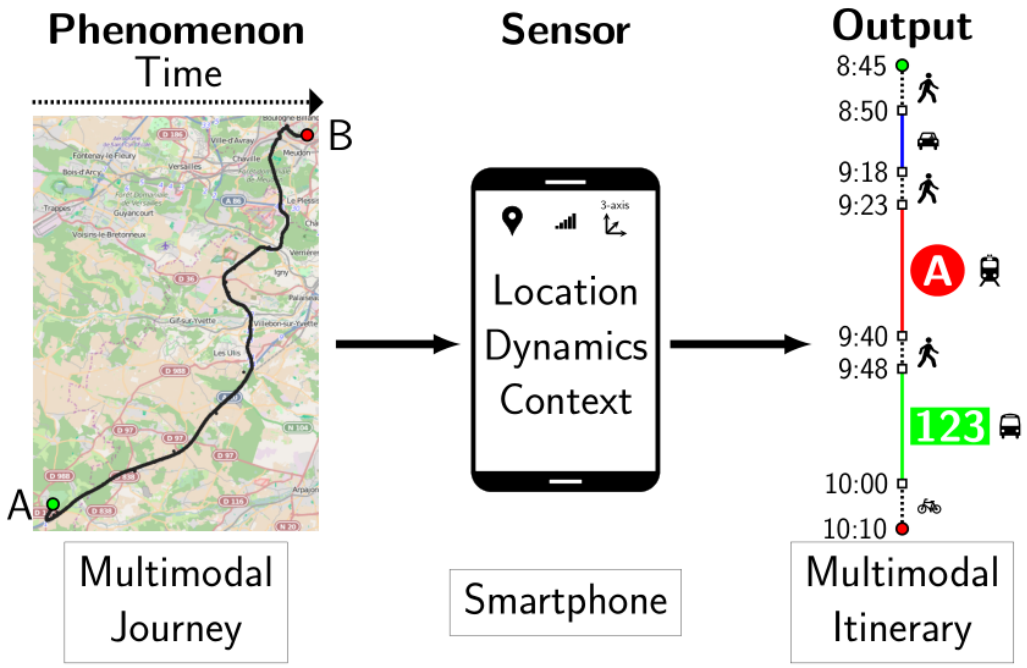

Hup-Me

Inferring and Reconciling a Timeline of User Activity from Rich Smartphone Data

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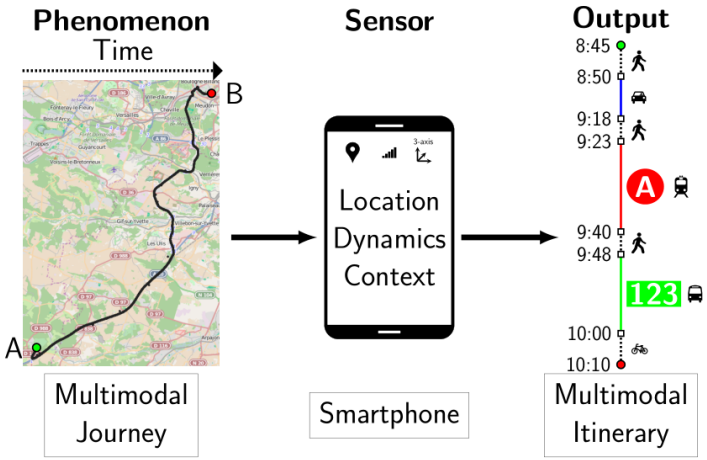
System overview



Goal

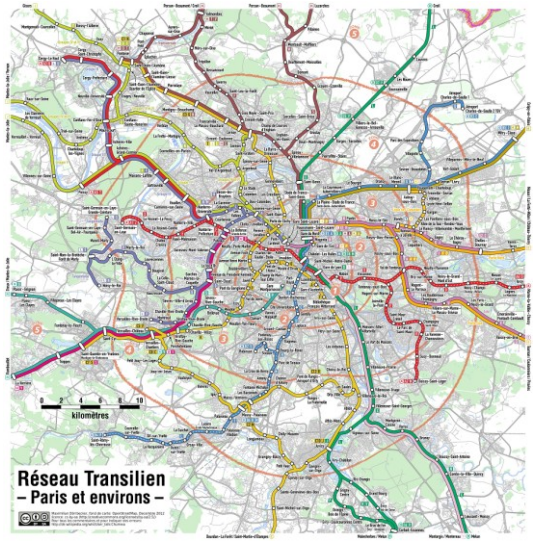
- Infer the **Multimodal Itineraries** traveled by a user

Input

- Smartphone Data (GPS, GSM, Wi-Fi, Accelerometer, Bluetooth)
- Transportation Network + Transit Schedules (OpenStreetMap + GTFS)

Output

- Multimodal Itinerary for modes: **foot, bike, car, bus, tram, metro** and **train**



Transportation Network, Paris, France - CC-BY-SA Maximilian Dörrbecker, OpenStreetMap

Novelty

- Rich sensor data
- Exploits Transit Schedules
- Exploits missing data (lost GPS signal)

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Algorithm and Evaluation

Transportation Network

- OpenStreetMap aligned with Transit Schedules over the Paris region

Two-Phase Algorithm

1. "Multimodal map-matching" using a Particle Filter over a Dynamic Bayesian Network
2. Transit Line Recognition from Transit Schedules

Future Work

- Include Personal Data (e.g. calendar, mails) to predict the user's itinerary

42.5 hours of annotated journeys from users in the Paris region

Confusion matrix by transportation mode

		Predicted mode accuracy (%)						
		foot	bike	car	bus	train	tram	Time (min)
Actual mode	foot	87	8	1	1	2	1	1068
	bike	2	98	0	0	0	0	69
	car	5	2	82	10	0	0	718
	bus	4	5	0	90	1	0	419
	train	12	0	2	3	83	0	149
	tram	15	3	6	1	0	75	129
Precision		91	36	96	80	81	92	2552

Transit Line recognition rates

	bus	train	tram
Accuracy (%)	95	78	99
Total Time (min)	381	127	98

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