Serial offenders' spatial behaviour: revisiting the marauder/commuter dichotomy

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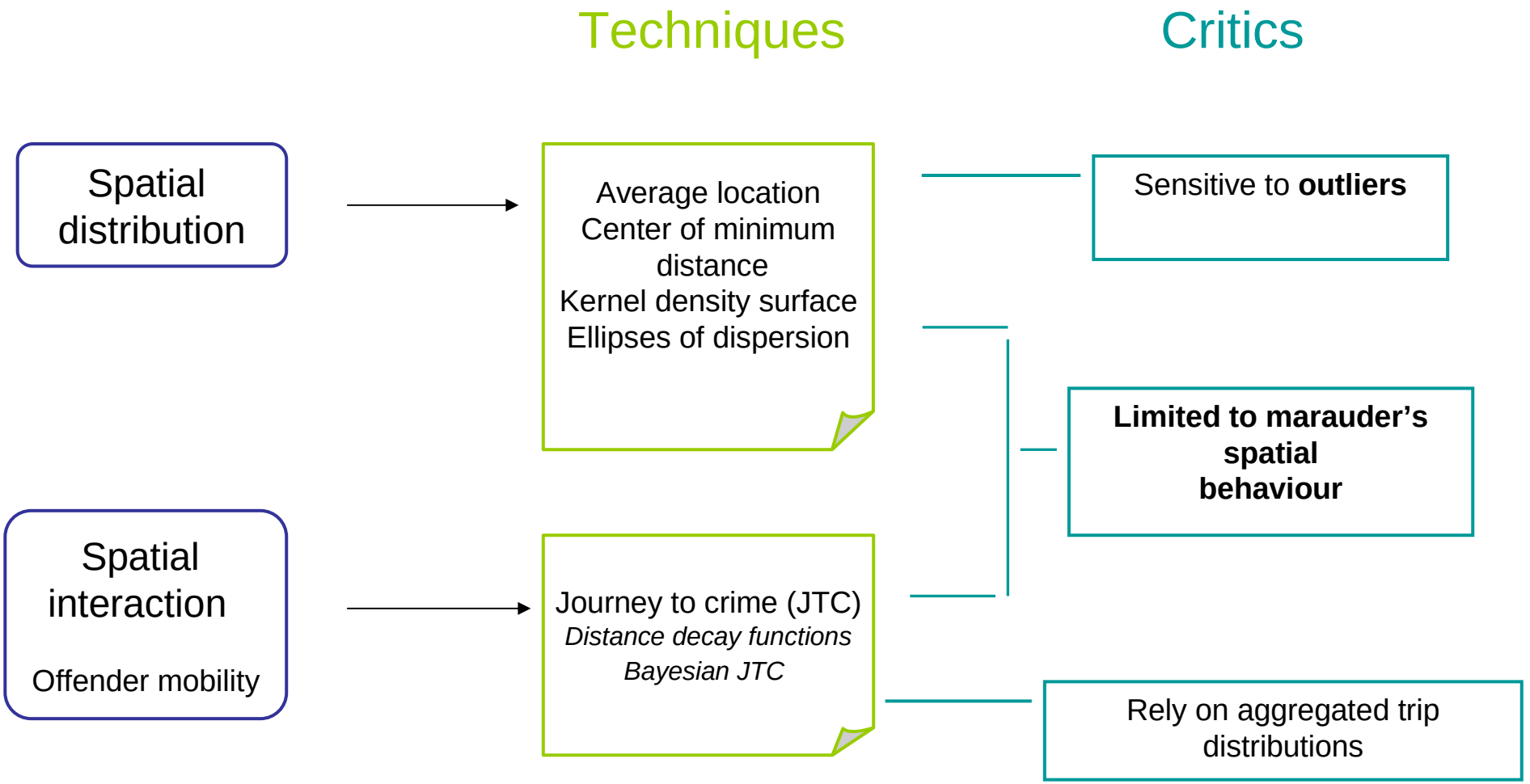
- Geographic profiling

  a **methodology** that uses the location of a **series** of crimes attributed to the same offender in order to determine a search area for his **anchor point**

Spatial distribution and spatial interaction are the two categories of GP methodologies, both limited to the marauder's behaviour !



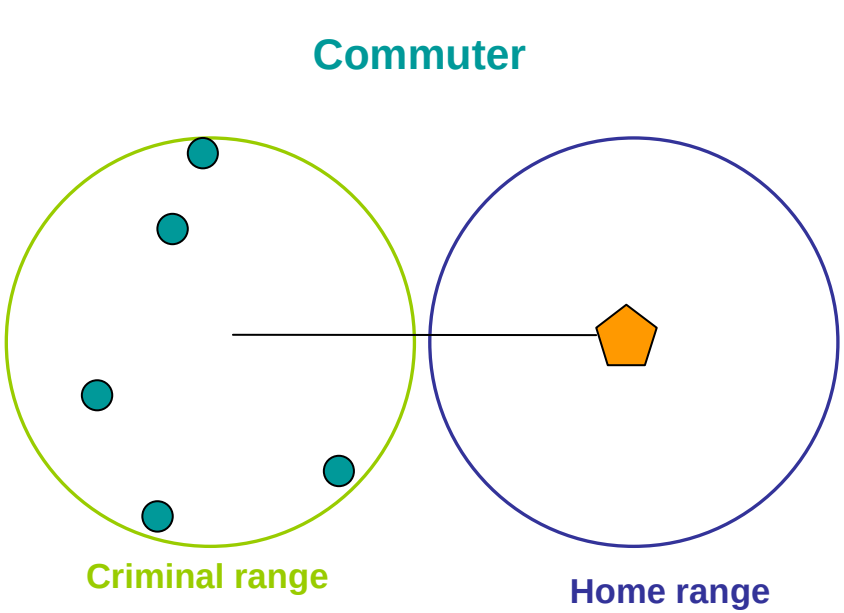
What does a marauder spatial behaviour mean?

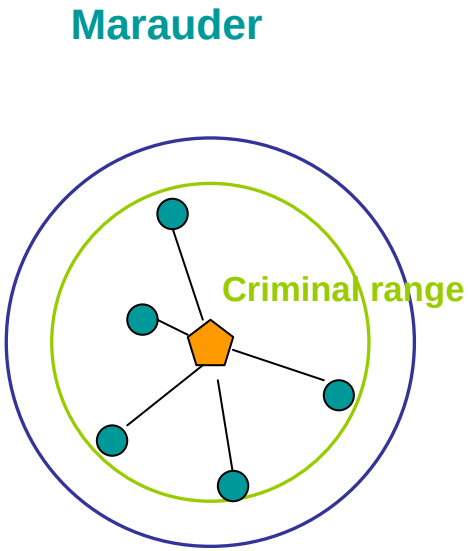
- Several authors made a distinction between mobile and stable offenders

	Geographically mobile	Geographically stable	Criterion for the typology
Ressler et al (1988)	Organized	Disorganized	Level of organisation
Canter & Larkin (1993)	Commuter	Marauder	Link between the home and criminal ranges
Rossmo (1997,2000a,b)	Poacher	Hunter, troller and trapper	Hunting process

Commuter vs Marauder

- The Circle theory





Are we facing a commuter or a marauder's behaviour ?

- Attempts to make this distinction with the elements of the crime scenes

  - Meaney (2004): travelled distance according to
    - Crime types (Burglars > Arsonists >Sex offender)
    - Urbanisation (Metropolitan areas < Rural areas)

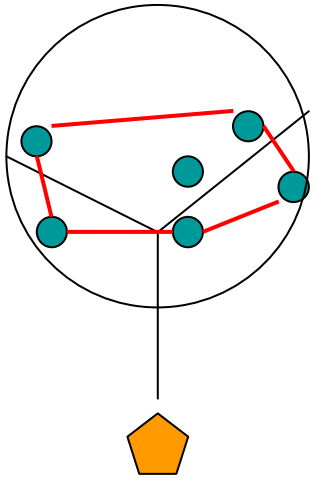
  - Lundrigan (2006):
    - Distance between the two closest offences

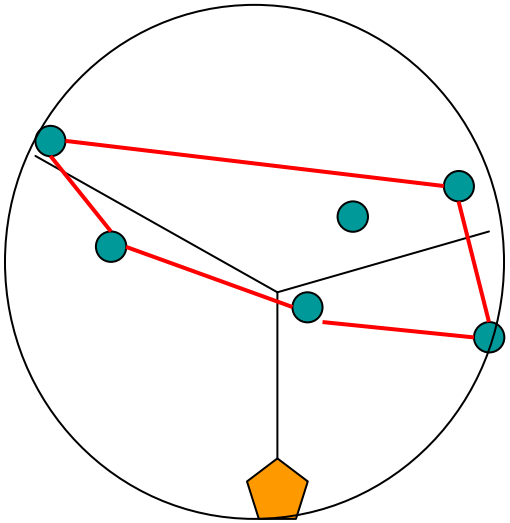
  - Paulsen (2007): geometric and temporal elements
    - Area of the convex polygon : larger for marauders
    - NNI value : more clustered for commuters
    - Days

    ➔Geometric factors are not discriminatory

What does the circle criterion mean here?

- It is more the distance between crimes sites than the relationship between the home range and the criminal range that conditions the distinction





- The hull convex polygon would have given different results

The relationship between home range and criminal range need to be specified

- Assumptions for both the circle hypothesis and the convex polygon:
  - Space is considered as isotrope
  - Euclidean distance is used to shape the home and criminal ranges

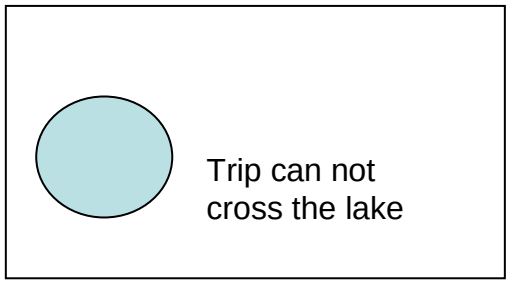
- But :
  - In Economic geography:
    - It is **covered distance**, even **time** or **cost distance** that shape the "**home range"**
  - In criminal activities:
    - Cost can be considered as

f (time spent, risk to be recognised or caught, reward)

➔ **The home and the criminal range should be seen as surfaces model by this cost distance**

The cost distance takes into account the influence of the environment on trips

- Constraints (binary variable): limit the directions
  - Barriers (natural or anthropogenic)
  - Presence of potential targets

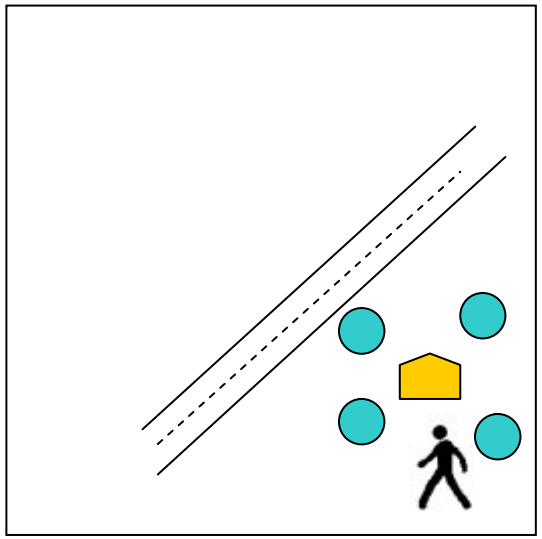


- Factors : increase or decrease the perceived distance
  - Accessibility of the sites
  - Risk to be seen or catch

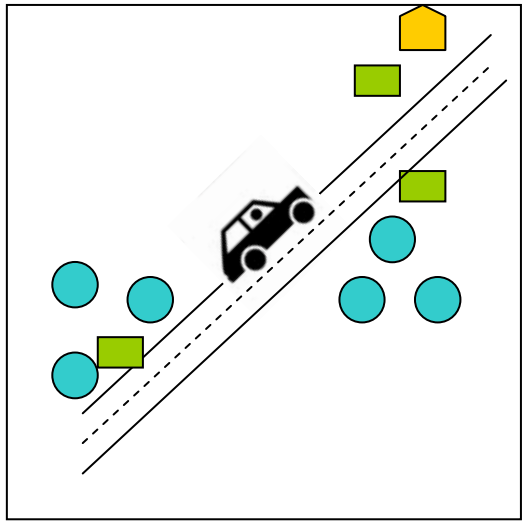
Barriers vary according to the mode of transportation

- Identification of the barriers is crucial as it help
  - Not only to determine the directions where the distance decay functions should be applied
  - But also to identify the mode of transportation
    - ➔ offender travelling by car has more chance to commute

Pedestrian : the highway is a barrier

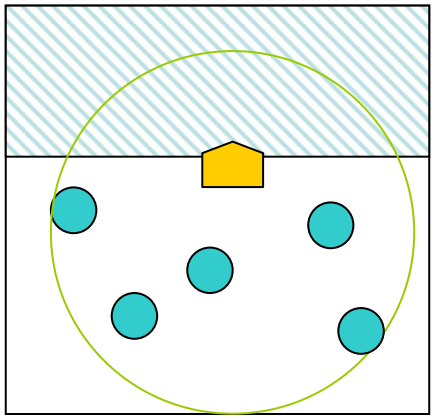


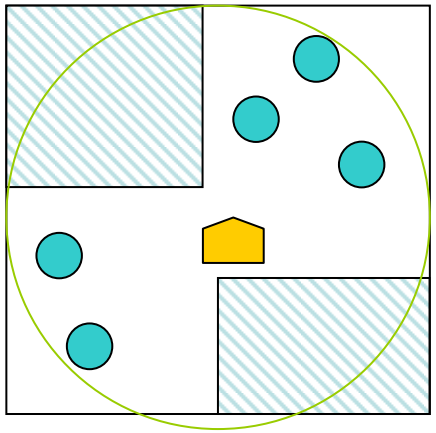
Car: the highway increases accessibility



Highway exit

Is the distribution of crimes influenced by attraction sites or by an uneven distribution of targets?





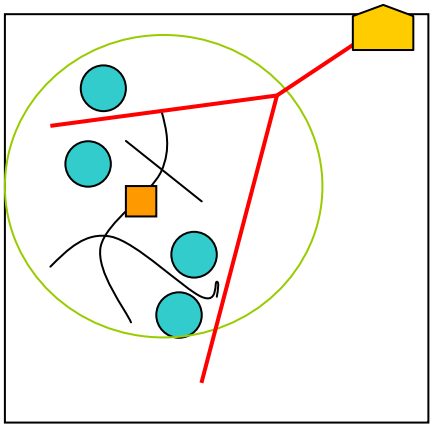
➔ If choice of some specific (more interesting) places, probably less relationship between the home and the criminal ranges

! The distribution is function of the limits of the analysed environment

Accessibility: do major roads influence the journeys?

- Assumption:
  - In order to travel longer distances, an offender will chose a fast way at least for the major part of his way
  - An offender who is travelling outside is “home range” has a bad knowledge of the environment, he does not stray too far from the fast track
- Creation of an index

$$\frac{\textit{Mean distance to major roads } (>70km/h)}{\textit{Mean intercime distance}}$$



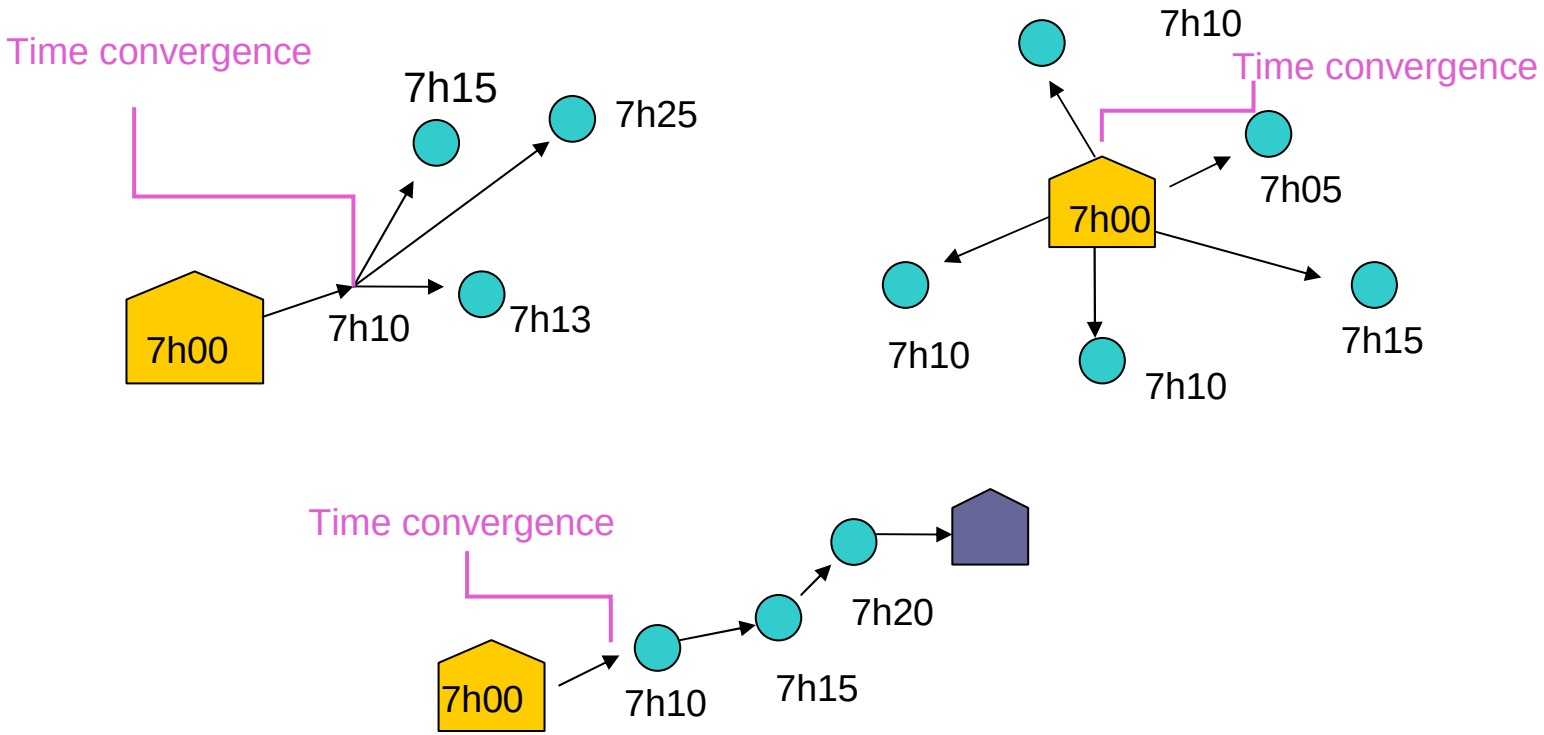
If there is an influence of these roads:
Mean distance to major road << Mean intercrime distance

Exception: The index does not work if the offender travels to a single well-known area

How can we complement the analysis with temporal information?

Small timeslots allow to go further in the analysis

- Assumption : the offenses are conditioned by the routine activities



Conclusions

- The commuter/marauder distinction is still crucial to know if GP methodologies can be applied
- Cost distance shape the home and criminal ranges and then modify the way to consider their relationship
- Spatio-temporal relationships help to describe the possible overlap between the home range and the criminal range

Perspectives

- Development of a search methodology based on cost distance
  - Identification of the barriers to moving
  - Estimation of the travel time: traffic conditions, …
  - Evolution of the targets through time (potential attractive areas may vary with hours, weekday, special events)

➔ Gis technique to analyse time-space convergence on anisotropic space

Any question?

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