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Report of Collaborative Modeling and Simulation (CoMetS) track of WETICE 2021

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***Abstract*—The 9th edition of the CoMetS track aims to bring together leading researchers and practitioners from both the modeling and simulation (M&S) community and the collaborative environments community, in order to focus on innovative research contributions that address both the use of collaborative technologies in the field of M&S and the use of M&S methodologies and tools to address the design of collaborative systems. This paper reports on the motivations of the track and the organization of its ninth edition.**

I. Motivation and Scope

Modeling and Simulation (M&S) is increasingly becoming a central activity in the design of new systems and in the analysis of existing systems because it enables designers and researchers to investigate systems behavior through virtual representations. For this reason, M&S is gaining a primary role in many industrial and research fields, such as space, critical infrastructures, manufacturing, emergency management, biomedical systems and sustainable future. However, as the complexity of the investigated systems increases and the types of investigations widens, the cost of M&S activities increases due to both the more complex models and the communications among a wider number and variety of M&S stakeholders (e.g., sub-domain experts, simulator users, simulator engineers, and final system users). To address the increasing costs of M&S activities, collaborative technologies can effectively support these activities by fostering the sharing and reuse of models, by facilitating the communications among M&S stakeholders, and more generally by integrating processes, tools and platforms.

The ninth edition track on Collaborative Modeling and Simulation (CoMetS) intends to bring together leading researchers and practitioners from both the M&S community and the collaborative systems community, in order to focus on the different perspectives that combine collaboration and M&S.

From the collaboration point of view, the use of collaborative technologies is an effective tool to support the network of spatially dispersed actors typically involved in a M&S effort. Collaboration can be applied to support M&S activities at different levels. As an example, collaboration could involve the use of distributed simulation standards (e.g., the HLA standard) or it could involve the use of co-location tools to boost interaction and cooperation between geographically dispersed M&S teams. The expected result is improved M&S capabilities in terms of model building and evaluation activities.

On the other hand, from the modeling and simulation point of view, simulation tools can be significantly used to analyze and increase the quality offered by collaborative environments. The ability to model and simulate the multi-dimensional aspects of collaboration is itself a significant challenge that contributes to the achievement of increased levels of quality and productivity.

The CoMetS track is now at its ninth edition (reports from previous editions, until 2019, can be found in [1], [2], [3], [4], [5], [6] and [7]). It still focuses on innovative research contributions that address collaboration issues in the field of M&S and vice versa, i.e., contributions that use M&S methodologies and tools to address the design of collaborative environments. A combination of both issues in the same venue further contributes to the understanding of the underlying mechanisms that can affect the quality of service delivered by collaborative environments for M&S.

II. Accepted Papers

The papers submitted to the track have undergone a thorough review process. Each paper has been reviewed by at least two members of the program committee. At the end of review process, the following papers have been accepted for publication and presentation at the conference:

- *Research on Value Based Heuristics Miner for Product Service System (full paper)*: the paper deals with manufacturing enterprises that integrate products and services. The objective is to improve and expand business processes from the perspective of service, so that they can realize the management of the whole life cycle of the product and obtain more benefits. The original process mining algorithm cannot support the establishment of customer-centered service process model, nor can it describe the value creation mechanism of service stakeholders in the service process. To solve this problem, the paper takes the manufacturing product service system

as the background, improves the flexible heuristic miner, which can mine customer-oriented service process model from the event log, and extracts the actors and value information of service activities, so as to build the service-oriented process value model. The proposed heuristic miner is evaluated through a case of an air conditioner product service system.

- *Process over Things (PoT): an Ontology Based Approach for IoT-Aware Business Processes (full paper)*: the paper proposes an approach, named Process over Things (PoT), that aims at facilitating the specification of IoT-aware business processes. The proposed approach uses a standardized ontology to deal with IoT interaction at BP modeling time and introduces a BPMN extension to explicitly address the IoT ontology in the BPMN model, yet being independent of the specific ontology implementation. A technology named PoT Broker is also introduced to fill the gap between the BP execution platform and the IoT devices access layer. The PoT Broker also obtains a significant level of automation when implementing IoT-aware BPs making use of a specific IoT ontology. The paper describes the architecture of the PoT approach and illustrates its application to a case study dealing with a weather alert system.

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