

Visual Analysis and Steering of Flooding Simulations

This paper appears in:

Visualization and Computer Graphics, IEEE Transactions on

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Volume: PP , Issue: 99

Page(s): 1

Product Type: Early Access Articles



ABSTRACT

We present a visualization tool for the real-time analysis of interactively steered ensemble-simulation runs, and apply it to flooding simulations. Simulations are performed on-the-fly, generating large quantities of data. The user wants to make sense of the data as it is created. The tool facilitates understanding: of what happens in all scenarios, where important events occur and how simulation runs are related. We combine different approaches to achieve this goal. To maintain an overview, data is aggregated and embedded into the simulation rendering, showing trends, outliers, and robustness. For a detailed view, we use information-visualization views and interactive visual analysis techniques. A selection mechanism connects the two approaches. Points of interest are selected by clicking on aggregates, supplying data for visual analysis. This allows the user to maintain an overview of the ensemble and perform analysis even as new data is supplied through simulation steering. Unexpected or unwanted developments are detected easily, and the user can focus the exploration on them. The solution was evaluated with two case studies focusing on placing and testing flood defense measures. Both were evaluated by a consortium of flood simulation and defense experts, who found the system to be both intuitive and relevant.

INDEX TERMS

• IEEE Terms

Aggregates , Analytical models , Buildings , Computational modeling , Data models , Data visualization , Rendering (computer graphics)

• Author Keywords

Computing Methodologies , Information visualization , Modeling , Multivariate visualization , Simulation , Visualization , Visualization systems and software , and Visualization

Additional Details

Topic(s) : Bioengineering ; Communication, Networking & Broadcasting ; Computing & Processing (Hardware/Software) ; Fields, Waves & Electromagnetics ; Signal Processing & Analysis

ISSN : 1077-2626

Digital Object Identifier : 10.1109/TVCG.2012.175

Date of Publication : 23 August 2012

Sponsored by : IEEE Computer Society

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