

A Study on Fundamental Technologies for Developing People Flow Dataset

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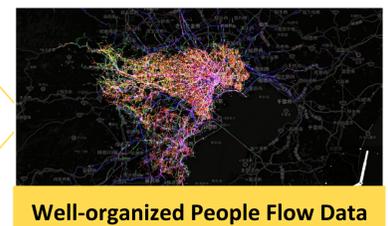
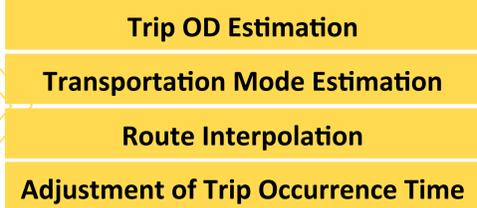
Background

Monitoring people movement has been attracted in several services and research fields such as city planning, tourism, and disaster prevention. since data acquisition through mobile phones has been general in addition to a legacy questionnaire survey, data acquisition technologies have been getting diversified. Therefore, people movement data acquired from different techniques have heterogeneous quality, and cause inefficiency in data utilization.



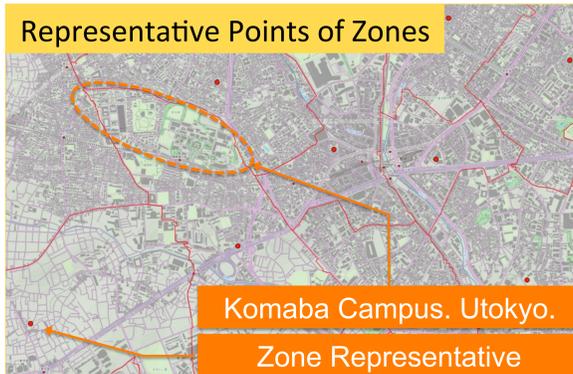
Objective

Reconstructing homogeneous format/quality of people flow data would facilitate variety of application fields. Especially, in order to estimate necessary information in people movement data, it is important to create fundamental techniques. Therefore, this research aims to establish these fundamental techniques, and applies them to person trip survey conducted around Tokyo area in 2008 as a case study.



Trip OD Estimation: Spatial Reallocation to POIs

- In PT survey, ODs are representative points of zones
 - Since detailed position in zone is unknown, spatial resolution depends on zone size and is usually sparse.



Spatial Reallocation

- OD should be located on a building point. Therefore, each OD is probabilistically reallocated to surrounding buildings based on floor space of each building

Route Interpolation: Movement Velocity, Road Capacity, PCU

- Road route search based on time duration (vehicle movement)
 - Velocity setting is determined according to mode and road type
 - As for vehicles, velocity is fixed even if it's different type
 - targets: taxi, vehicle, light vehicle, shipping car, bus

Road Type	Highway	Urban highway	National Road	Local Road	PR City Road	Pref Road	City Road	Street	Others
Vel (km/h)	100	70	50	45	45	40	30	30	30

出典)関本ほか、都市空間における効率的な動線解析の共通基盤のあり方について、土木学会論文集F3, Vol.67, No.2, 1_170-1180, 2011

Road Capacity

- Each road segment has different road capacity
- To simplify settings, all road segments are set 1,500 cars/line/hour

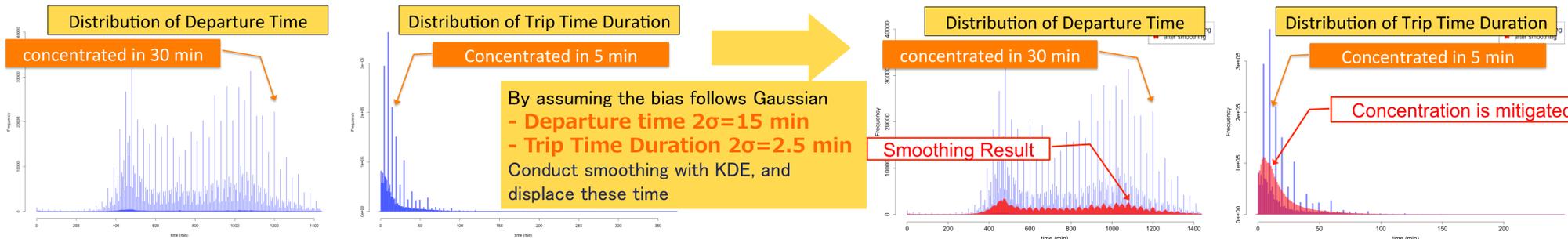
PCU (Passenger Car Unit)

Transport mode	Vehicle Light Vehicle	Shipping Car	Bus	Taxi
PCU(人)	2.533	2.487	21.267	1.37

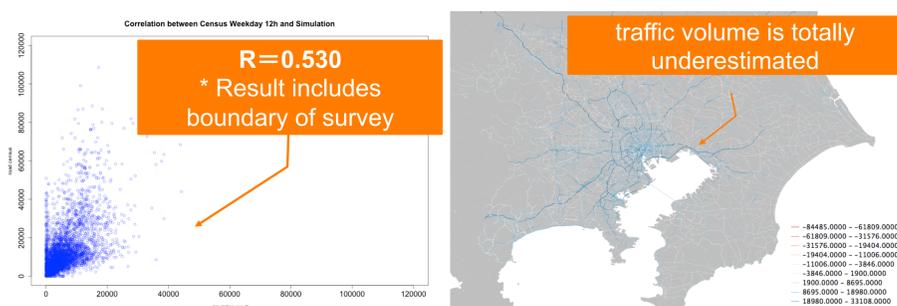
国土交通省「H24自動車輸送統計年報 4-1-2 旅客輸送量原単位」から算出

Adjustment of Trip Occurrence Time: Smoothing

- Questionnaire includes bias in departure/arrival time



Result: Comparison to Road Traffic Census(2005)



Remaining Issues

- Since PT Survey only includes citizens in metropolitan area, internal and external traffics are not considered well
- Highway traffics are obviously small
 - Highway is rarely employed in route search because IC gate is far away
- Entire traffics are also small
 - PCU should be set more realistic value
 - Some estimated roads employ roads outside of census targets