Scientific
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Letter to the Editor

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Simulation and modeling is something that we, humans, have been accustomed to from the beginning of our journey on Earth. Due to the evolutionary pressures on one hand and the limited capacity on the other, our brains have evolved to become both extraordinary modelers of the physical and social reality and anticipators of future events.

The advents of computing and communications technologies have added additional complexity to the already challenging world—we collect more information on more events and phenomena than ever before. Our brains are not accustomed to this level of exactness and detail. We are used to the "approximate and sufficient," not the "exact and optimal."

That is why computer-based simulation and modeling techniques are needed more than ever. This nonlinear, often random, and ever changing world requires sophisticated techniques for analyzing, characterizing, explaining, anticipating, exploring, estimating, and predicting events in order for individuals, organizations, and societies to better understand the best path forward to security, prosperity, viability, and sustainability.

Simulation and modeling techniques, methods, and methodologies span a wide range of algorithmic approaches and data types, including statistics, machine learning, data mining, artificial intelligence, genetic algorithms, visualization, systems science, network science, fractals, chaos theory, structured data, unstructured data, aural files, and video segments. This even includes the latest buzzword: Big Data.

In order to be successful, modelers need to pay attention to the importance of all phases of the simulation and modeling process, including:

1) Identifying the key issue or problem to be simulated or modeled;

2) Determining whether the simulation/modeling task is one of explanation, characterization, prediction, or possible futures;

3) Selecting the most relevant attributes and variables;

4) Selecting the most appropriate simulation and/or modeling technique(s);

5) Procuring the most appropriate and comprehensive data set;

6) Defining the most informative output modalities; and

7) Defining the end user-acceptable verification and validation procedures.

These phases are especially important for problems that deal with biological, business, or social issues like cancer, epidemics, economic crises, wars, poverty, or conquering new markets that invariably involve shifting environments filled with random events and unpredictable, emergent outcomes that always seem to be of "one of a kind nature." Journals like Open Journal of Modeling and Simulation can help practitioners navigate the simulation and modeling space in the most effective and beneficial way.