Modeling mobility patterns from smart phone data

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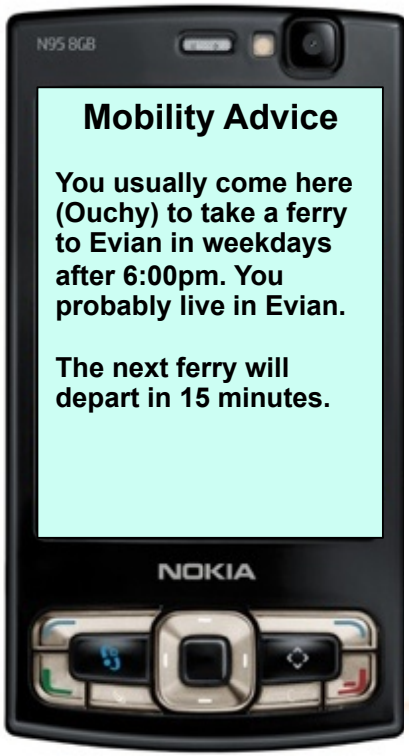
Motivations: customized service

Customized services ← Understanding Mobility Patterns



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Motivations: Rich Data

Surroundings

Motivations: Rich Data

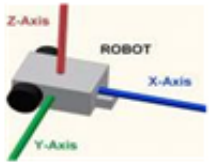
Phone

Camera

Calendar

Media Play

Call Log



Acceler ometer

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Data Collection Campaign

>100 smart phones

Remote server

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Mobility Patterns

Activity?

Why Travel?

Where?

Transport mode?

Which Route?

How to infer them from smart phone data?

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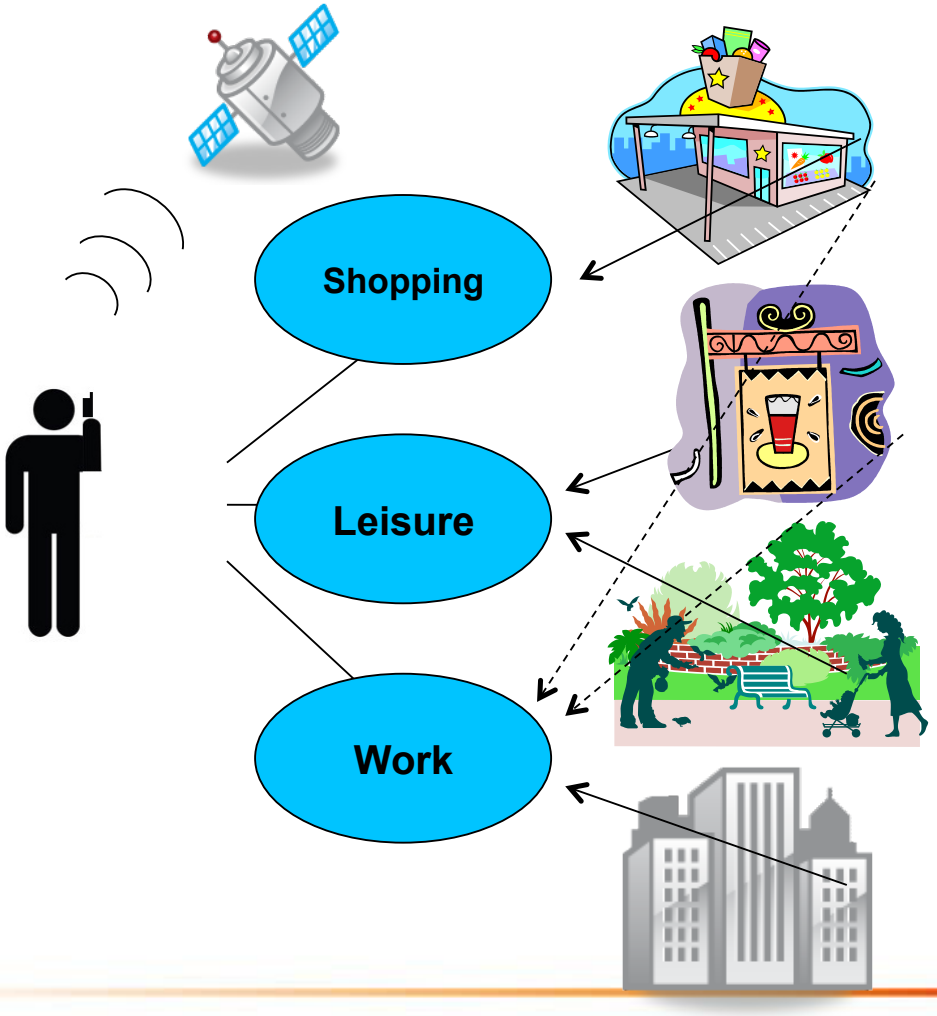
Location-based Activity Inference:

- GPS +
- Land use



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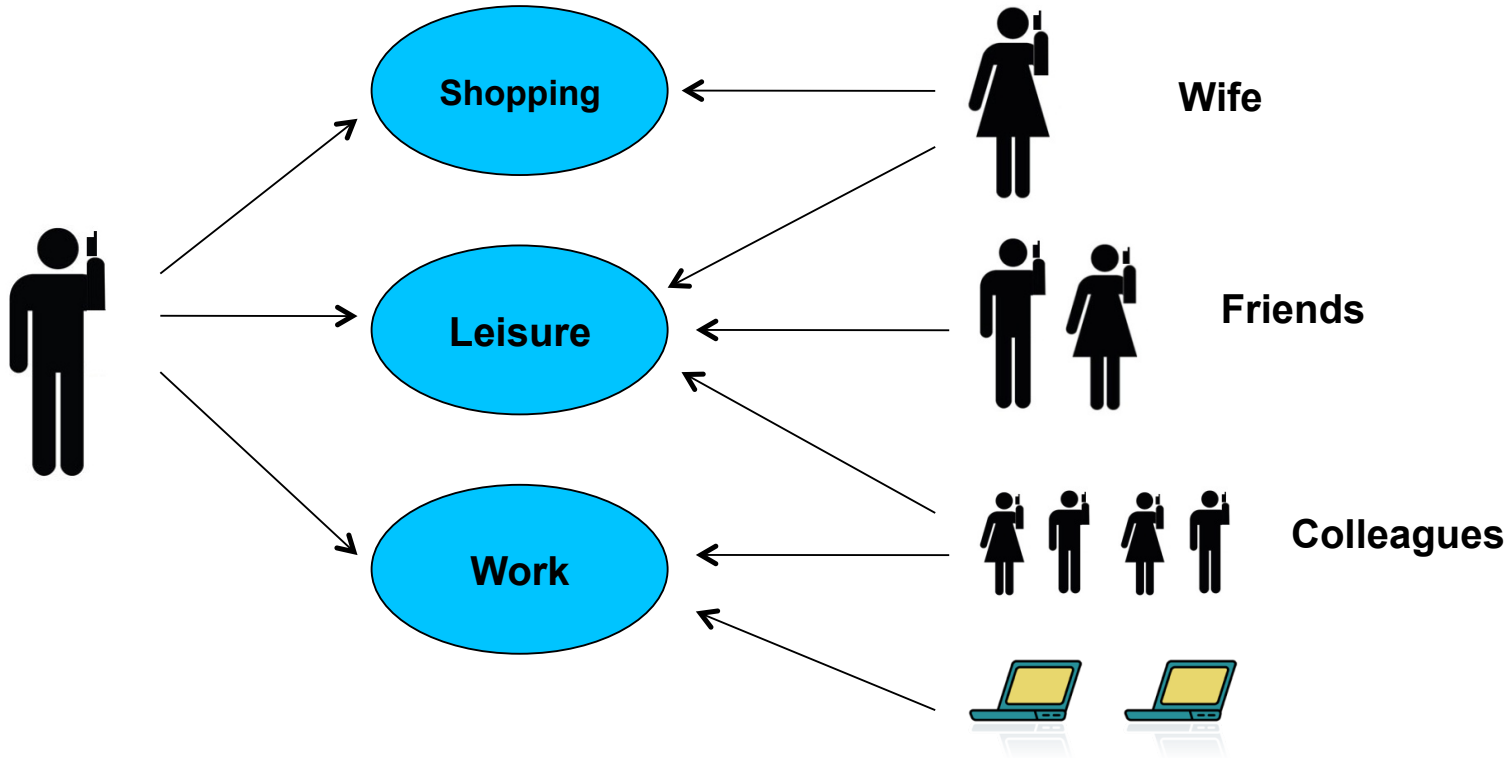
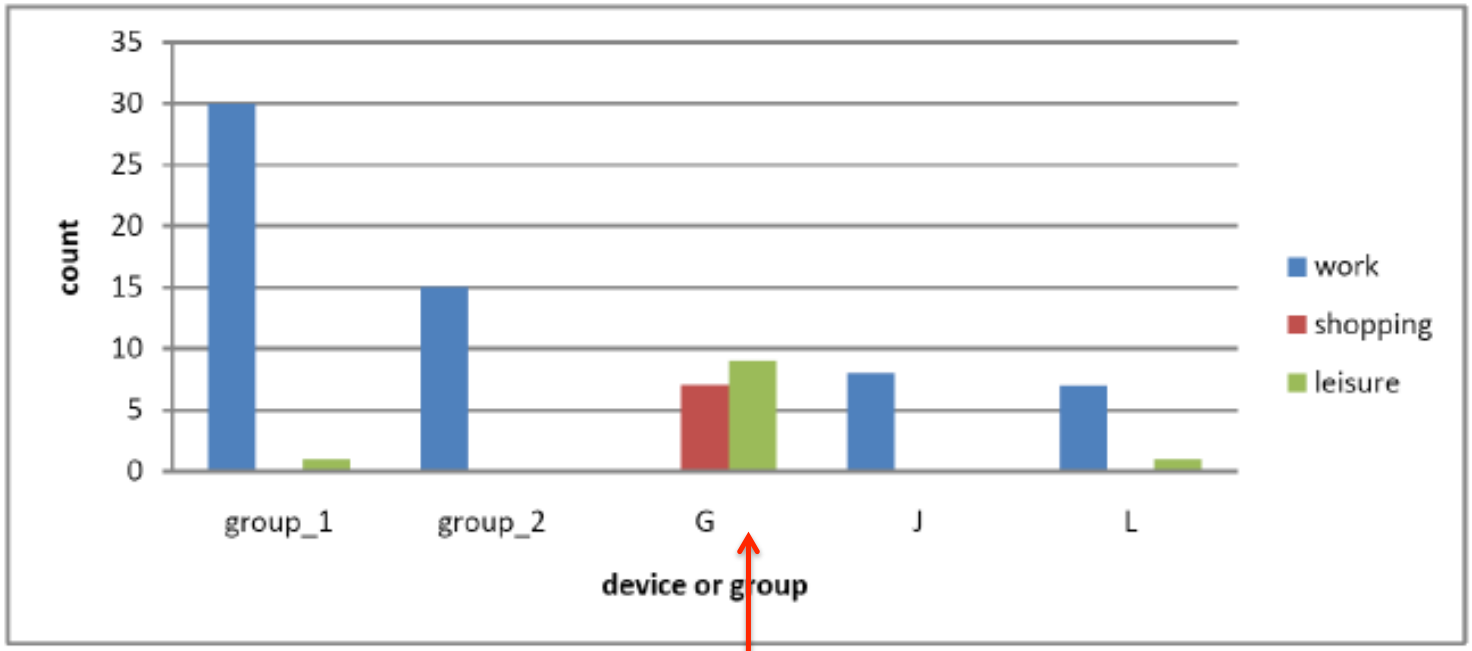
Activity Inference: understanding the environment

- More information from smart phones (e.g. Bluetooth)



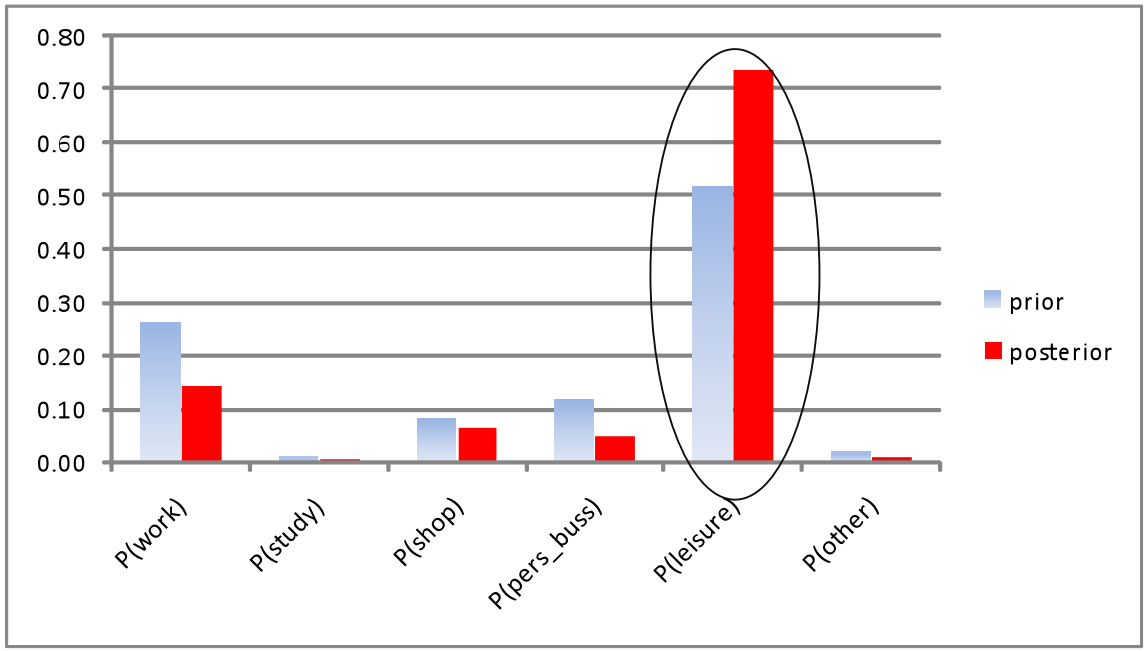
BT-Activity relationship



Wife

Activity Inference: Case study

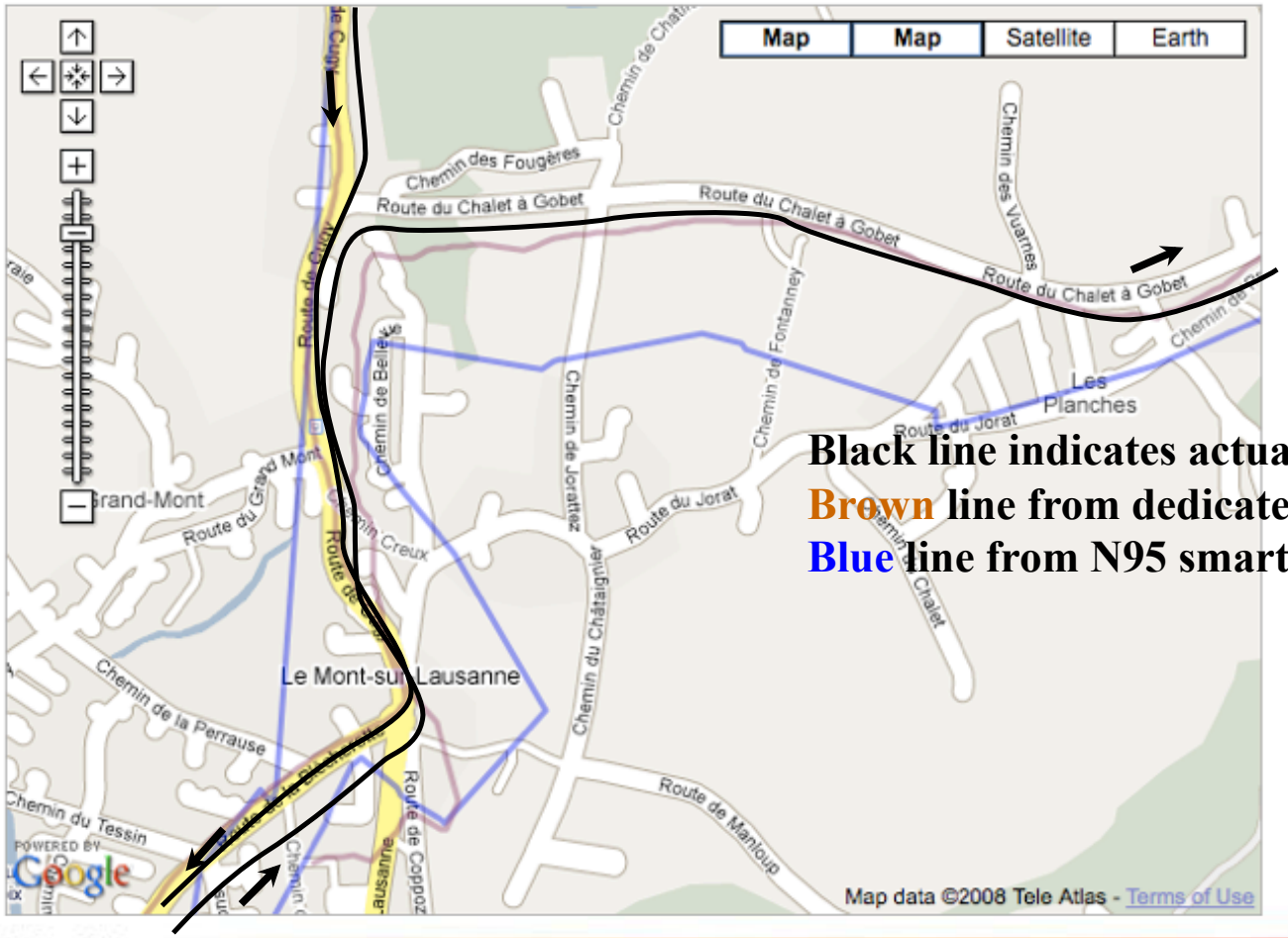
- **A particular event:** Leisure activity performed at work location during afternoon/night



Route Inference: GPS track

Traditional method: map matching

Location (GPS) data from N95 smart phones: sparse and inaccurate



Black line indicates actual path
Brown line from dedicated GPS device
Blue line from N95 smartphne

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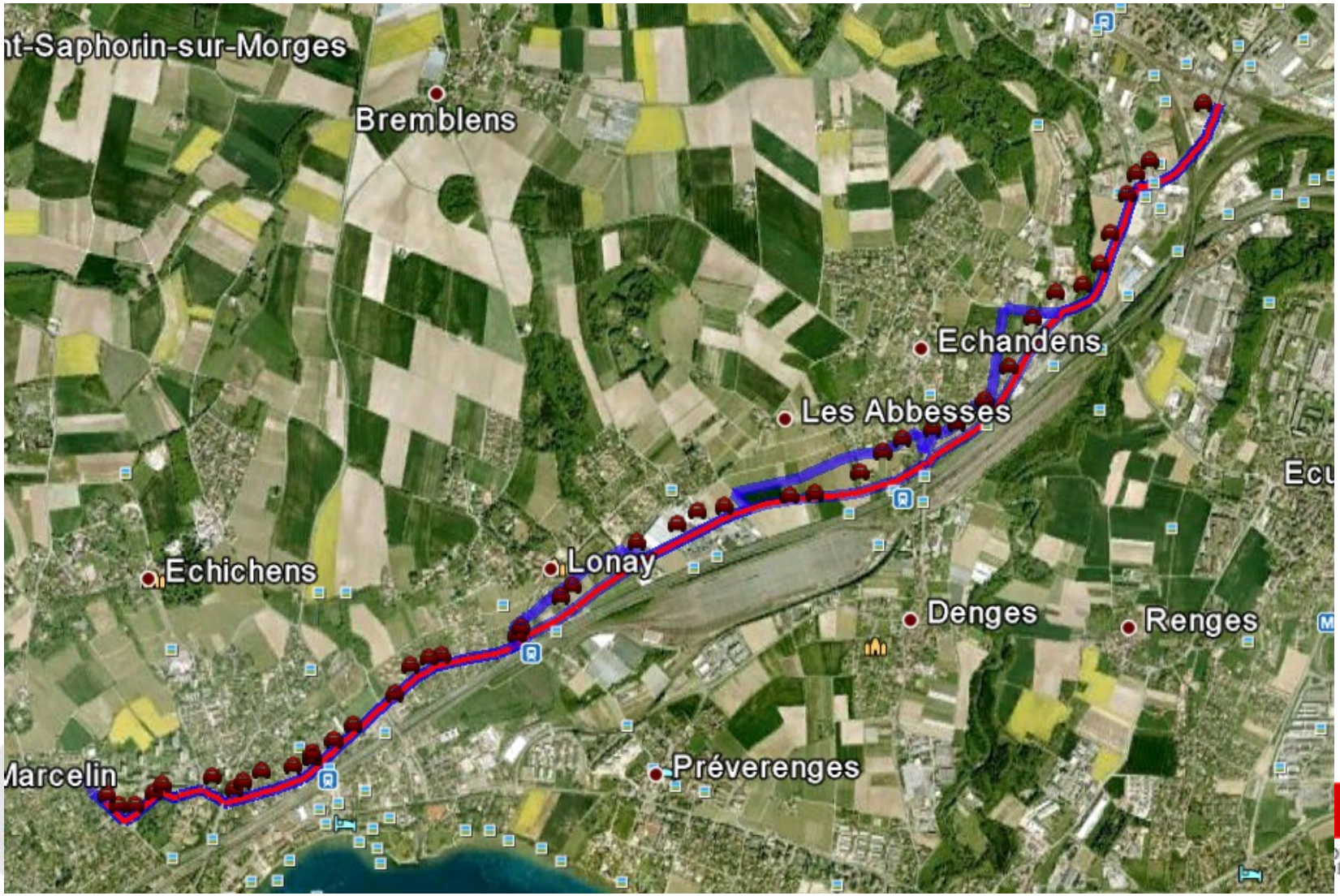
Probabilistic path observation generation



Conclusions

- Mobility is a complex phenomenon
- Behavior plays an important role
- We want to
  - Understand
  - Predict
  - Influence
- Research strategy: combine
  - Advanced mathematical models, and
  - Modern technology