Visual Analytics for Demographics, Social Networks and Business Base Pattern
IEEE VIS (VAST Challenge), Award for Outstanding Challenge 1 Submission

Yuxiao Li Xuexi Wang Yue Wang Ting Liu Huiting Wang Ziyue Lin Siming Chen*
School of Data Science, Fudan University

Introduction

Mini-challenge 1 of VAST 2022 required a visual analysis of the basic profile of the city of Ohio. We were asked to analyze the demographic characteristics of the city, social relationship patterns, and business base patterns by giving participants attributes (gender, education, etc.), basic social behavior data, and some economic transaction data.

We implemented a visual analysis system that includes a map, a radar map, a calendar selector, a search and clustering view of social relationships, and a base view. Among them, the map supports the joint selection filtering and cross-sectional distribution display of multi-class features for demographics. The social relationship view supports the social relationship search for specific people and displays the k-means clustering visualization results of their related people. The calendar view, radar map, and base view work together to display the time-series characteristics of the base derived from HDBSCAN, including consumer traffic, work traffic, average consumption level, and average wage level of the business base. The five components of the visualization system coordinate with each other to support the exploration and discovery of demographic characteristics, social relationship patterns, and business base pattern characteristics of the city.

System
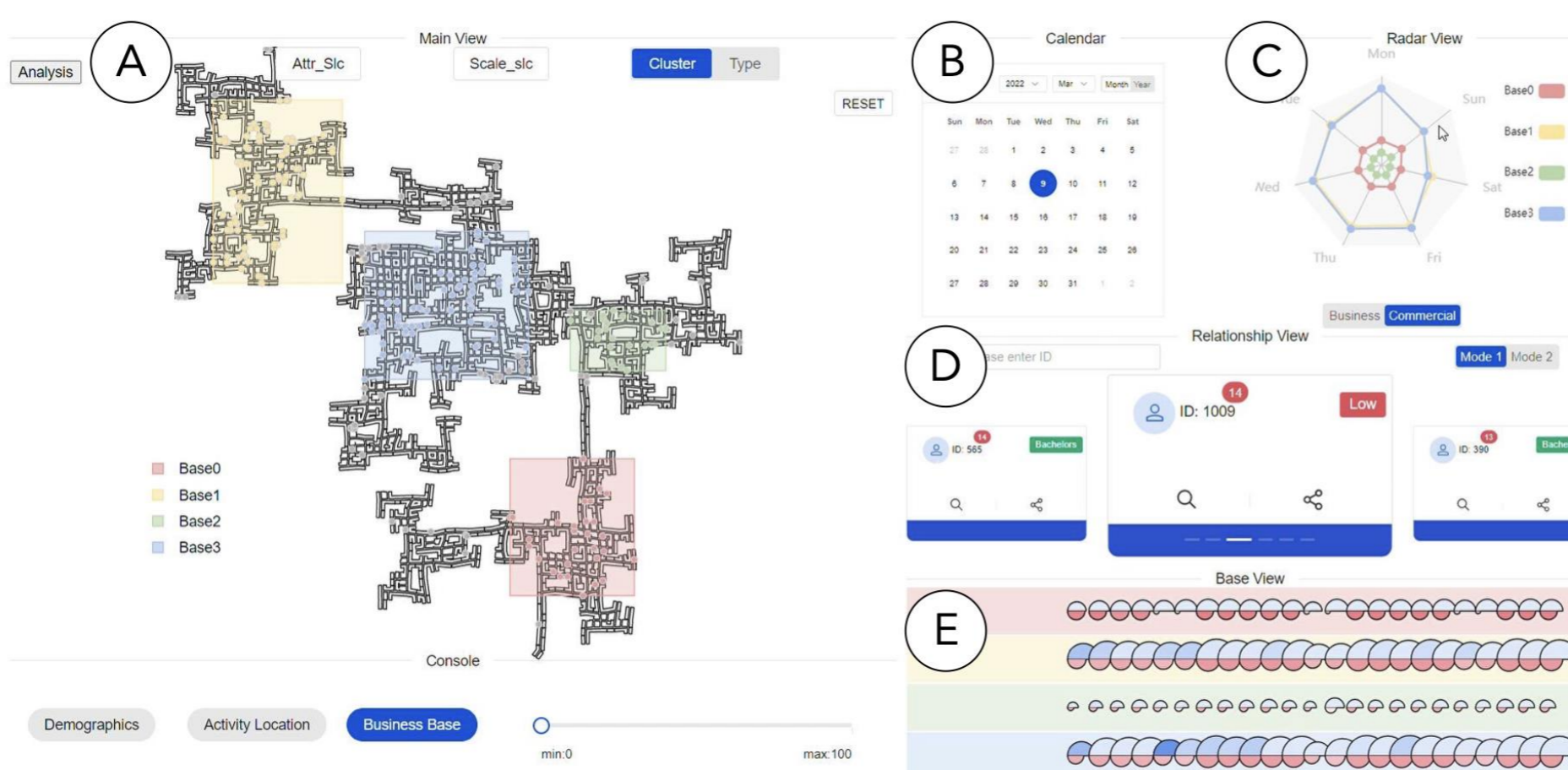
(A) Map view
1) Provide the distribution of the participants in detail
2) Visualization of the business basements

(B) Calendar
Provide a selection of the date

(C) Radar view
Provide the Business/commercial condition of each business base on the selected dates
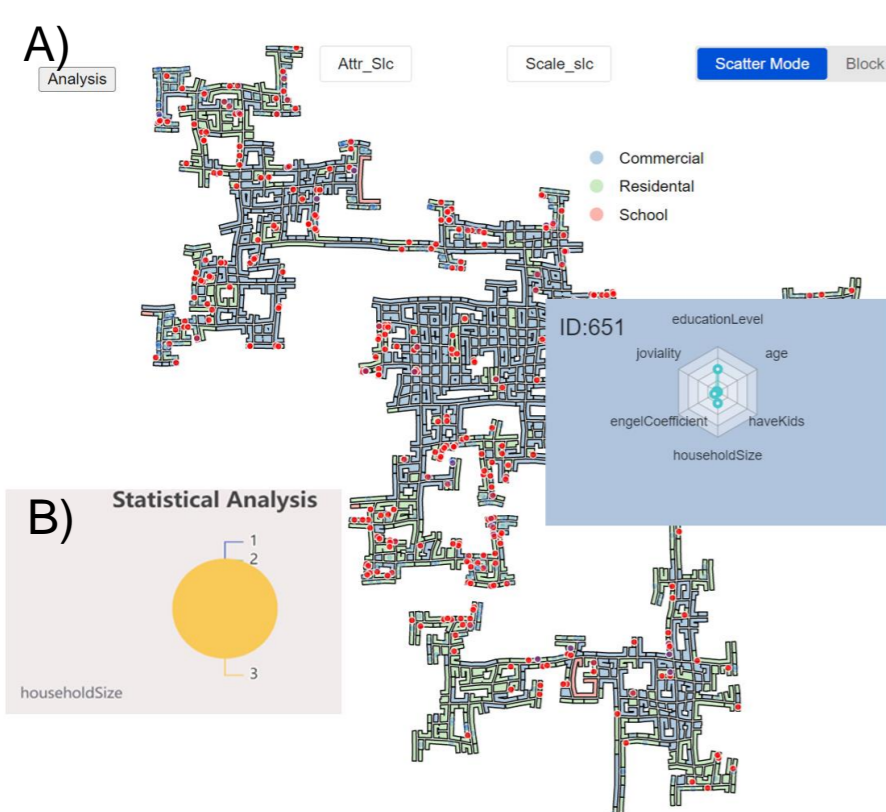
(D) Relationship view
Display the social-network condition and details on the selected data

(E) Base View
Provide an overview of the business/commercial condition of each business base among the 30days before and after the selected date

Case

- Figure A on the left shows the People with Engel coefficients greater than average and the radar view of the detailed attributes of participant 651
- Figure B shows the statistical analysis of people with children and their family size
- Figure C on the right shows The initial state of relationship view and 6 recommended participants
- Figure D shows the social relationships of participant 730 and specific social activity with participant 390
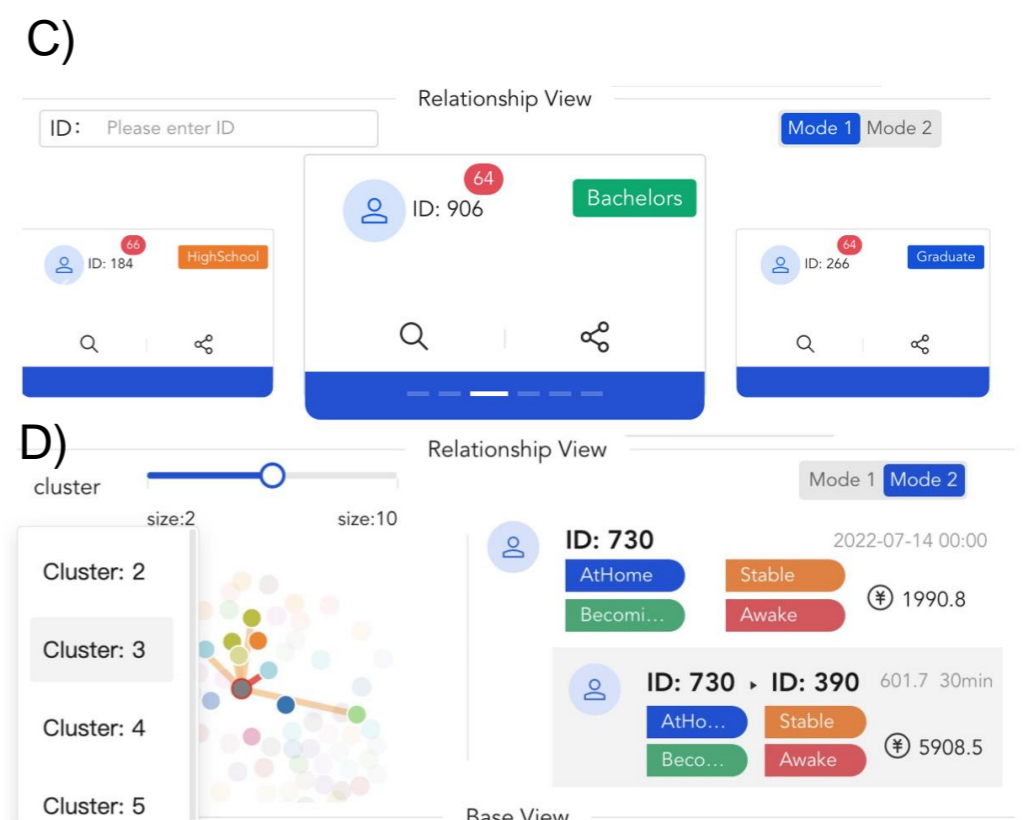
Acknowledgements

Contact

Siming Chen: simingchen@fudan.edu.cn