

# EconomicVis: Visual Analytics for Financial Health, Employment and Similar Life Patterns Mining

## IEEE VAST Challenge 2022 MC3 Award for Strong Support for Visualization-Derived Insight

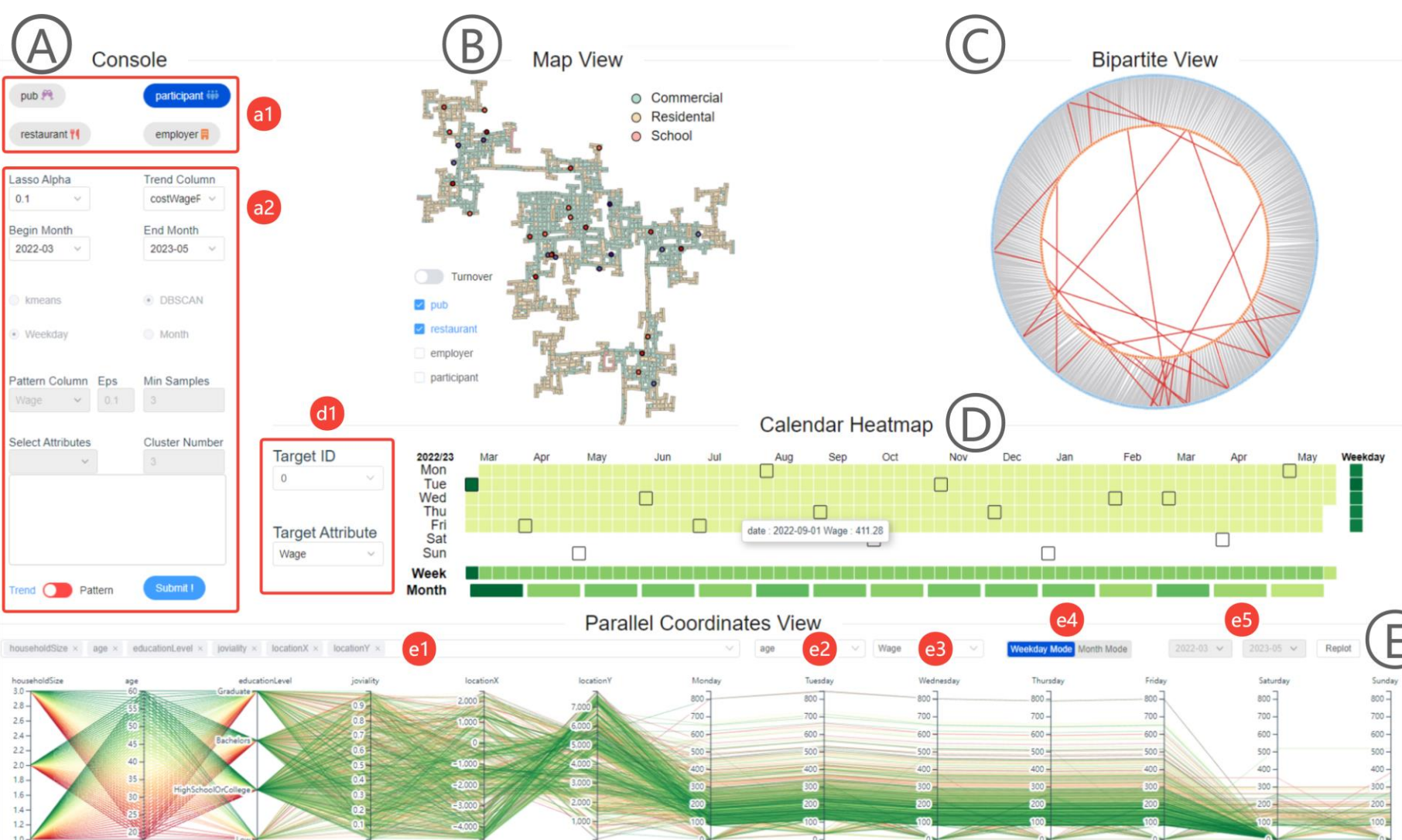
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### Introduction

The VAST Challenge 2022 Mini-Challenge 3 provides 15 months of check-in, income and consumption data, and a number of demographic variables for 1011 volunteers in the city, requiring the participants to depict the financial health of the city. We define the keys to this task as time series visualization, trend analysis, and similar pattern mining.

Our solution focuses on the complementary nature of algorithms and visual analytics. The system consists of 4 views, the map view to show the spatial distribution of economic development, the bipartite view to show employment and separation relationships, the calendar heatmap to show time series at different granularities, and the parallel coordinates view for both high-dimensional data and time series visualization, combined with the console to support clustering.

### System



#### (A) Console

- 1) Select the entity (a1)
- 2) Perform time trend analysis and similar pattern clustering (a2)

#### (B) Map View

Provide a spatial perception of the economic volume and turnover

#### (C) Bipartite View

Explore the employment relationship and reveal the turnover (red line)

#### (D) Calendar Heatmap

Display trends and patterns of time series at daily granularity, weekly granularity, monthly granularity and within a week.

#### (E) Parallel Coordinates View

- 1) Explore high-dimensional data
- 2) Compare multiple time series
- 3) Display clustering results

### Case

The system is useful for finding similar life patterns, allowing a more visual observation of the participants you want to know.

From the calendar heatmap, we can find that the residents live in a cyclical manner. For example, the participant of id 840 does not work on Tuesdays and Wednesdays (B1), while it can be found that he spends more money on food (B2) and recreation (B3) on these two days, and some other participants have some similar situations.

Meanwhile, using DBSCAN clustering in the console (A), we can see that the system clustered 21 work patterns (C1), 15 food spending patterns (C2) and 9 leisure spending patterns (C3), respectively, with pattern columns set to wages, food, and recreation.



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