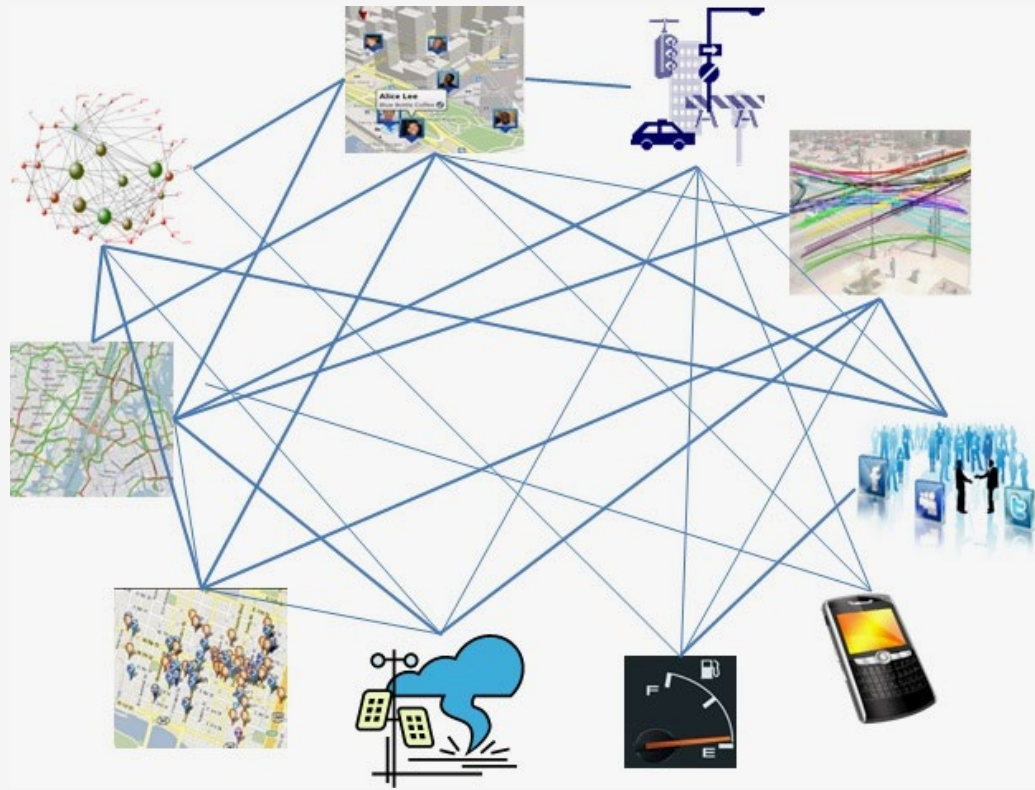


Role of AI in Urban Computing

By Benjamin Akhtar, Haotian Fang, Praneeth Ramesh, and Param Somane

What is Urban Computing?

- ▶ A large amount of diverse data is gathered by sensors, devices, vehicles, buildings, and human beings in urban spaces.
- ▶ *Urban computing* is the process of obtaining, combining, and analyzing this data to tackle the major issues faced by cities.



What are some challenges we are facing?



Sustainability

Economic
growth

Weather
forecasting



Air pollution

Waste management

Energy consumption

Public transport

Traffic congestion



City-wide
surveillance
(Data Acquisition)

Segmenting city
based on behavior

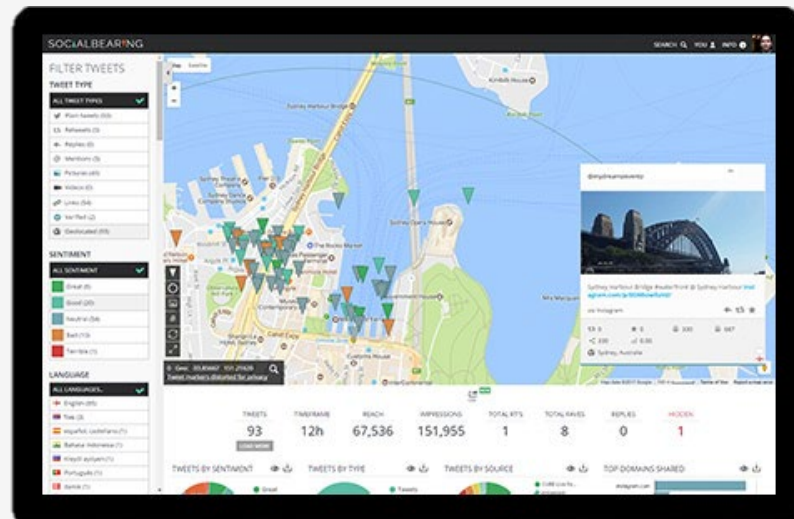


City Segmentation

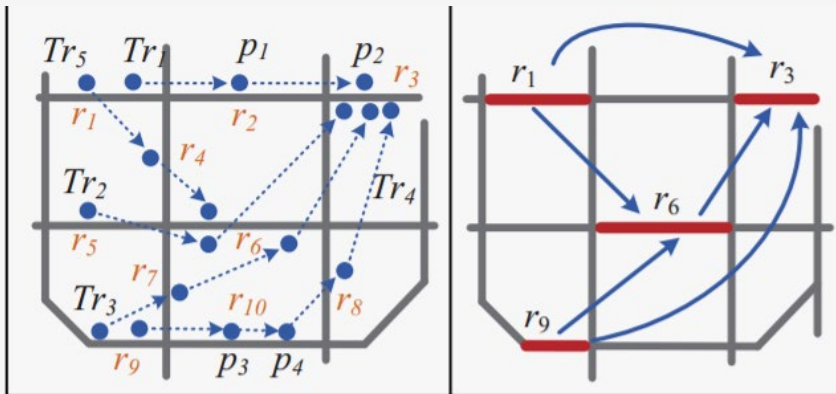


Tessellation of a city into sections based on behavior similarity

AI Model: Clustering algorithms

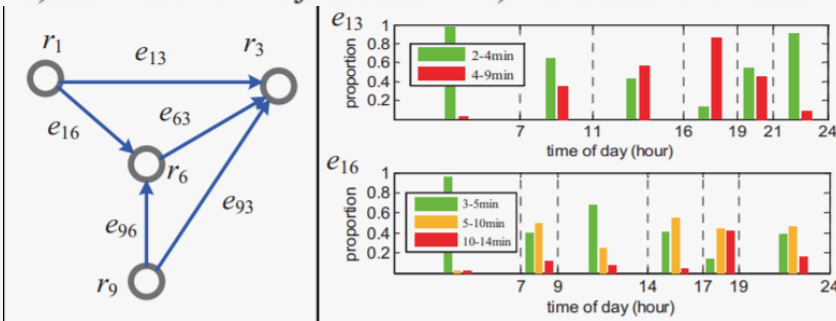


Traffic Congestion



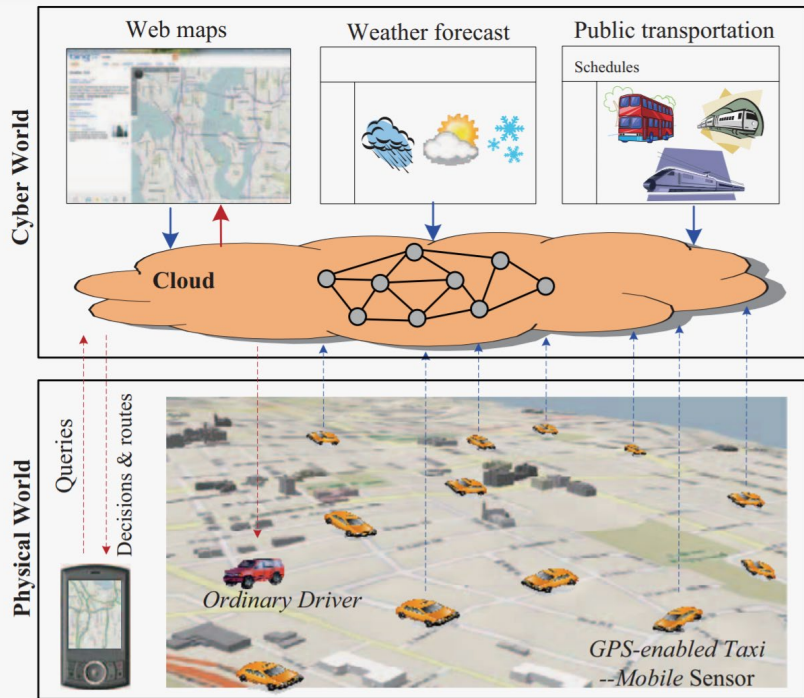
A) Matched taxi trajectories

B) Detected landmarks



C) A landmark graph

D) Travel time estimation



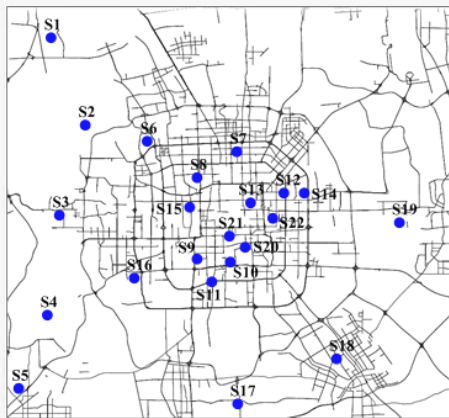
T-Drive: Driving directions based on taxi trajectories

Bing maps

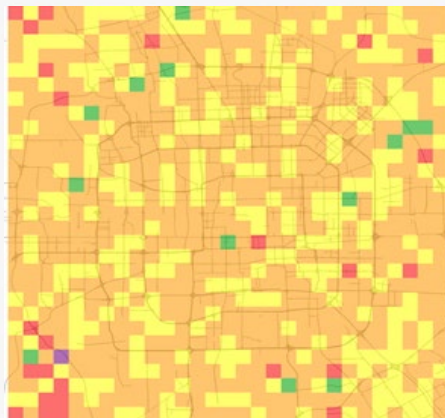
AI Model: Hidden Markov model, variance-entropy clustering, A* search

Air Quality

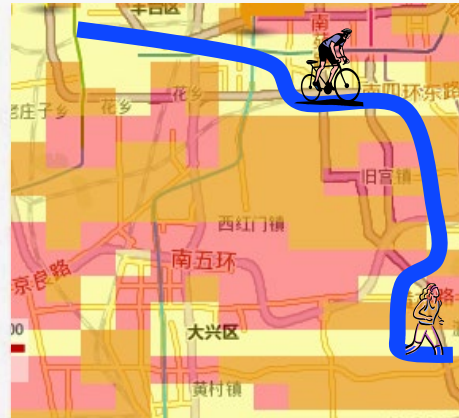
AI Model: Data mining, machine learning



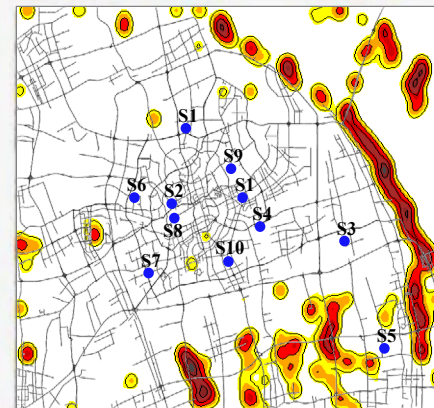
(a) Monitoring stations



(b) Fine-grained air quality



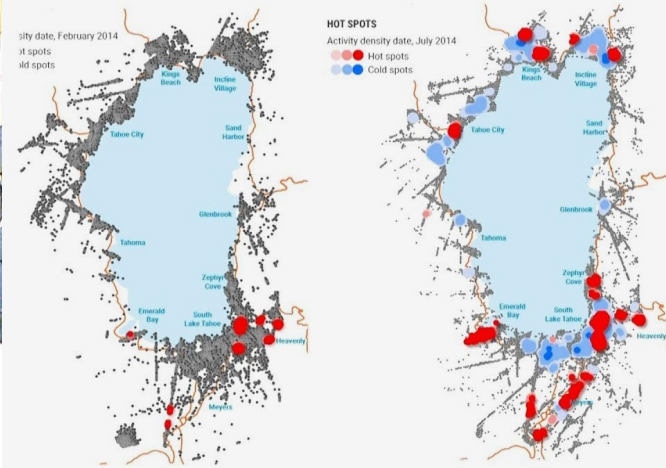
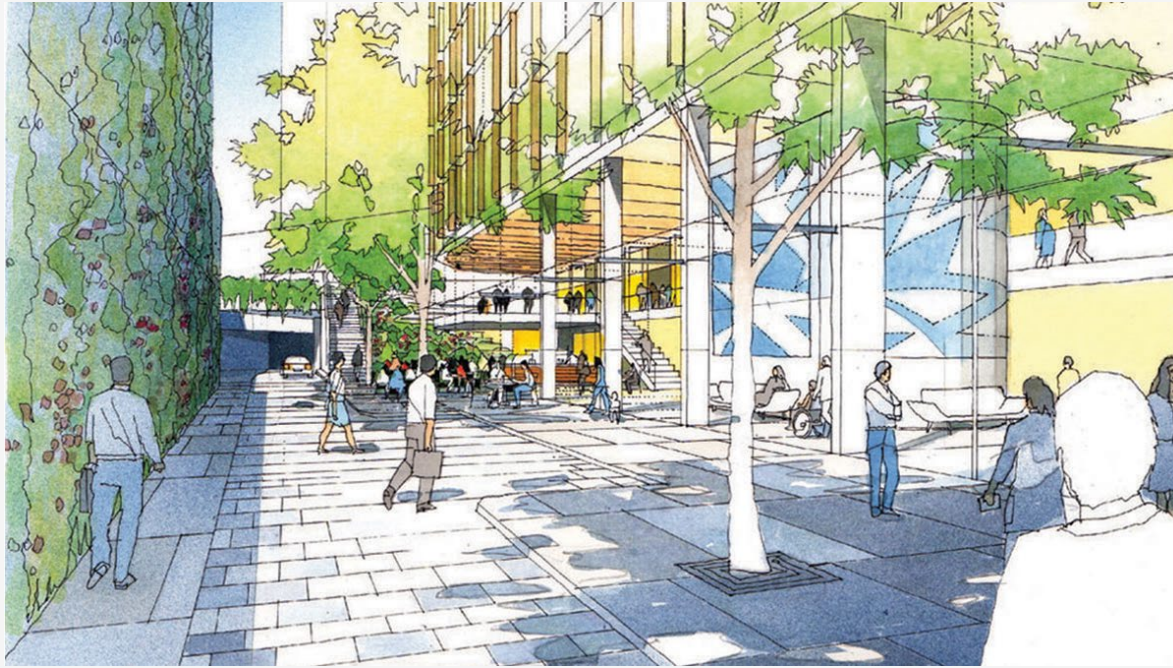
(c) Routing based on air quality



(d) Locations for new stations

Monitoring real-time and fine-grained air quality using big data (Beijing)

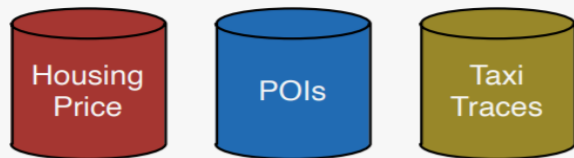




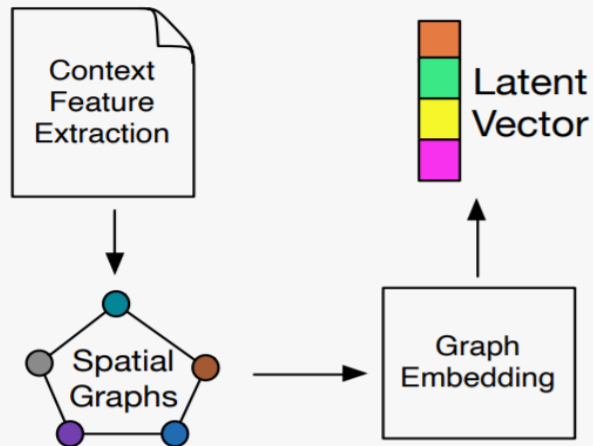
- *Urban planning* refers to the efforts of designing land-use configurations. It is a multi-faceted discipline in which planners collect data points from targeted areas to determine if a store, hospital or other type of building is likely needed in that area.

Framework of LUCGAN

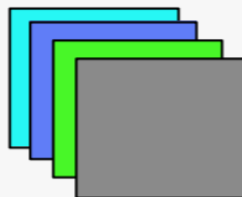
Multi Data Sources



Representation Learning



Generated Solution



Model Training



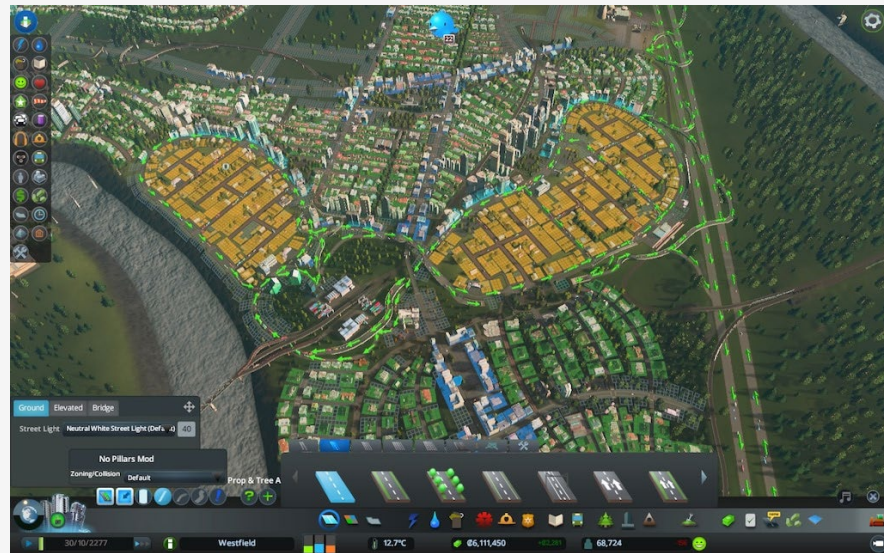
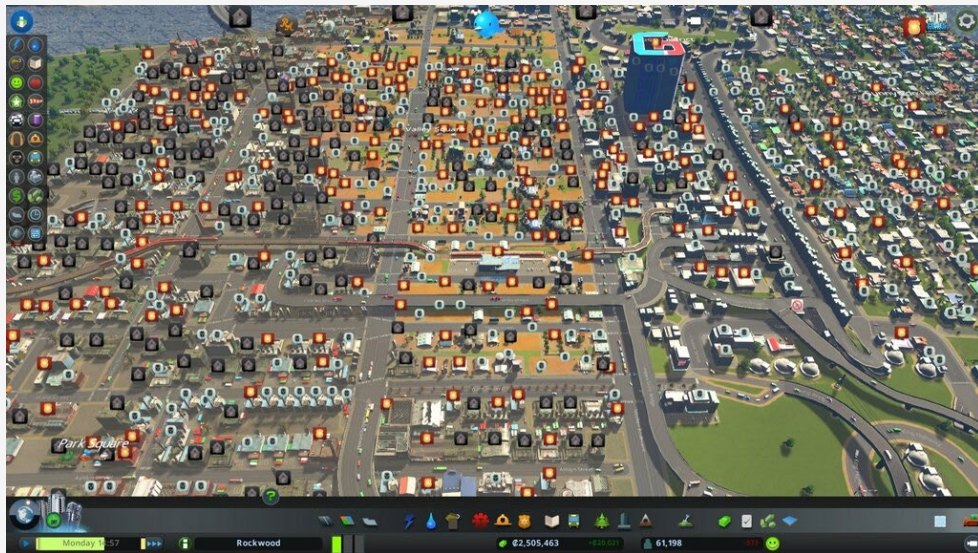
Table 1: POI category list

code	POI category	code	POI category
0	road	10	tourist attraction
1	car service	11	real estate
2	car repair	12	government place
3	motorbike service	13	education
4	food service	14	transportation
5	shopping	15	finance
6	daily life service	16	company
7	recreation service	17	road furniture
8	medical service	18	specific address
9	lodging	19	public service



Source: **Cities: Skylines as an Urban Planning Tool**

<https://www.planetizen.com/news/2020/08/110146-cities-skylines-urban-planning-tool>





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Thank you!

Any questions?