

An Execution Engine for Physical Visualization Design

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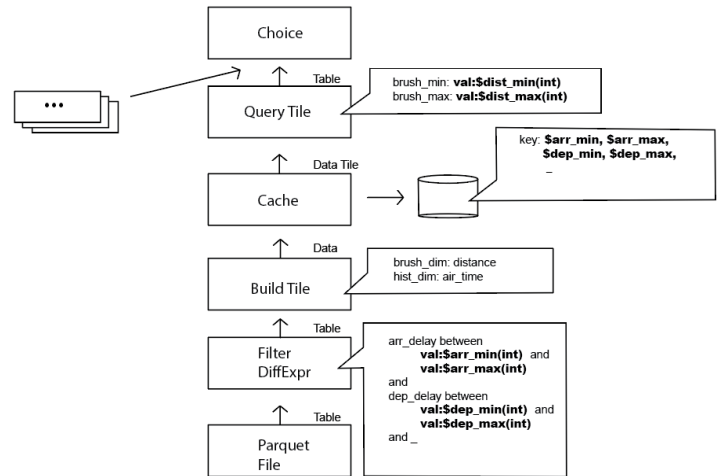
Introduction: Physical Visualization Design (PVD)[1] is a system that allows a fast design of interfaces such as visualizations and interactions with user-designed choices. PVD is overall demonstrated as an optimizer for automating physical design; given a specification of an interface’s query workload, storage constraints, and latency expectations for interactions. It determines a set of query plans. We primarily focus on the Diffplan specification format and the execution engine to commit the users requests.

Methods: We have the user choose the PVD Workflow. During the design time, the user provides specifications for the interface in the form of a Data Interface Grammar. The information is then optimized and takes action through latency and storage constraints and produces a Diffplan.

Every user interaction in the interface produces new choice node bindings which are applied to the Diffplan through binding values. The plan devised from the Diffplan is then executed in the engine, and the user's future changes to the choice nodes update the interface further..

Results: Implemented a client-only plan by creating data tiles and caching them according to the interface bindings. So the user would decide what the data set will show via choice nodes and in the query tile we’d have the basic changes to other widgets being made. After the choices are cached and the tile of the dataset is built; any further changes would create a new tile via the user's request through widgets.

Conclusion: Combined Diffplans with choice nodes through binding values, which are produced as the user interacts with the widgets in the interface.



References:

[1] Ramjit, L., Kong, Z., Netravali, R., and Wu, E. Physical visualization design. In Proceedings of the 2020 ACM SIGMOD International Conference on Management of Data (New York, NY, USA, 2020), SIGMOD '20, Association for Computing Machinery, p. 2809–2812.

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