Demand corridor as a planning tool ...

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Presentation plan

• Demand corridor typology

• Demand corridor as a planning tool
  • Comparing shapes of supply and demand corridors;
  • Identifying spatiotemporal patterns;
  • Diagnosing transportation network;
  • Analyzing similar trips (feedback).

• Conclusion
On an individual level:

The straight line (desire line) is the shortest way to get from one point to another - the « ideal » path !

On a collective level:

The corridor, which includes partially or fully the desire lines, optimizes distance collectively.

« Partial » similarity:
Find nearby segments with the same direction

Similarity « as a whole »:
Find desire lines with the same origin area + same destination area

Identifying demand corridors

- Identify main axes with a high concentration of trips
- Identify areas (origins / destinations) with high number of similar trips.
Identification of demand corridors

How to identify the two types of corridors using only raw data?

Identification algorithm: «Trajectory Clustering for Desire Line»:

**TraClus-DL**: «partial» similarity approach

**TraClus-DL+**: similarity «as a whole» approach

Similar operation, but TraClus-DL+ uses only origin/destination segments, in addition to some other extra operations.

1. **Width**: initial influence area width
2. **Concentration**: minimum number of segments to form a corridor = ex. 2 segments
3. **Angle**: maximum angle allowed between clustered segments (to guarantee direction similarity)
In your opinion, how many trips by day a (walk) corridor must count to be considered as an important corridor?

A. 50 trips
B. 50 – 100
C. 100 – 400 trips
D. 400 – 1000 trips
E. More than 1000 trips
Example: Identification of demand corridors, Deux-Montagnes train

Source:
OD 2008 survey, people using Deux-Montagnes train before 12:00 am

Methodology:
Corridor approach (partial similarity)
Applying TraClus-DL with maxima parameters to centralize trips within one main axis

Direction of corridor: North → city-center.

% of partially grouped trips: 760 trips (90%)

At least 200 different segments are grouped in each small corridor → 50% of total desire lines length is grouped.

Is there another main corridor or minor corridors?

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Demand corridors can help questioning the supply: its direction, its shape, its load profile, its location...... without preconceptions!

Example: Identification of demand corridors, Deux-Montagnes train

Changing TraClus parameters to include more trips

New axis (lower concentration)
Source:
GPS taxi data (~ 50 000 OD sets) from 5 Wednesdays in October 2014.

Methodology:
Corridor approach with (« as a whole » similarity)
Spatiotemporal analyses
Example: Detecting travel patterns

Identification of travels similar in space and time

→ Better understanding of mobility (detecting travel patterns)

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Identification of travels similar in space and time

Better understanding of mobility (detecting travel patterns)

During the day: rides between hospitals!?

Example: Spatiotemporal travel patterns

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What is the maximum distance to a public transport stop that you consider as “a nearby stop”?

A. <100 meters
B. 100 – 250 meters
C. 250 – 500 meters
D. 500 meters – 1 km
E. 1 km or more ...

20% 20% 20% 20% 20%
Select all answers that apply when you estimate the proximity to a place: you consider

A. Distance to destination
B. Time to destination
C. Path slope
D. Presence of a sidewalk and pedestrian facilities
E. Agreeability of the trip

20% 20% 20% 20% 20%

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Example: Diagnose transportation network

Identify "intervention" areas based on trip similarities.

Diagnose the quality (fluidity) of network during the day (changes in the time or speed of rides).

Change in the average duration of rides during the day in the same corridor.

- Old port ➔ Airport (68 rides)
- City-center ➔ Airport (28 rides)

Average duration of the ride (min):
- 20 min (21h-6h)
- 19 min (6h-9h)
- + 20-35% of ride duration compared to the night
- 31 min (9h-12h)
- + 60% of ride duration compared to the night
- 15h-18h
- 18h-21h

Ride start period:
- nuit
- Pointe A.M.
- Avant-midi
- Après-midi
- Pointe P.M.
- soir

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Indices for users (travel time, fare,…) to arrive to the destination area.

Example: Accessibility map based on taxi experience

Identifying similar trips ➔ analyzing feedbacks
Example:
Departure from Old-Port area to ...
Estimation: average time, fare,..
Possibility to estimate by (hour, period, day ..) with sufficient amount of data.

Average ride time ≈ 9 min (48 night-rides analyzed)

Departure area: Old-Port
Arrival area: Near Peel – Metro station
### Conclusions

#### Demand corridor typology

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Corridor</th>
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<tbody>
<tr>
<td>Similarity «as a whole» of desire lines</td>
<td>Partial similarity «segments» of desire lines</td>
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- **Valuing disaggregated data**
- **Visualizing spatiotemporal trip patterns** (historic, current or future data)
- **Identifying axes / areas of intervention**
- **Designing network from the demand only**
- **Diagnosing the supply (shape, area of influence, fluidity)**

**Mobility Chair Projects**

- **Travel chain**
- **Itinerary and modal choices**
- **Alternatives diversity and quality**

Identify chain (connected) corridors for future improvement?

Propose «share» modes?

Generalizing individual modal choices results depending on diversity and quality of alternatives for the whole corridor?

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Thanks.....