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Extended Abstract
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Computer Graphics 2016: Leveraging the arts for modeling & simulation- Paul Fishwick -The University of Texas at Dallas

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Since its inception, special effects has played a serious role in several areas like CAD , game development, and computer animation. Through the utilization of special effects , we enjoy artificial realities and therefore the ability to draw figures within a versatile electronic medium. Computer simulation in special effects is usually construed to be one where the simulation is employed to realize realistic behavioral effects. But what if the naturally art-based design approaches in graphics might be wont to visualize and manipulate the mathematical models used because the basis of simulation? This direction suggests that graphics, and therefore the arts, can affect how we represent complex models. I'll present approaches utilized in our Creative Automata Laboratory to reframe models as works of art that maintain an aesthetic appeal, and yet are highly functional, and mathematically precise. Modeling and simulation (M&S) is a widely used toolset within the defense community across many application domains. Most often associated with military training, M&S is also used for analysis, experimentation, testing, and evaluation (e.g., in the acquisition process). M&S products are therefore very valuable and sometimes high-investment assets. Thus, it's essential that M&S products, data, and processes are conveniently accessible to an outsized number of users as often as possible. Therefore a replacement M&S eco-system is required where M&S products are often accessed simultaneously and spontaneously by an outsized number of users for his or her individual purposes. This M&S eco-system has to support stand-alone use as well as the integration of multiple simulation systems and real systems into a coherent (maybe distributed) simulation environment whenever the need arises.

Following the shift towards cloud-based IT solutions that has already led to significant changes in the non-defense sector, service-based architectures are considered to be very promising also for realizing the next generation of M&S environments and are expected to shape the future defense M&S environment. The combination of M&S with service-based architectures and concepts taken from cloud computing is understood as "Modeling & Simulation as a Service" (MSaaS).

This special issue is composed of five papers that document the state-of-the-art regarding MSaaS. The papers address theoretic foundations as well as practical applications of service-oriented architectures in the context of M&S applications in the defense sector. Reports of existing, fielded applications are included as well as visionary contributions about the scope and appearance of the future defense M&S environment.

The paper by van den Berg, Siegel, and Cramp presents a case study of how current high-level architecture-based simulation environments may be provided as-a-Service using recent containerization technology. They investigate various aspects of service orientation and containerization, including simulation composition, networking, discovery, scalability, and overall performance. Using Docker they illustrate their approach for a number of training use cases.The paper by Hannay defines the place of MSaaS in the overall ecosystem wherein such services are used and interoperate. The NATO Consultation, Command, and Control (C3) Taxonomy is used as a reference frame and it is demonstrated how overarching architecture building blocks and patterns may be defined in this context.The paper by Diallo shows how current web standards and technologies may be used to simplify the use and development of simulation environments. The benefits of adopting three basic principles—service orientation, platform independence, and interoperability—are illustrated and current challenges are identified.The paper by Cayirci and Özcakir presents a novel approach to how the defense planning process may be supported by simulation and how additional benefits may be leveraged by utilizing a service-oriented cloud approach for the modeling and simulation support to the process.The paper by Martinez and Lopez discusses different deployment models for individual services and service-oriented simulation environments. Different deployment models are compared and

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recommendations as well as remaining open challenges are derived.

Biography

Paul Fishwick is a Distinguished University Chair of Arts and Technology (ATEC), and Professor of Computer Science. He has six years of industry experience as a Systems Analyst working at Newport News Shipbuilding and at NASA Langley Research Center in Virginia. He was on the Faculty at the University of Florida from 1986 to 2012, and was Director of the Digital Arts and Sciences Programs. His PhD was in Computer and Information Science from the University of Pennsylvania. He is active in modeling and simulation, as well as in the bridge areas spanning art, science, and engineering. He pioneered the area of aesthetic computing, resulting in an MIT Press edited volume in 2006. He is a Fellow of the Society for Computer Simulation, served as General Chair of the Winter Simulation Conference (WSC), was a WSC Titan Speaker in 2009, and has delivered over 16 keynote addresses at international conferences. He is Chair of the Association for Computing Machinery (ACM) Special Interest Group in Simulation (SIGSIM). He has over 230 technical papers and has served on all major archival journal editorial boards related to simulation, including ACM Transactions on Modeling and Simulation (TOMACS) where he was a Founding Area Editor of Modeling Methodology in 1990. He is on the editorial board of ACM Computing Surveys.

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