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Visualization System for Analyzing Congestion Pricing Policies

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Design Goal

- The visualization system provides an analysis process to determine an effective target area for the policy.
- The system offers a method to identify the optimal toll.
- The system provides a process to analyze the influence of pricing policy at the district level.

Traffic Congestion Indicator

$$TCI_{(i,t)} = \frac{Speed_{(i,t)}}{FFS_{(i)}} \qquad C_{(I,t)} = \begin{cases} 1, & TCI_{(i,t)} > 0.55 \\ 0, & TCI_{(I,t)} \leq 0.55 \end{cases}$$

We use TCI to analyze the impact of toll policy, and classification for congestion road.

Conclusion and Futurework

- We proposed a visualization system to analyze the influence of congestion pricing policies.
- Our system uses speed only among the indicators that congestion pricing policy influence.
- We will add demand and road capacity indicators, and improve the system using visualizations like glyphs.

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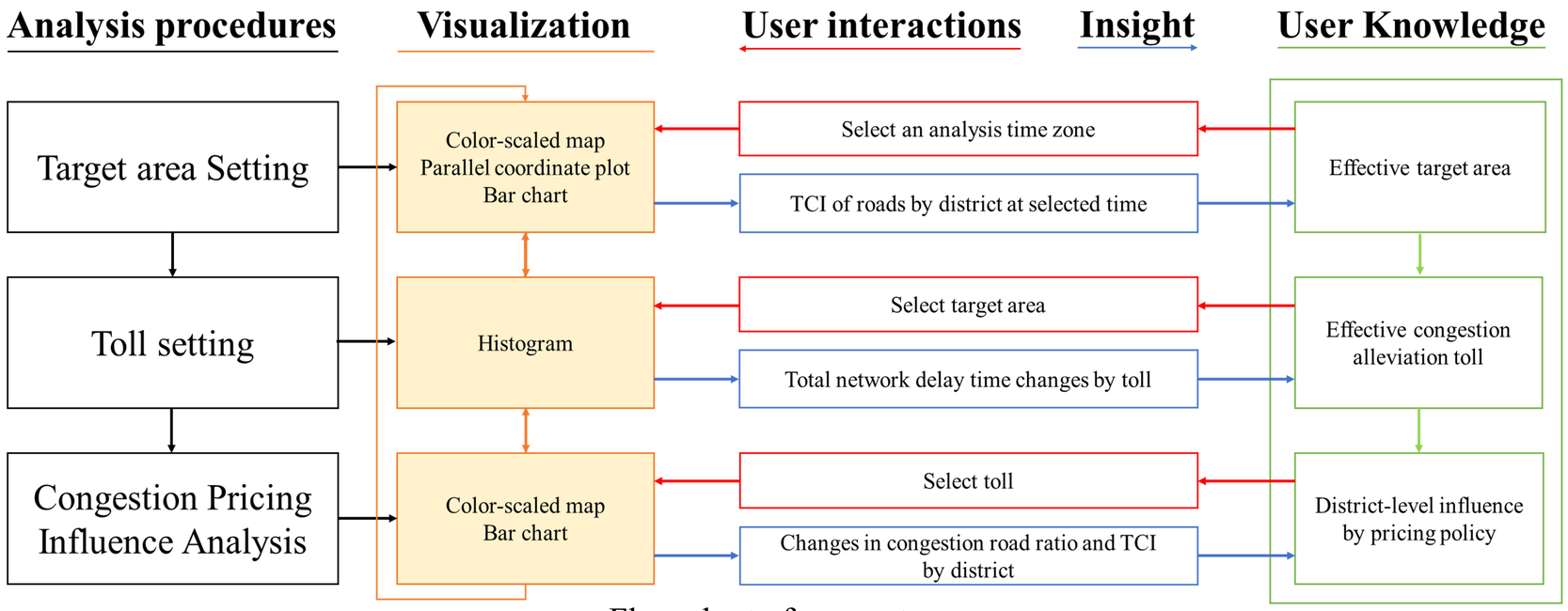
Abstract

- Traffic congestion has a negative impact an environmental pollution and productivity.
- One notable solution is the congestion pricing policy.
- However, tolls deduced from previous policy analysis techniques struggle to capture the spatiotemporal insight.
- We propose a visualization system to analyze the spatiotemporal influence of congestion pricing policy.

Visualization



Flow chart of our system

- Our system provide TCI of road using a calendar heatmap, histogram, color-scaled heatmap, and parallel coordinate plot according to time and district.
- (a) is a filter view used to set the period and time for analysis.
- (b) is a map view that shows the spatial distribution of congested roads during the selected period and time.
- (c) is a district view that displays the average TCI of roads by districts over time.
- (d) is a target district view that shows changes in total vehicle delay time by toll level in the selected area.

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