Motivations

Existing models follow a pipeline of operators. They can be adjusted before or after being applied, but not on the fly.

Nowadays applications and datasets ask for:
- supporting incremental data handling and incremental visualizations
- allowing the interaction with partial results adjusting parameters
- optimizing the visual analysis

Our goal

A new visualization model to address these needs that we term Online Visualization

The Online Visualization Model

Enhanced Data Modeling

Monolithic Operators

Enhanced Process Modeling

Operators with intermediate results

Metrics & Parameters

Common Visualization Models (e.g., CHI)

Data

DATA TRANSFORMATION

ANALYTICAL ABSTRACITION

VISUALIZATION TRANSFORMATION

VISUAL MAPPING TRANSFORMATION

View

Online Visualization Interaction & Steering: A Case Study

Task (based on NTHSA FARS dataset): the user issues a query interacting with several sliders, setting a reference crash. The system computes similar crashes, plotting them on a density map

Implementation

Online Visualization can be implemented using priority queues and asynchronous threads:
- (a) data chunks are added to the queue
- (b) retrieved by the worker thread that
- (c) iteratively computes better solutions
- (d) a good enough result is generated and passed on to subsequent threads.
- (e) if the result is not yet good enough to be final, it is again added to the queue

References