

# A Visualization System for Spatio-temporal Situation Awareness

VAST Challenge 2021 Mini-Challenge 2 Award: Outstanding Comprehensive MC2 Submission



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## ABILITY

- identify the consumption and behavior patterns of employees.
- assist in the detection of suspicious activities and suspicious groups.

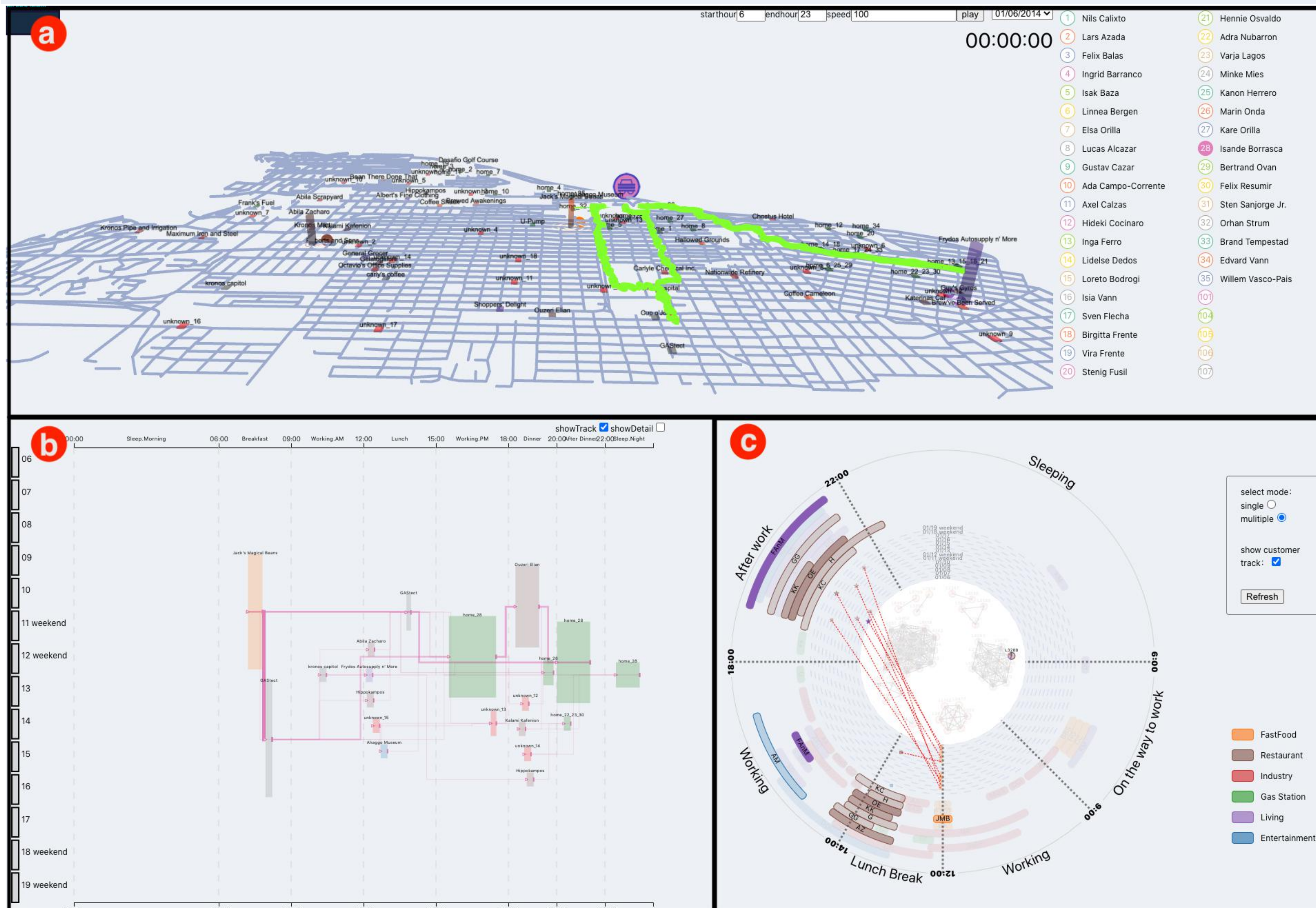
## DESIGN

For multi-source heterogeneous data, the details are displayed separately, and a unified view is provided for correlation analysis, and the results are explained.

## KEY WORD

- multi-source heterogeneous data.
- Abnormal behavior detection.
- Spatio-temporal data visualization.

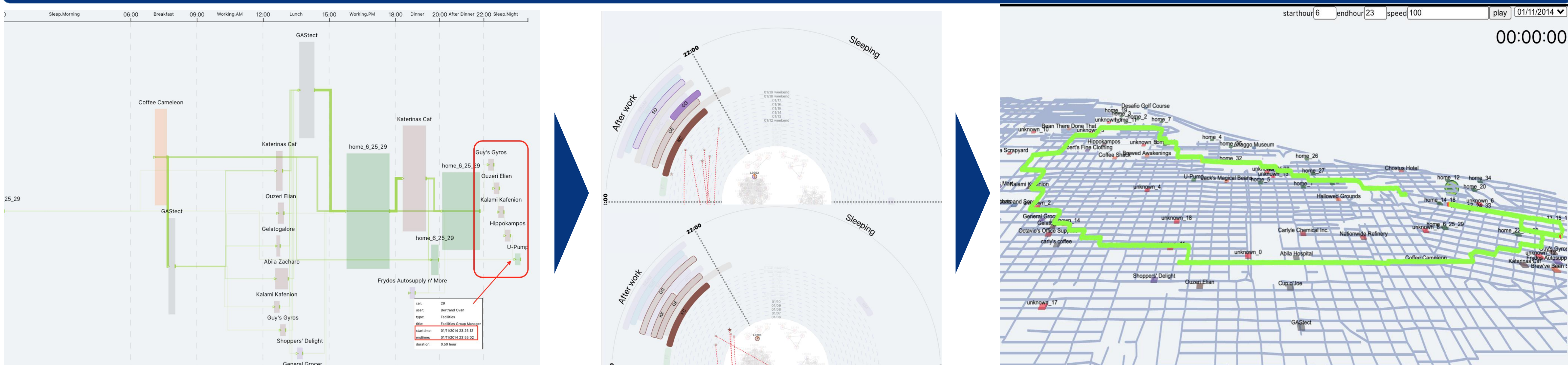
## SYSTEM



- a) The Spatial-Temporal Map.
  - 1) Enhance the display of the trajectory data, such as distance, rate, etc.
  - 2) Discover conflicts and deviations between trajectory data and consumption data.
  - 3) Analyze and interpret suspicious events.
  - 4) Provide a location-based analysis process.
- b) The Temporal Behavior View.
  - 1) Analyze the daily activity patterns of employees.
  - 2) Discover suspicious activities.
  - 3) Explore the relationship between employees.
  - 4) Discover suspicious places that are not marked on the map.
- c) The Consumption View.

Acquire the daily individual consumption patterns and discover abnormal consumption behaviors and locations.

## CASE: The lost loyalty card.



Bertrand Ovan went to Guy's Gyros, Ouzeri Elian, Kalamí Kafeniön, Hippokampos, and L9362 was only used after January 11 and stayed for a short time on January 11.

L3295 was only used before January 11. There is no spending record for both cards on January 11.

the view shows that he drove the car around the city, as if looking for something..

Bertrand Ovan lost his original loyalty card L3295 on January 11, and he went to look for it overnight but failed to find it. So he replaced it with a new card L9362 on January 12.

## FUTURE WORK

In future work, further improvements will be made to the Spatial-Temporal Map to better describe the trajectory data. For example, we need to deal with visual clutter and find a more suitable method for visualizing overlapping trajectories.

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