

Visual Steering to Support Decision Making in Visdom

Eduard Gröller

ICGA, Fakultät für Informatik, **TU Wien**
VisGroup, Dept. of Informatikk, **UiB**

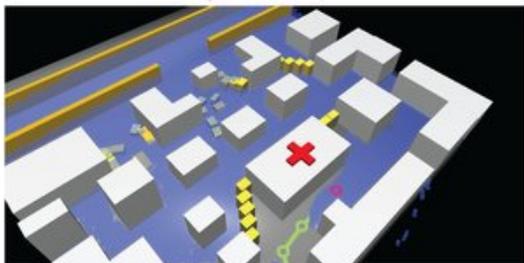
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Abstract:

Computer simulation has become an ubiquitous tool to investigate the nature of systems. When steering a simulation, users modify parameters to study their impact on the simulation outcome. The ability to test alternative options provides the basis for interactive decision making. Increasingly complex simulations are characterized by an intricate interplay of many heterogeneous input and output parameters. A steering concept that combines simulation and visualization within a single, comprehensive system is largely missing. This talk targets the basic components of a novel integrated steering system called Visdom to support the user in the decision making process. The proposed techniques enable users to examine alternative scenarios without the need for special simulation expertise. To accomplish this, we propose World Lines as a management strategy for multiple, related simulation runs. In a dedicated view, users create and navigate through many simulation runs. New decisions are included through the concept of branching. To account for uncertain knowledge about the input parameters, we provide the ability to cover full parameter distributions. Via multiple cursors,



users navigate a system of multiple linked views through time and alternative scenarios. In this way, the system supports comparative visual analysis of many simulation runs. Since the steering process generates a huge amount of information, we employ the machine to support the user in the search for explanations inside the computed data. Visdom is built on top of a data-flow network to provide a high level of modularity. A decoupled meta-flow is in charge of transmitting parameter changes from World Lines to the affected dataflow nodes. To direct the user attention to the most relevant parts, we provide dynamic visualization inside the flow diagram. The usefulness of the presented approach is substantiated through case studies in the field of flood management. The Visdom application enables the design of a breach closure by dropping sandbags in a virtual environment.