Discrete Events Simulation (DES) is a powerful tool of modeling and analysis used in different disciplines. DES models require data in order to determine the different parameters that drive the simulations. The literature on DES input data management indicates that the collection and processing of necessary data is often a highly manual process, which causes inefficiencies, significant time consumption and a negative user experience.

The focus of this research investigation is addressing the manual data collection and processing (MDCAP) problem prevalent in DES projects. This research investigation presents an integrated framework to solve the MDCAP problem by classifying the data needed for DES projects into three generic classes. Such classification permits automating and streamlining the preparation of the data, allowing DES modelers to collect, update, visualize, fit, validate, tally and test data in real-time, by performing intuitive actions. In addition to the proposed theoretical framework, this project introduces an innovative user interface that was programmed based on the ideas of the proposed framework. The interface is called DESI, which stands for Discrete Event Simulation Inputs.

The proposed integrated framework to automate DES input data preparation was evaluated against benchmark measures presented in the literature in order to show its positive impact in DES input data management. This research investigation demonstrates that the proposed framework, instantiated by the DESI interface, addresses current gaps in the field, reduces the time devoted to input data management within DES projects and advances the state-of-the-art in DES input data management automation.

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Approved for distribution by Peter Kincaid, Committee Chair, on June 5, 2015.

The public is welcome to attend.