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May 9, 2023



Modular automated fleets

Source: NEXT Future Transportation



Urban air mobility



Emerging modes: commonalities?



Micromobility

Source: BTS



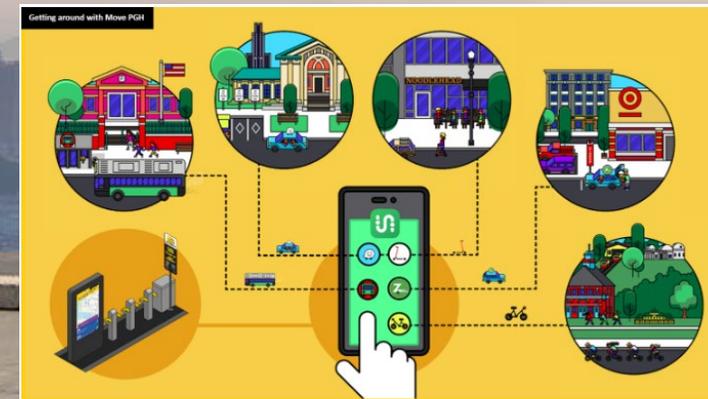
Ridepooling/ microtransit

Source: Foljanty

Photo from iStock 1393960783

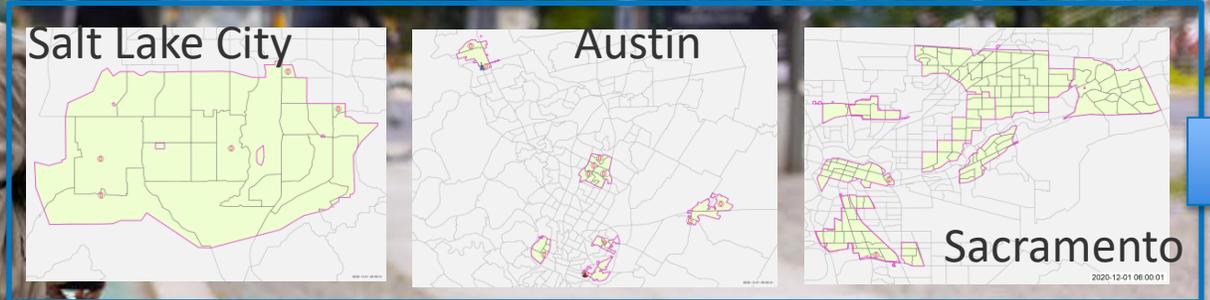
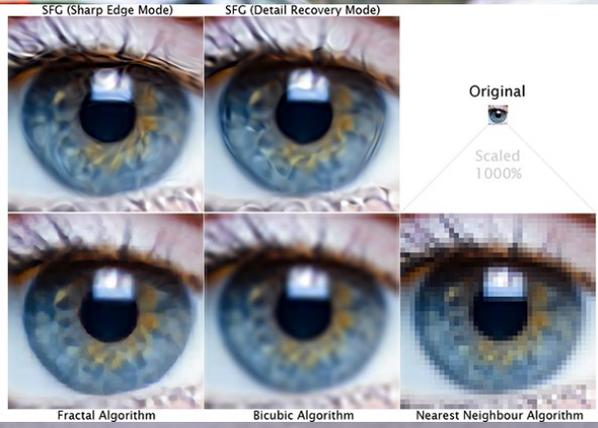
1. Limited deployment data
2. Non-trivial to incorporate (user + operator) behavioral response in system design

MaaS

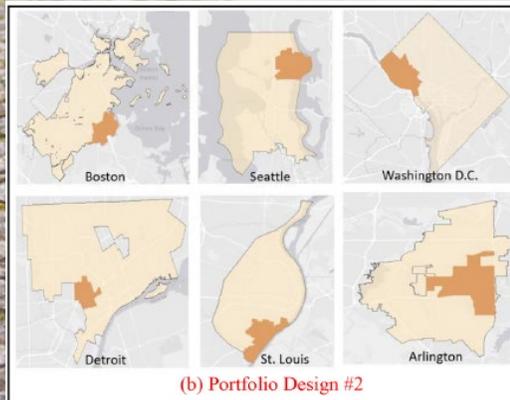
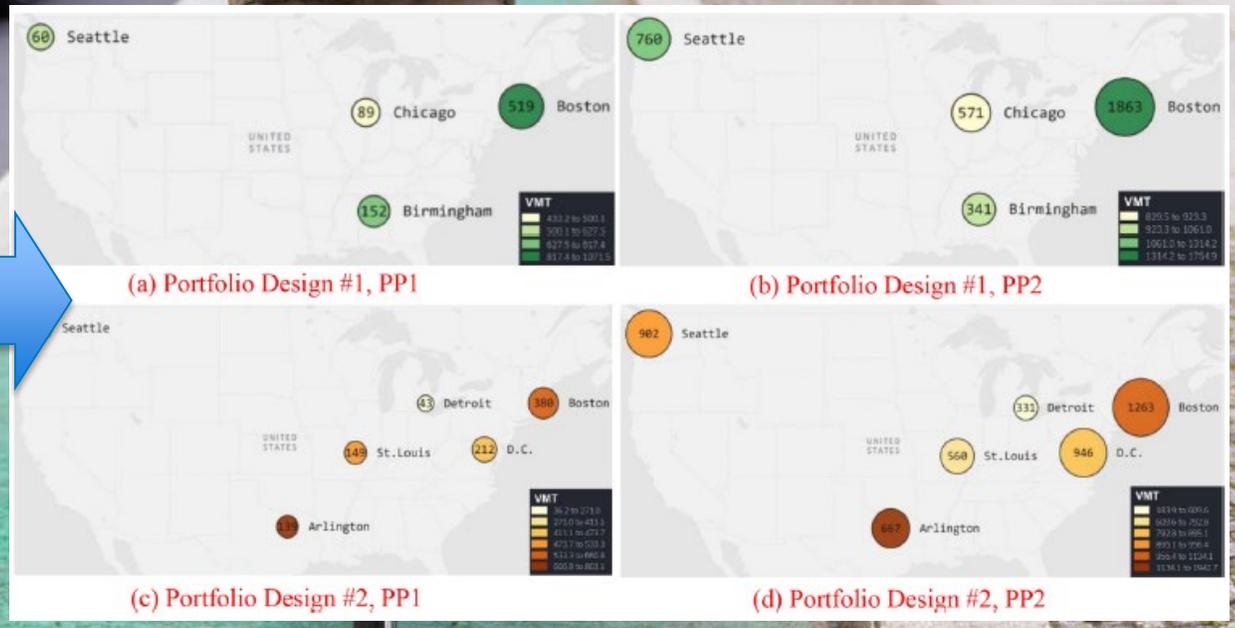


Credit: City of Pittsburgh

Simulation-based scenario upscaling



County	Population	Unprotected area (acre)	Transit stop density	Street density	Population density	Employment density	Household (HH) density	Auto ownership per household	HH weighted mean income (dollars)	Microtransit ridership	Fleet size	Vehicle miles traveled	Revenue estimated (dollars)	Operation cost estimated (dollars)
Williamson County	145570	34577.08	0.001	10.363	4.210	2.236	1.405	0.914	115566	549	45	2054.88	203	10292
Sacramento County	154988	25247.78	0.005	15.691	6.6	2.2	2.2	0.0	10	10	424.52	322		1721
Salt Lake County	85223	10630.45	0.042	19.542	8.817	3.795	3.312	0.875	80421	457	19	806.98	1143	1914
Santa Clara County	165336	22040.15	0.014	17.791	7.502	2.768	1.003	1.063	186384	1085	31	1501.18	294	5746



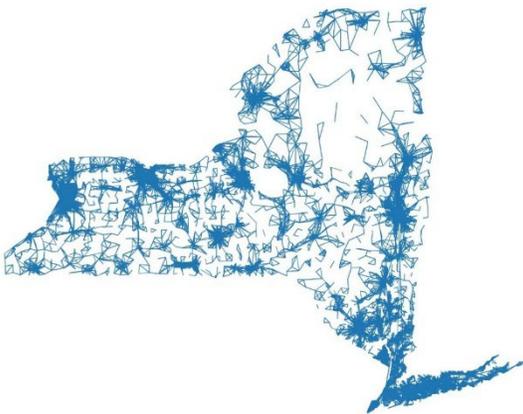
Data available:



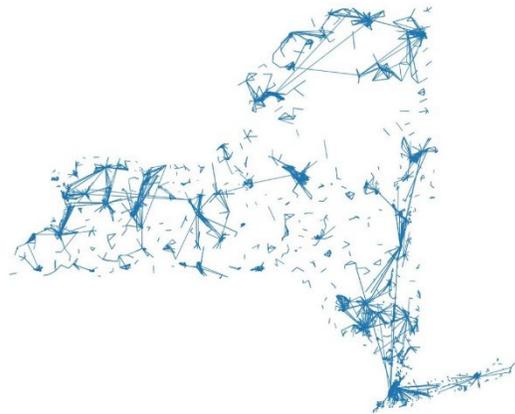
Photo from iStock 1318992710

Using ubiquitous data for behavioral systems design

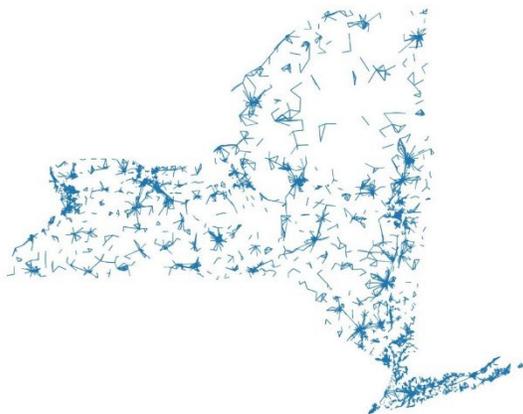
NotLowIncome Trip OD



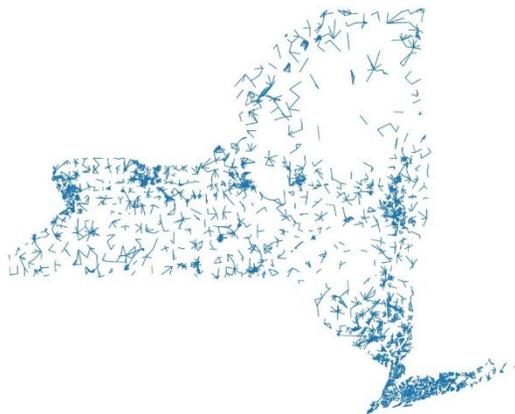
LowIncome Trip OD



Senior Trip OD



Student Trip OD



Replica Data Schema

Replica produces large-scale models that accurately represent mobility, economic activity, people, and land use in detail throughout the United States.

Replica customers have access to a number of datasets, which are described below. Click to see detailed descriptions and schema.



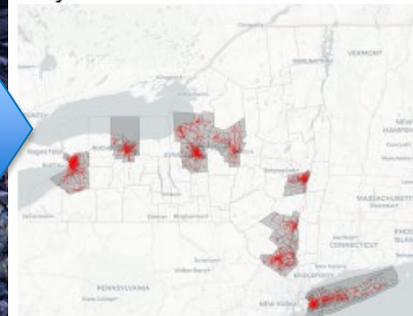
Revenue

Social welfare

Welfare disparities

B. 10 zones, 5,000 vehicles

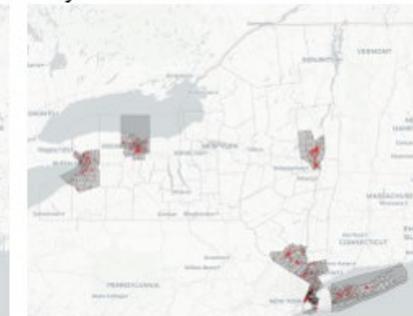
Objective 1



Objective 2



Objective 3



Data available:



Some guiding thoughts for discussion

- **Shared infrastructure** conflict resolution: EV chargers, curb, road space, service vehicles?
- **Standardized measures** of sustainability, equity, and efficiency in behavioral systems design?
- **Standardized data** for modeling user behavior?
- Centralized federal project **deployment portfolio**?
- Investments and training needs in **agency R&D** to keep up with pace of industry?