or more (but not limited to) of the following sub-topics:

- Multiple antenna processing
- Signal processing for contention resolution algorithms
- Orbital angular momentum processing
- Full duplex algorithms
- Device-to-device signal processing
- 3D beamforming
- Sparse signal processing
- Massive MIMO,
- Full-dimension MIMO
- Large scale cooperative processing
- Imperfect channel and queuing state information in signal processing
- Context aware processing

- Innovative modulation formats and encoding
- MAC-PHY cross-layer design for 5G access
- Error correction protocols
- mm-wave design, spectrum sharing
- Energy harvesting for 5G
- Coordinated distributed antenna processing,
- Interference alignment
- Cooperative relaying diversity
- Adaptive beamforming
- Space division multiplexing
- Multi-packet reception with interference cancellation
- Cognitive radio resource allocation
- Self-organized resource allocation
- Multi-hop ad-hoc processing
- Blind and semi blind algorithms for multiuser detection and contention resolution
- Decentralized contention resolution protocols for 5G futures wireless networks
- Signal processing for cloud radio access network
- Software defined networking processing
- Ultra-dense networks
- Full duplex algorithms
- Non-orthogonal multiple access
- Error correction and channel coding for 5G
- PHY-layer for low latency
- Embedded security
- Filter bank multi carrier
- Spectral-efficient FDM systems
- Generalized FDM
- Channel modelling issues
- Multi-objective optimization for signal processing in 5G
- Game theory for self-organized and cognitive radio 5G networks
- Low latency solutions for machine-type communications

### **Important Datelines**

- Inform the Chair: As soon as you decided to contribute
- Submission: February 28
- Notification with comments for camera-ready: March 15
- Registration: April 2
- Camera ready: April 9

### **Contribution Types**

- Regular papers [in the proceedings, digital library]
- Short papers (work in progress) [in the proceedings, digital library]
- Posters: two pages [in the proceedings, digital library]
- Posters: slide only [slide-deck posted on [www.iaria.org](http://www.iaria.org)]
- Presentations: slide only [slide-deck posted on [www.iaria.org](http://www.iaria.org)]
- Demos: two pages [posted on [www.iaria.org](http://www.iaria.org)]

### **Paper Format**

- See: <http://www.iaria.org/format.html>
- Before submission, please check and comply with the editorial rules: <http://www.iaria.org/editorialrules.html>

### **Publications**

- Extended versions of selected papers will be published in IARIA Journals: <http://www.iariajournals.org>
- Print proceedings will be available via Curran Associates, Inc.: <http://www.proceedings.com/9769.html>
- Articles will be archived in the free access ThinkMind Digital Library: <http://www.thinkmind.org>

### **Paper Submission**

<https://www.iariasubmit.org/conferences/submit/newcontribution.php?event=SIGAL+2017+Special>  
Please select Track Preference as **5GSIGWAVE**

### **Registration**

- Each accepted paper needs at least one full registration, before the camera-ready manuscript can be included in the proceedings.
- Registration fees are available at <http://www.iaria.org/registration.html>

### **Contact**

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