Multi-Criteria Search for Automatic Dashboard Design

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Summary

Automatic Dashboard Design (ADD) Framework
Formulated our automatic dashboard design framework as an Interaction of three primary components: Generator, Oracle, and Explorer

Four Design Criteria for ADD
Identified four dashboard design criteria to align our components to adapt target data and users’ analytic goals: Specificity, Interestingness, Diversity, and Coverage

Web Interface for ADD
Designed an interface for Gleaner that enables users to interact with the design framework.

ADD Framework

Dynamically Modify with ADD Criteria & User Intent

Generator
Query single or multiple charts from design space

Oracle
Scores and ranks the candidate dashboards

Explorer
Explores the candidate dashboard search space

Optimal Analytic Dashboard

ADD Criteria

Specificity
Quantifies the degree to which a dashboard fulfills the user’s analytical goals

- User Intent
  - Constraint
    - Bar Chart
  - Preference
    - Mean Aggregation
    - IMDB Votes

Interestingness
Measures the number of statistical insights that each chart contains

- Oracle
  - Kurtosis
  - Skewness
  - Outliers
  - Significance
  - Correlation

Diversity
Measures the diversity between each chart pair that comprises a dashboard

Coverage
Quantifies how exhaustive a dashboard represents the underlying data

Interface Design

The work was partly supported by Institute of Information & Communications Technology Planning & Evaluation (IITP) grant funded by the Korea government (MSIT) (No. 2021-0-00420, A Graduate School Support Program (Sungkyunkwan University) and the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. NRF-2022R1F1A1073101).