

Smart Mobility in Smart Cities

Insights from Scientific Research



Dr. Eran Ben-Elia

**Gaming in Augmented Mobility Environments (GAMES) Lab
Ben-Gurion University of the Negev**

with



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**Geosimulation and Spatial Analysis Lab
Tel Aviv University**

Outline

Urban parking dynamics and behaviors



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graph TD; A[Urban parking dynamics and behaviors] --> B[Big Urban Data and Accessibility in the City]; B --> C[Advanced Routing Information];
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Big Urban Data and Accessibility in the City

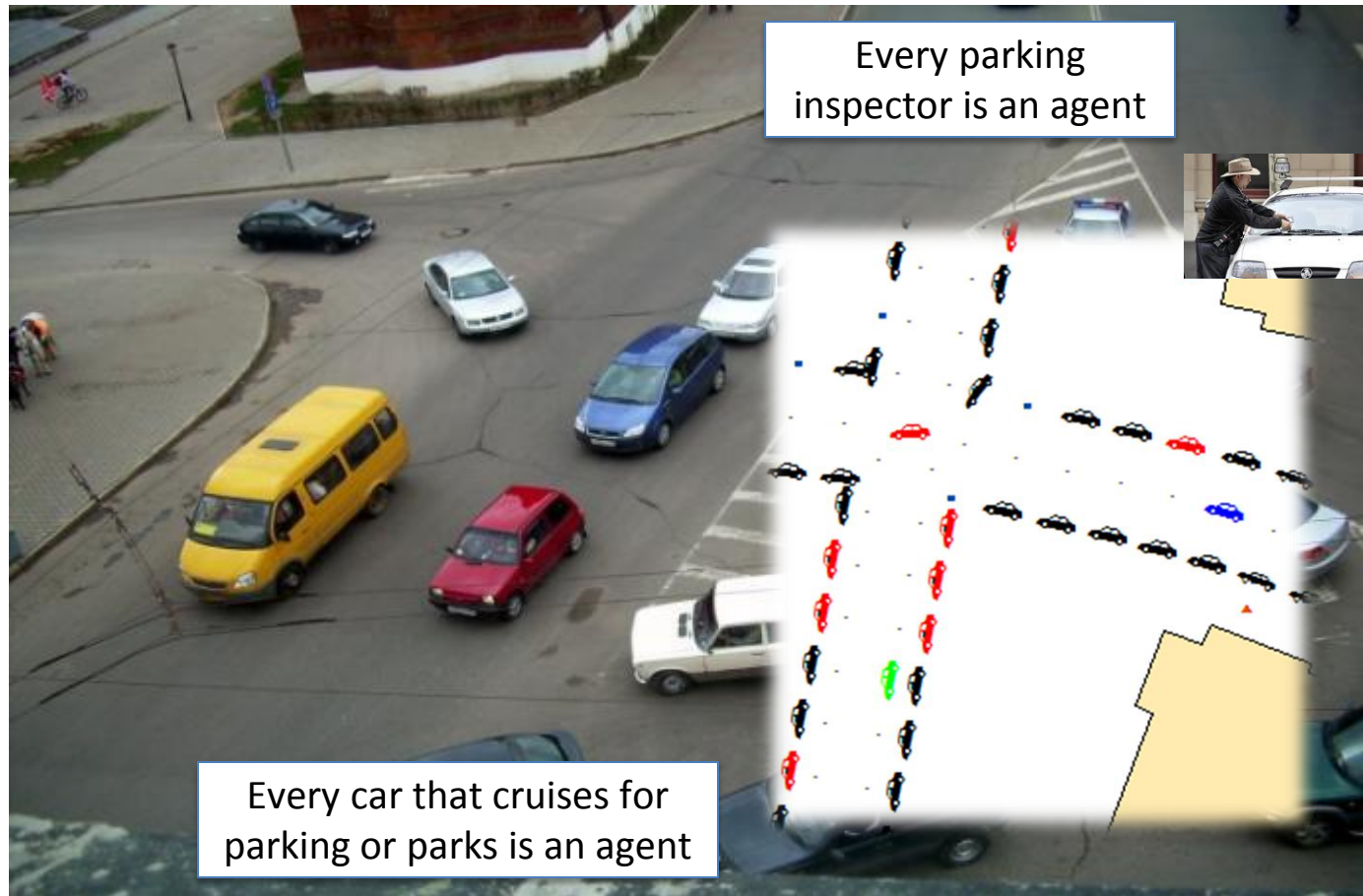
Advanced Routing Information

Urban parking dynamics

PARKING SPATIOTEMPORAL PATTERNS

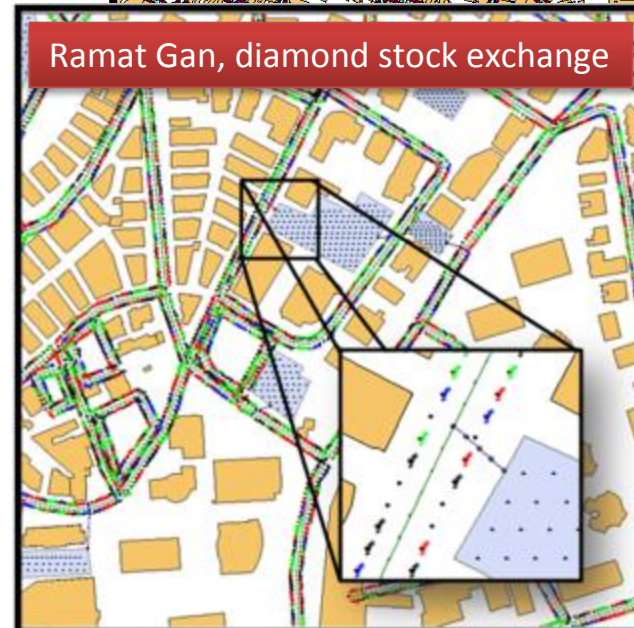
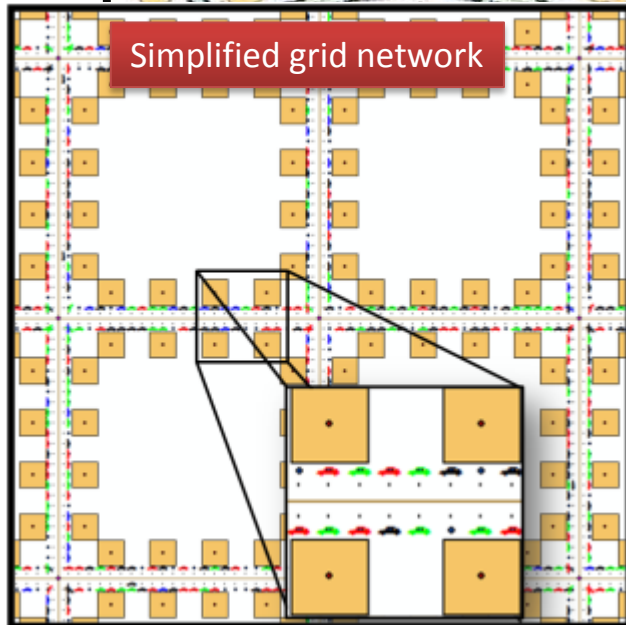
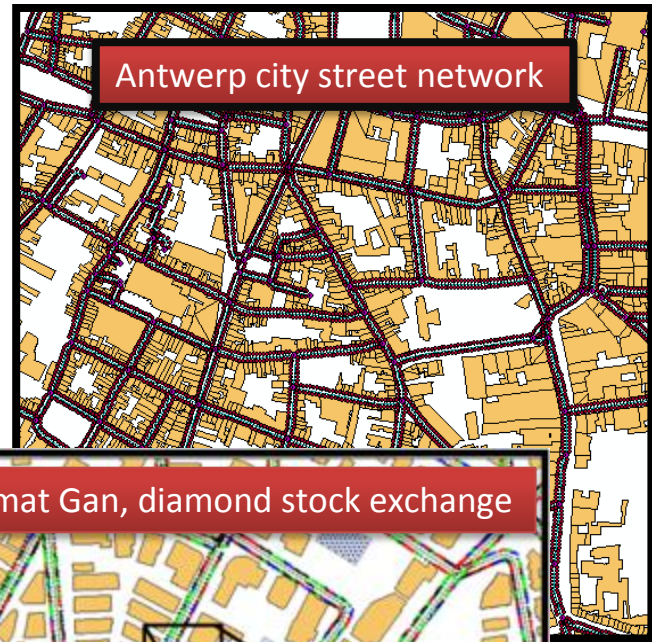
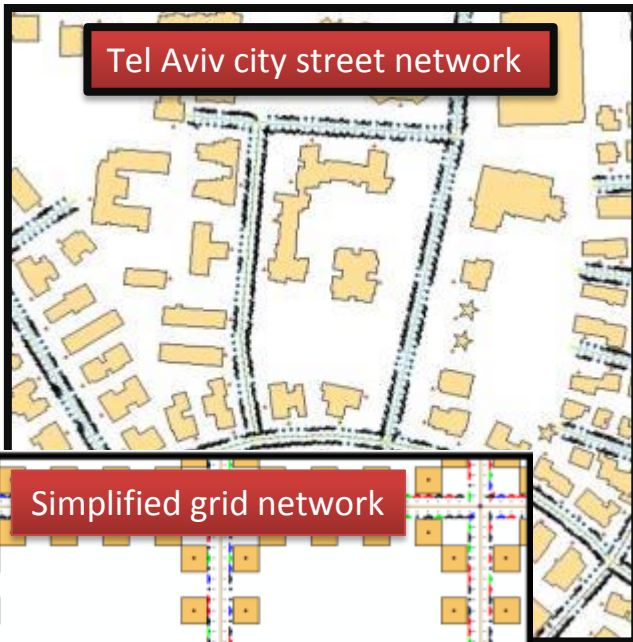
PARKAGENT: Agent-Based modeling of the parking search

- 
Residents
- 
Commuters
- 
Guests
- 
Customers



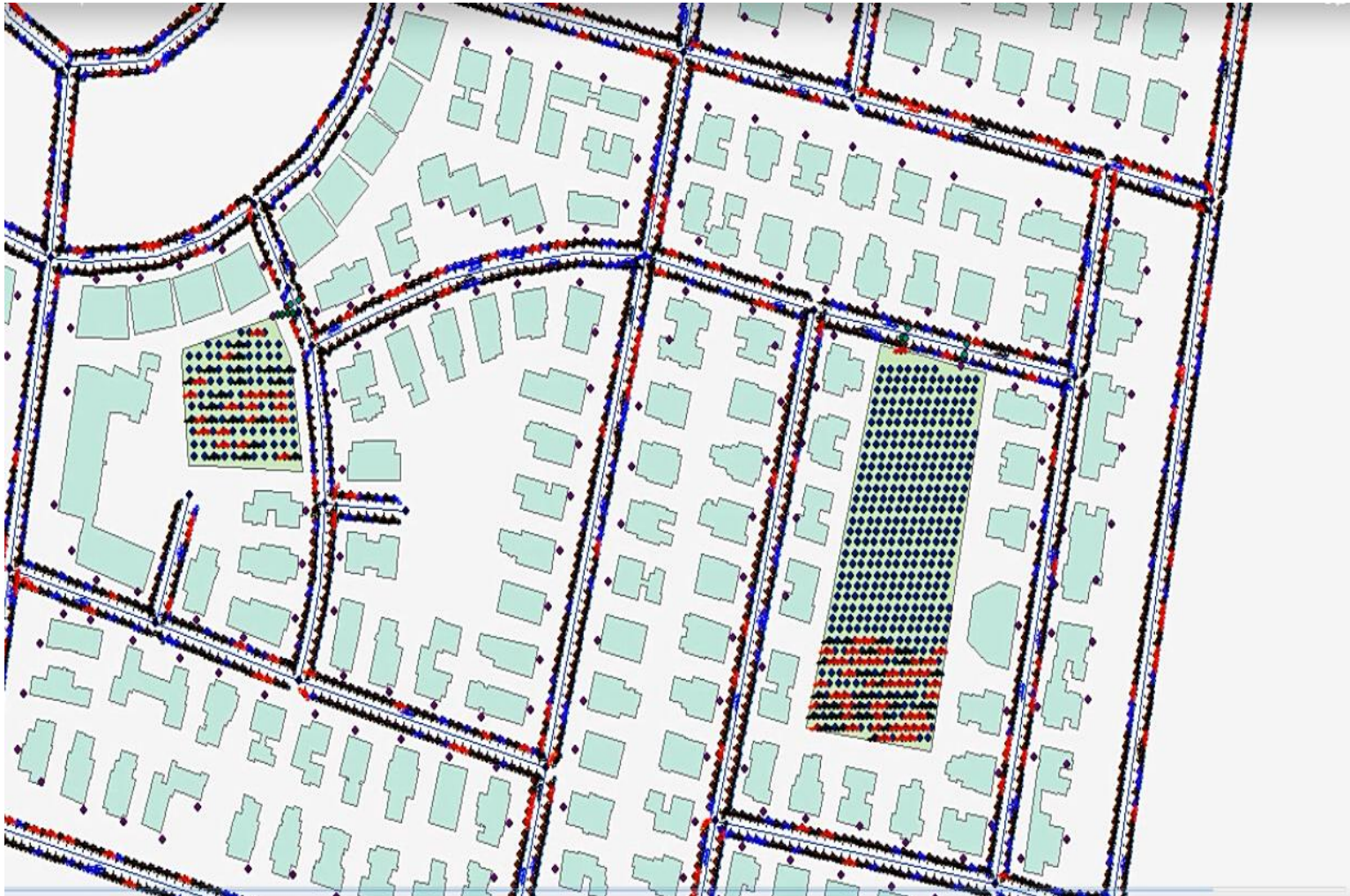
PhD student Nadav Levi and Prof. Itzhak Benenson

PARKAGENT is easily adjustable to any new city



Geosimulation and Spatial Analysis Lab

A closer look at PARKAGENT



We investigate parking behavior in an interactive game “PARKGAME”

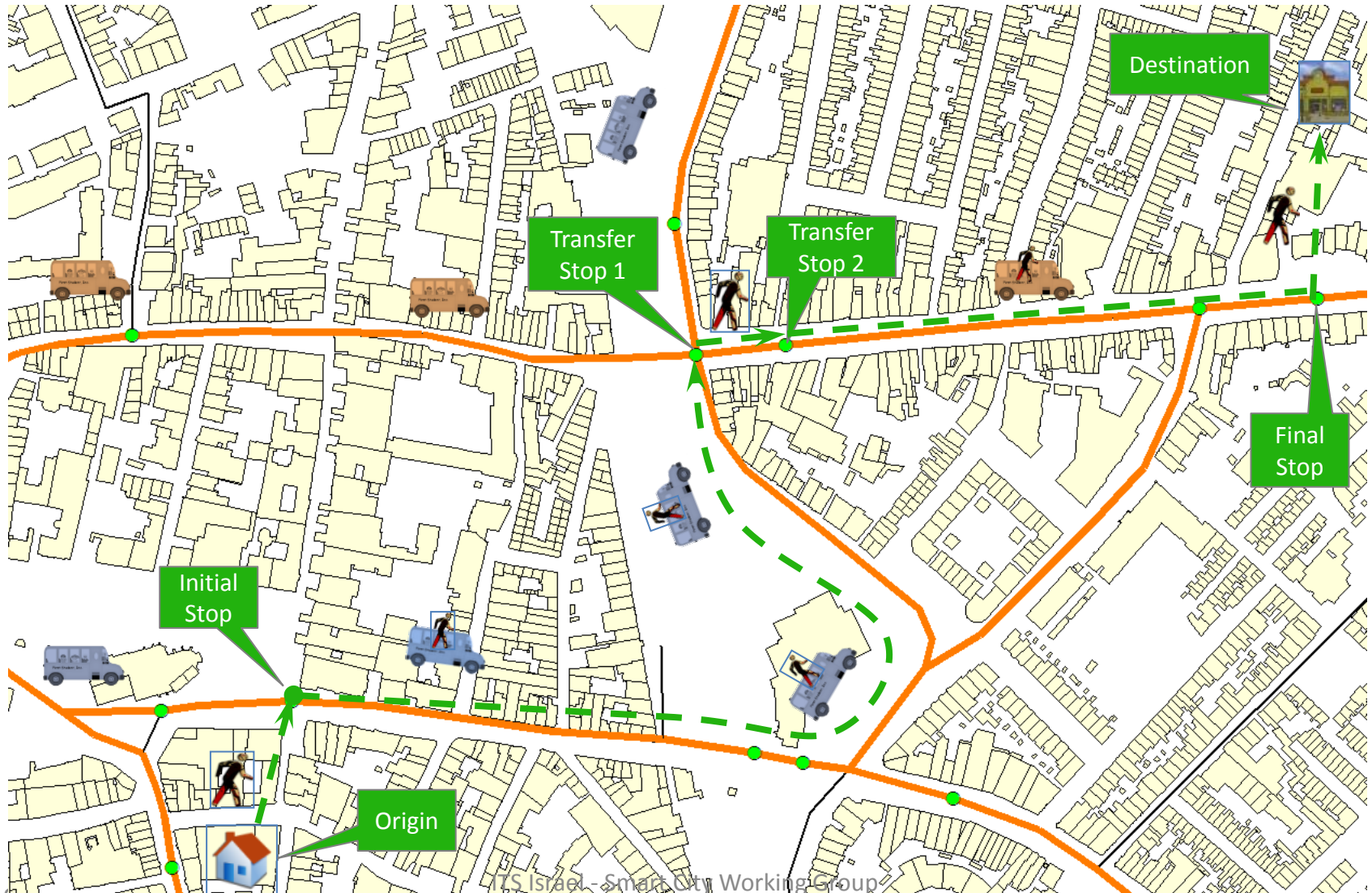


Dr. Eran Ben-Elia, Prof. Itzhak Benenson, Dr. Yevgeny Medvedev, Shay Ashkenazi

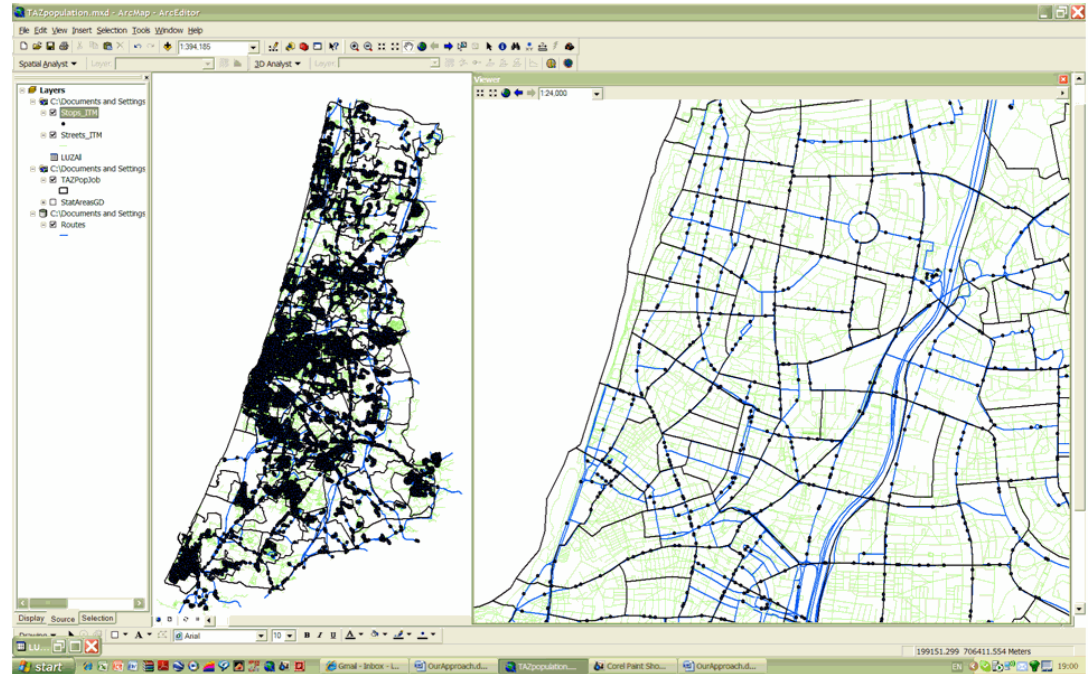
Big Urban Data and Accessibility

*Dr. Yodan Rofo (BGU) Dr. Eran Ben-Elia, Prof. Itzhak Benenson,
Dimitry Geyzersky (Performit Ltd)*

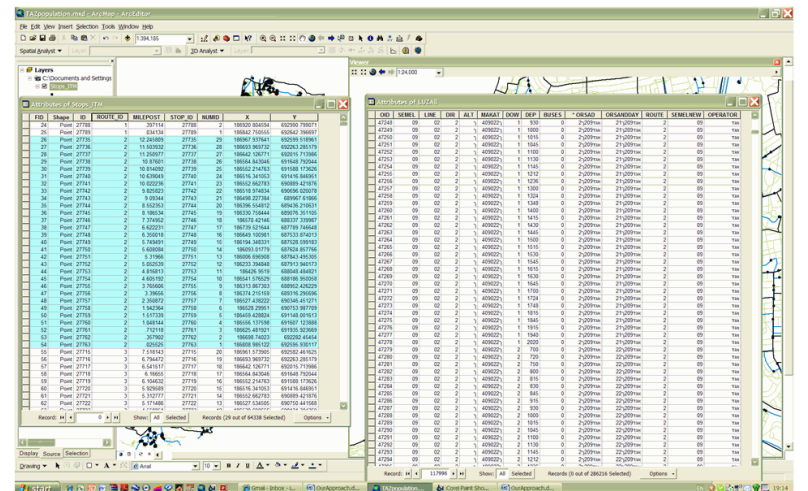
The idea: Compute accessibility from the human viewpoint (building to building)



Bus lines Bus stops

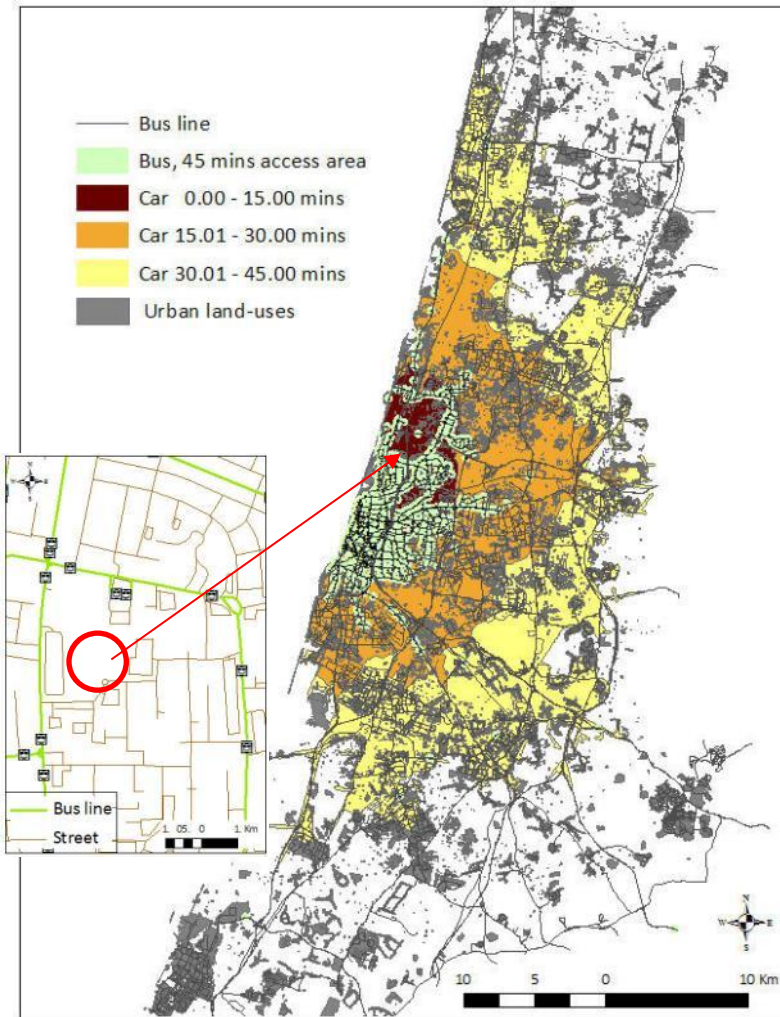


Relation between bus lines and stops.

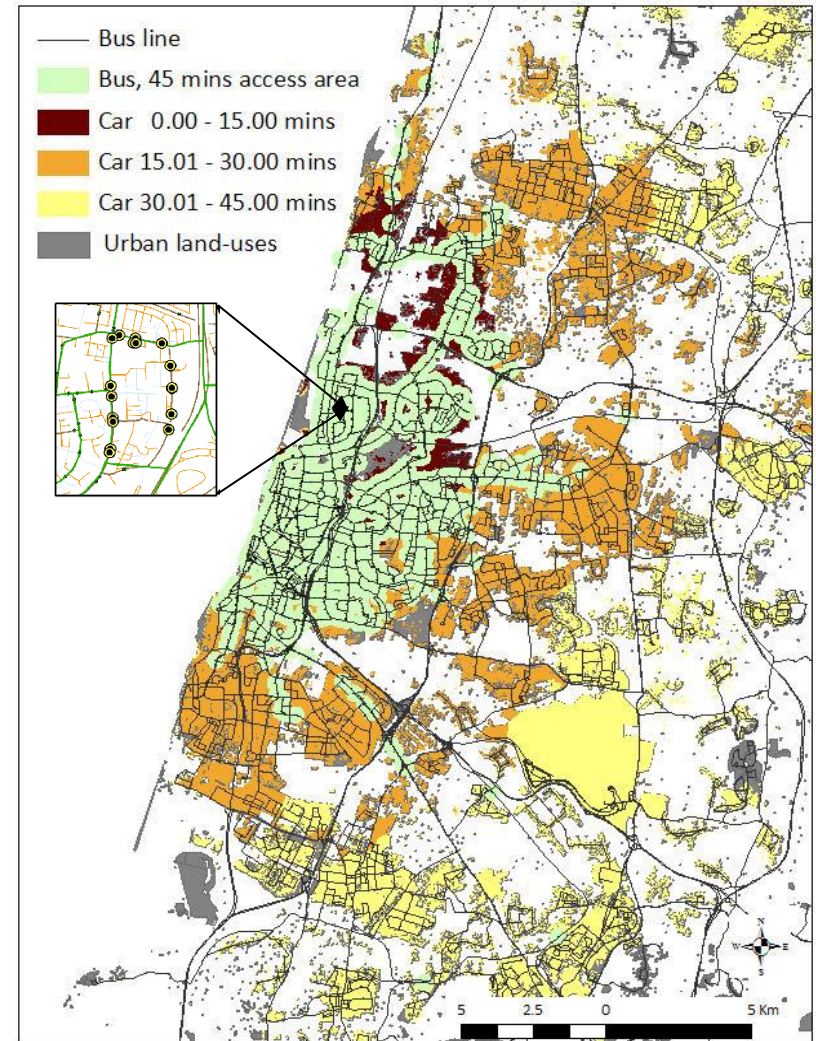


Necessary for measuring bus accessibility

Car access areas versus bus access area (to jobs)



Entire metropolitan area



Built areas

Car access area is essentially larger than access areas

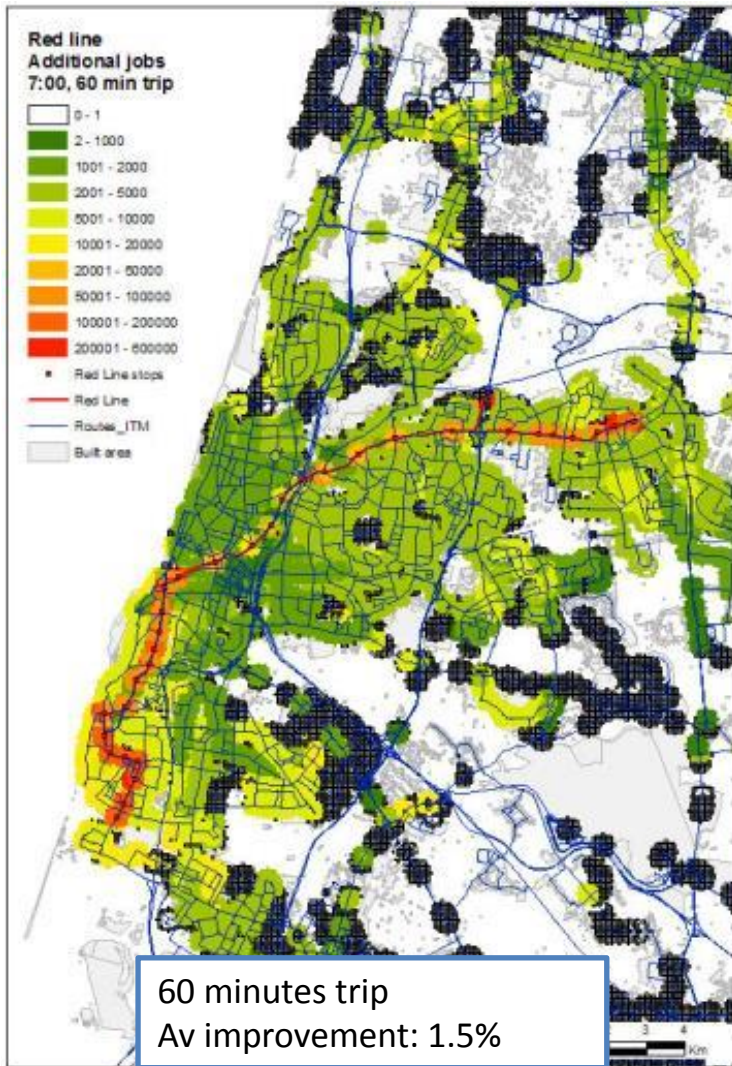
Tel-Aviv metropolitan area: High Resolution Accessibility maps between 07:00 – 07:30



07:30

Planned Light Rail: Combined with the bus network

Trip start: 7:00, No of transfers: 1



LRT does not improve accessibility that much...

Utilizing mobile phone CDRs to reinvent public transport

Flagship call initiative 2013 "Future Travelling"

SMART-PT

Smart Adaptive Public Transport



SMART-PT: A new Concept for Smart Public Transport

- **Supplying travel information is not enough if the PT is not useful to the potential traveler.**
- **Operators will recognise current and future spatiotemporal dynamics of demand from mobile phone records**
- **Seamlessly plan and adapt PT supply: mode, vehicle, route, timetable, while safeguarding high levels of service to all users.**

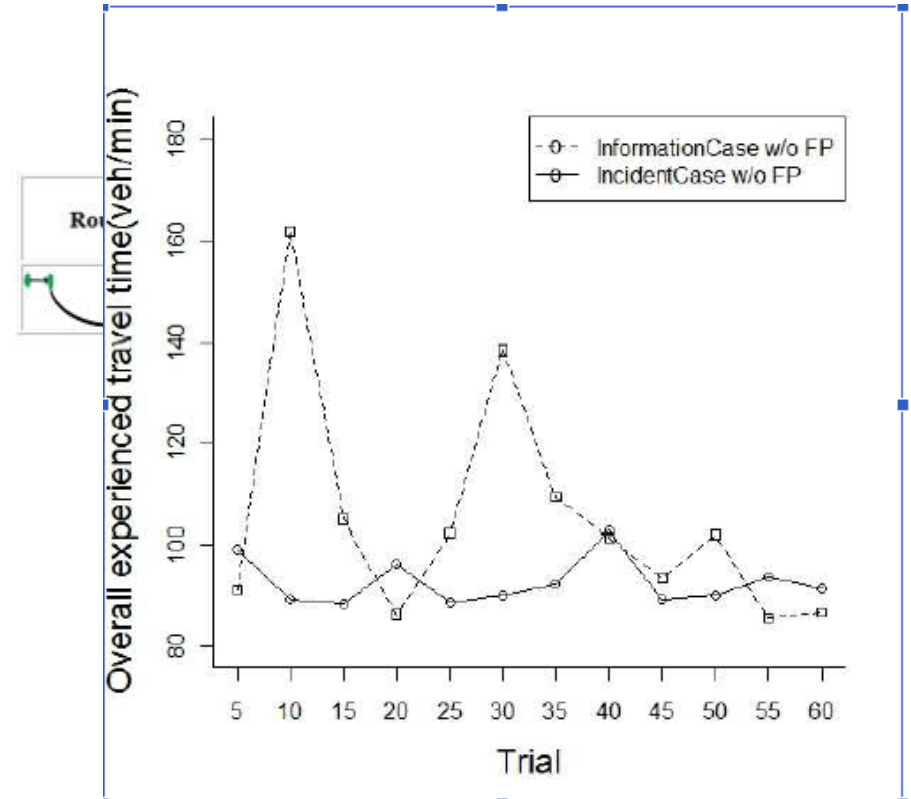
Towards Advanced Routing Information for Autonomous vehicles

Dr. Eran Ben-Elia

A Competitive Route-Choice Learning Game



Drivers choose routes independently but travel times are determined by collective flows.



Information Paradox: Competition between informed self-interested travelers can lead to congestion

Really



In an era of autonomous driving....

Not just passively outsmarting traffic but proactively cooperating in reducing it!

Cooperation in Congested Road Networks (ISF)

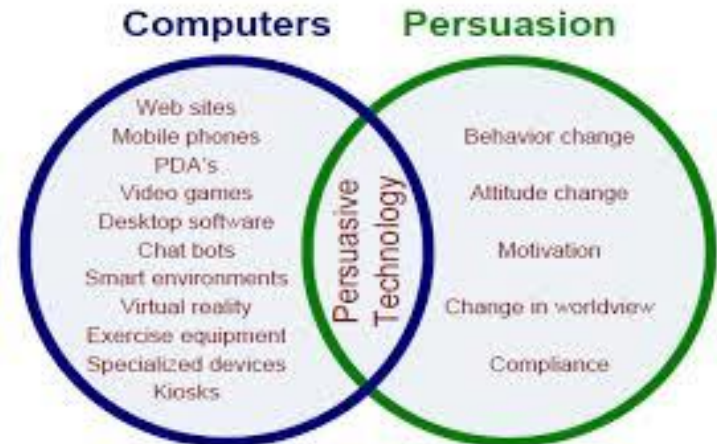


Fair routing concept for optimal sharing of network resources

Testing persuasive technology in an immersive gaming environment



Modeling social interaction dynamics with agent-based simulations



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