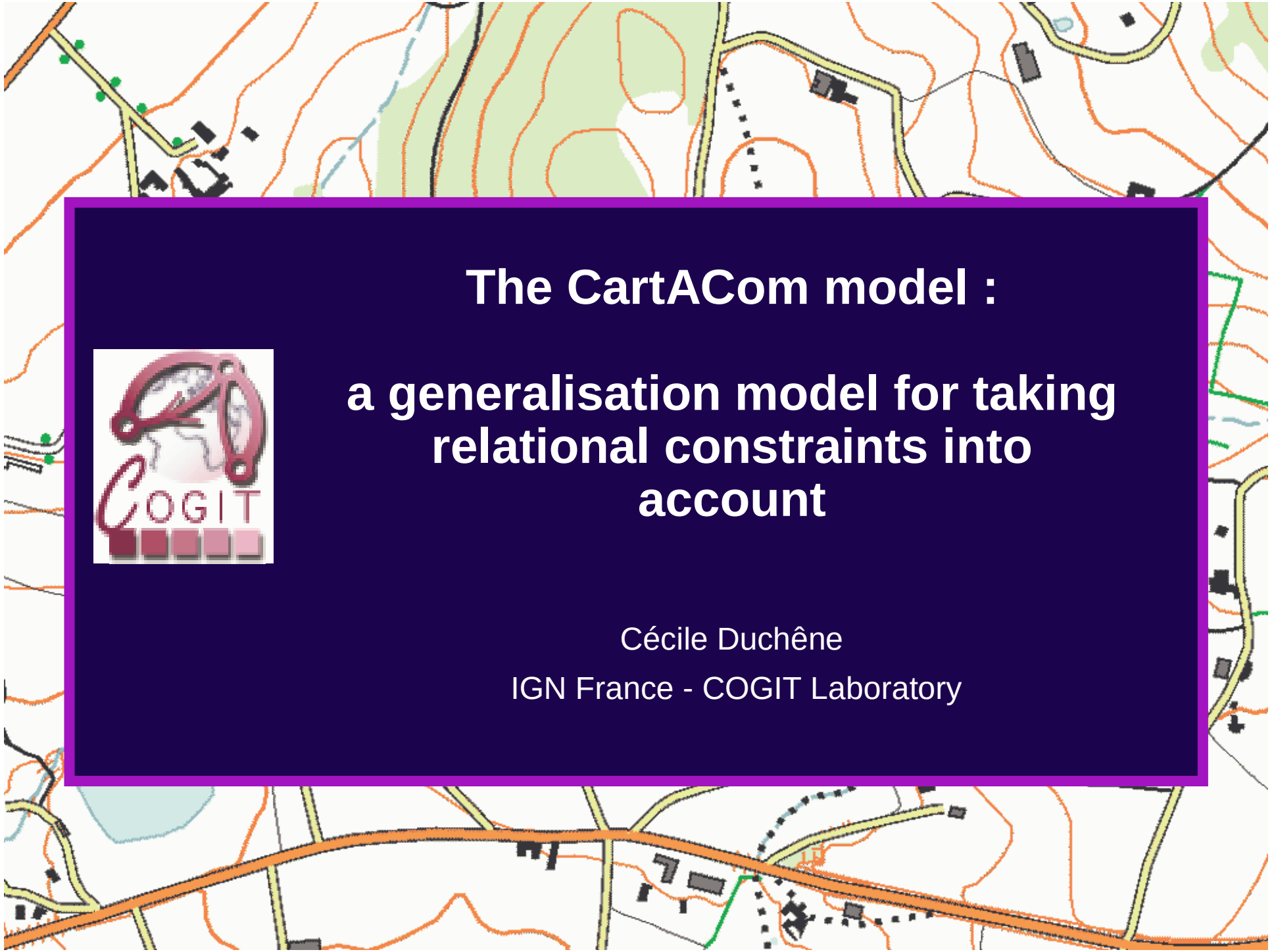


The CartACom model :

a generalisation model for taking relational constraints into account

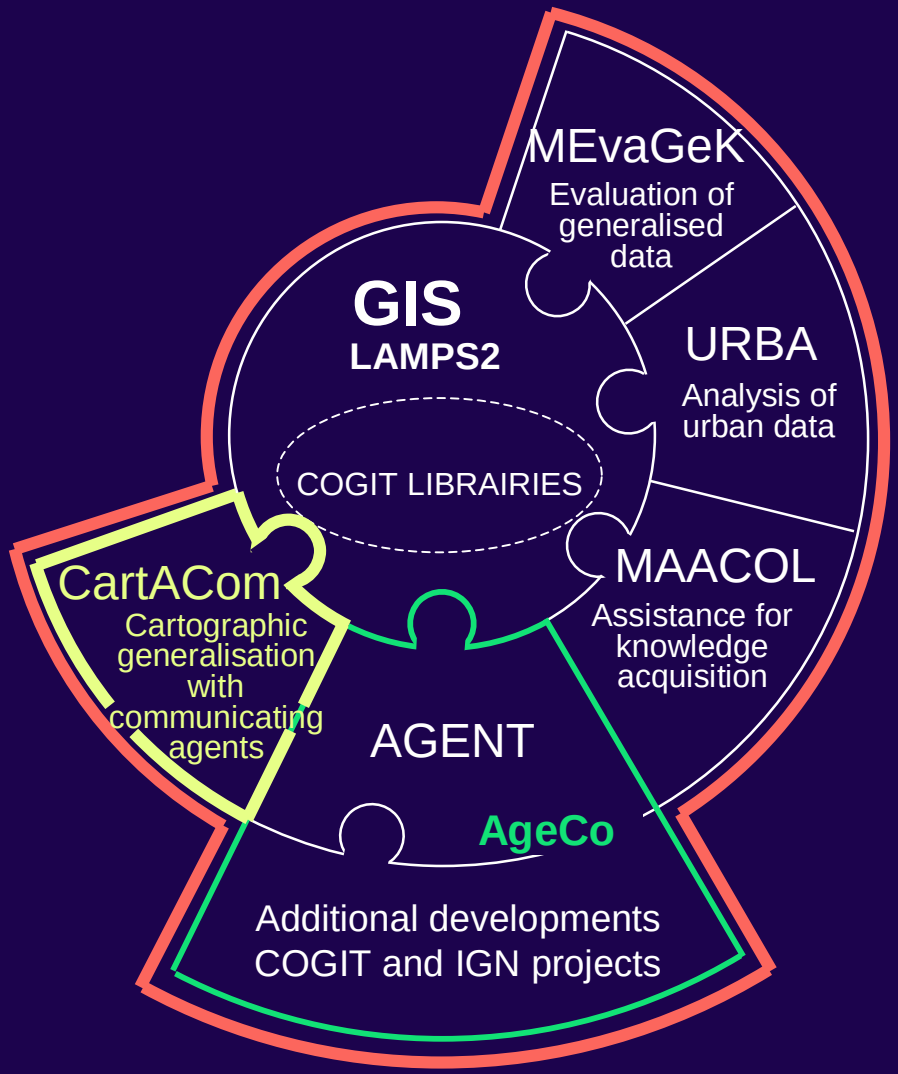
Cécile Duchêne

IGN France - COGIT Laboratory

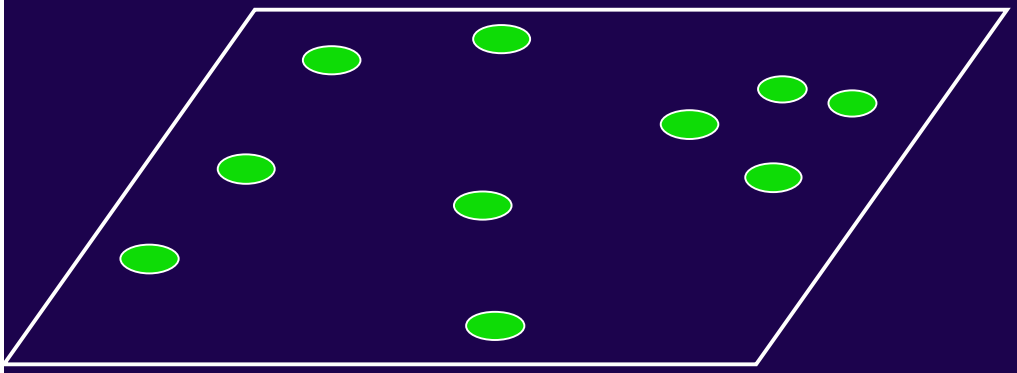
This presentation in the context of AGIT

AGIT :

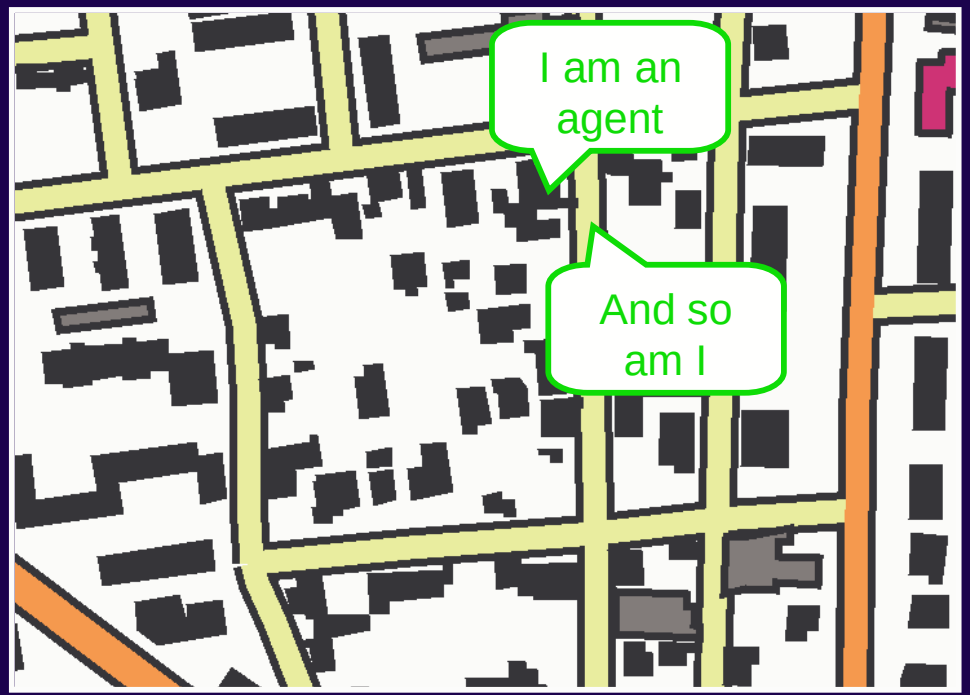
COGIT laboratory's platform for research and studies in generalisation



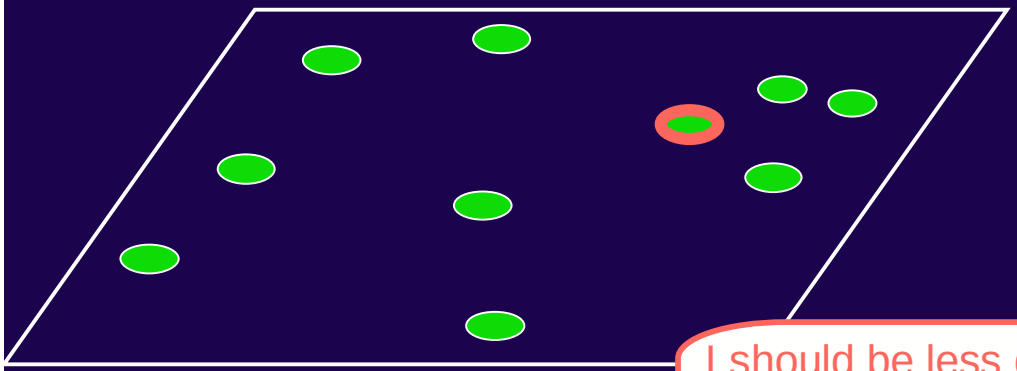
Context: the AGENT model [Ruas 1999; AGENT 2001]



Geog. objects modelled as agents

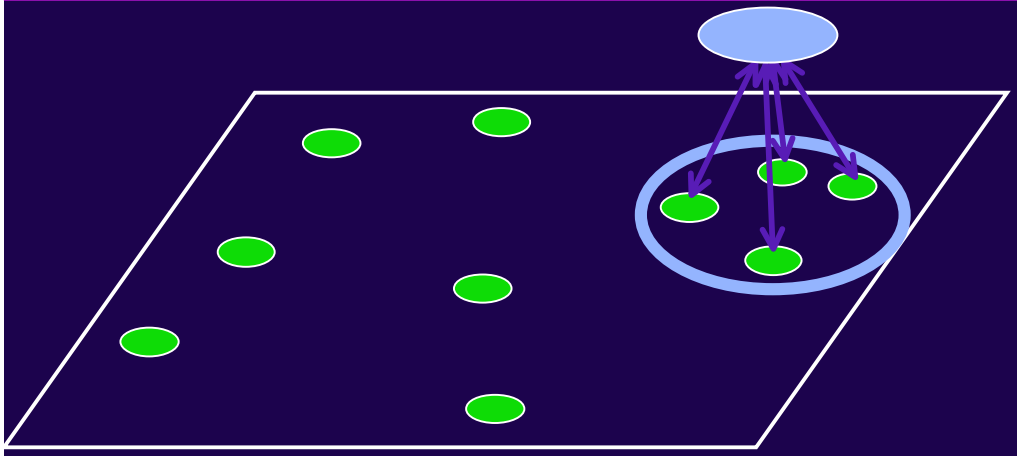


Context: the AGENT model [Ruas 1999; AGENT 2001]



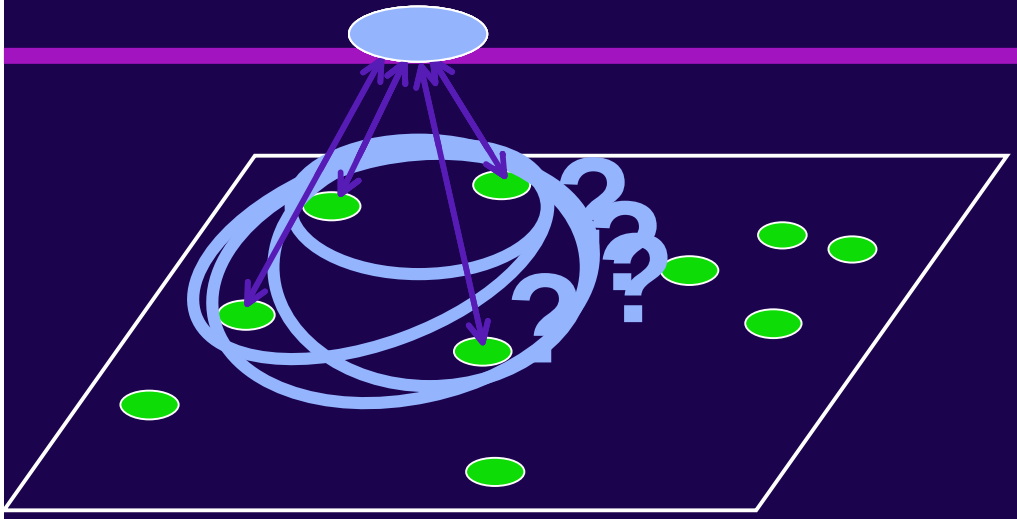
Geog. objects modelled as agents guided by constraints

Context: the AGENT model [Ruas 1999; AGENT 2001]



Geog. objects modelled as agents
guided by constraints
"meso" level of analysis

Limits of the AGENT model



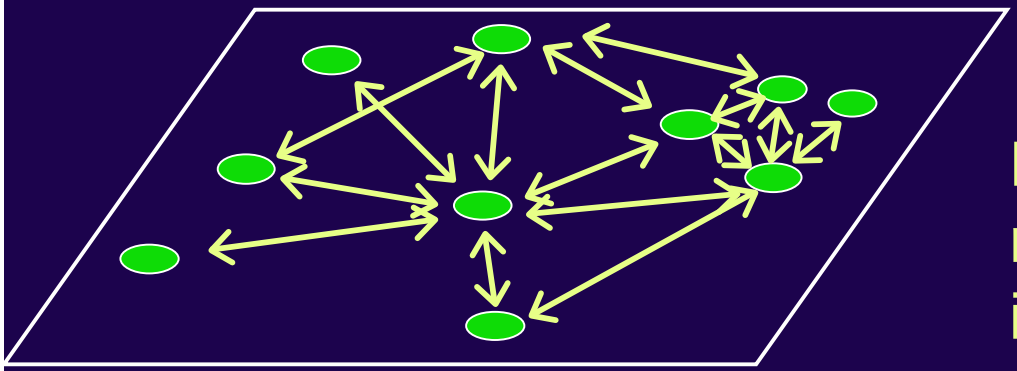
In rural areas:

– No natural hierarchy
  ⇒ no obvious meso

– Geog. themes are more various

– Conflicts are more local
  more various

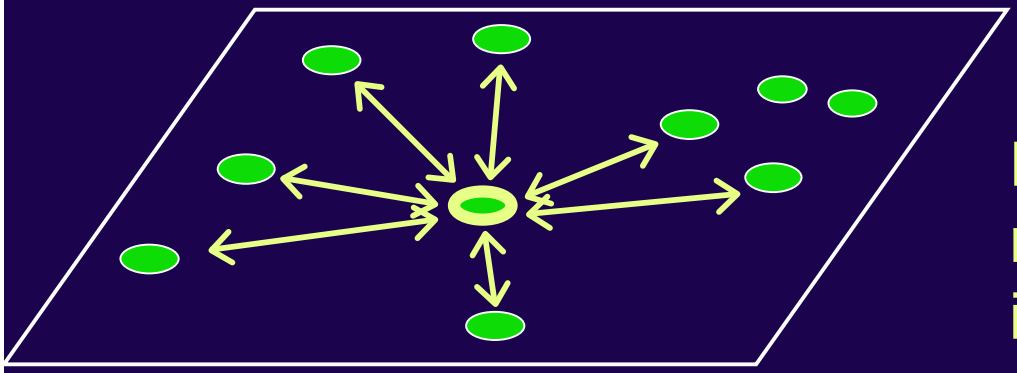
Objective



Objective :

Propose a generalisation model based on transversal interactions between agents

Objective



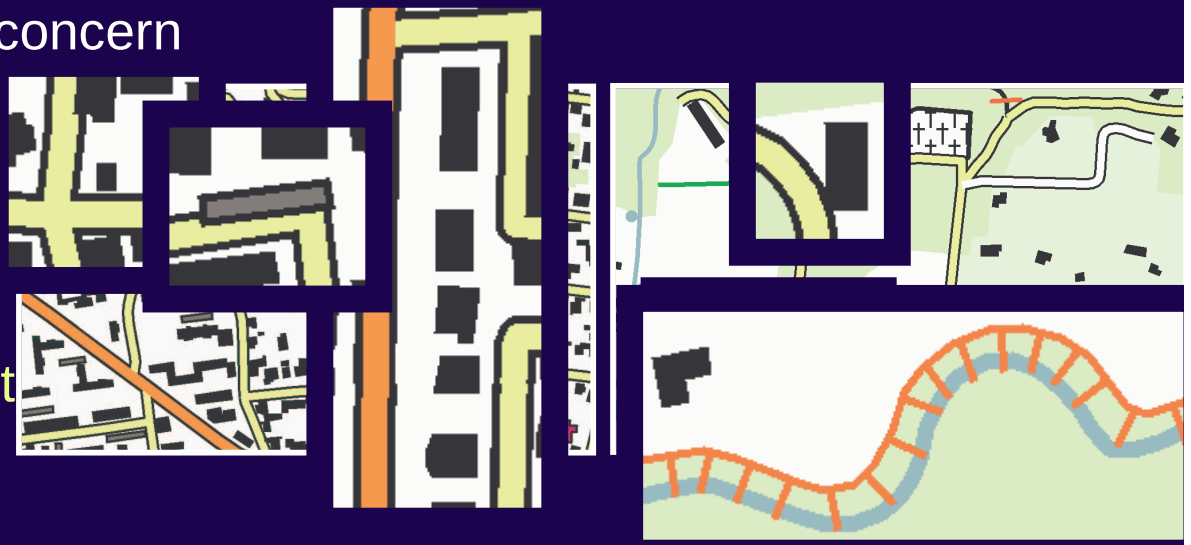
Objective :

Propose a generalisation model based on transversal interactions between agents

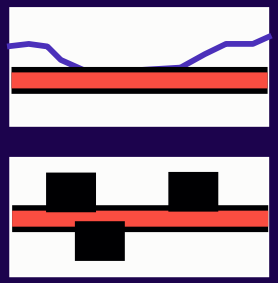
Principle 1 : Consider relational constraints

A cartographic constraint can concern

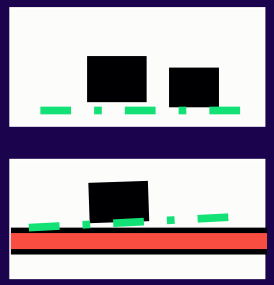
- An object
- A group of objects
- A relation between two objects : relational constraint



Legibility

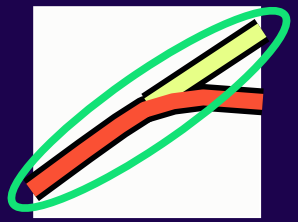


Symbol overlap

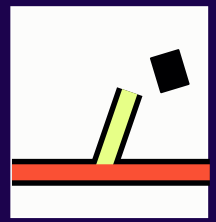


Near parallelism
Near alignment

Preservation of relations

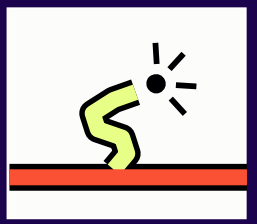


Alignment



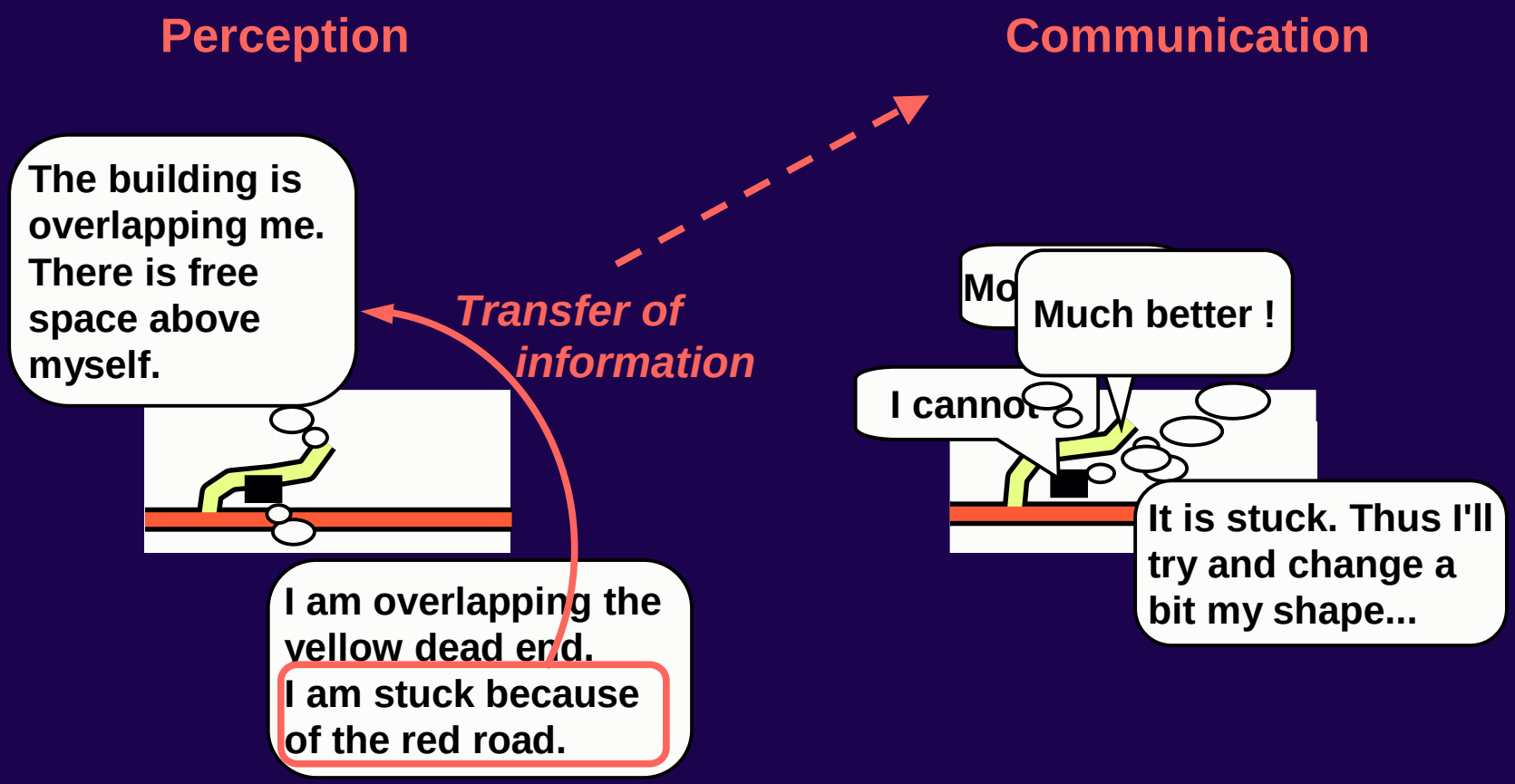
Relative position (a the end, on the right)

Geographic coherence



Serving

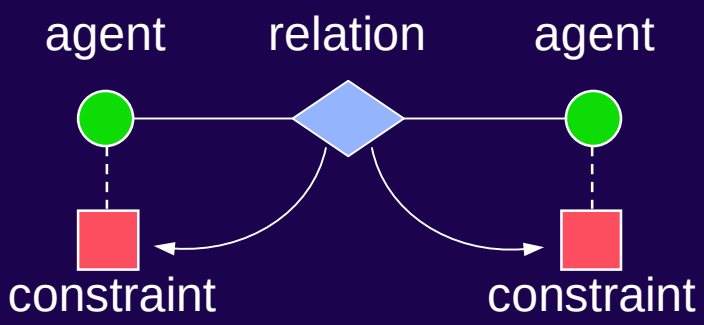
Principle 2: agents see and communicate

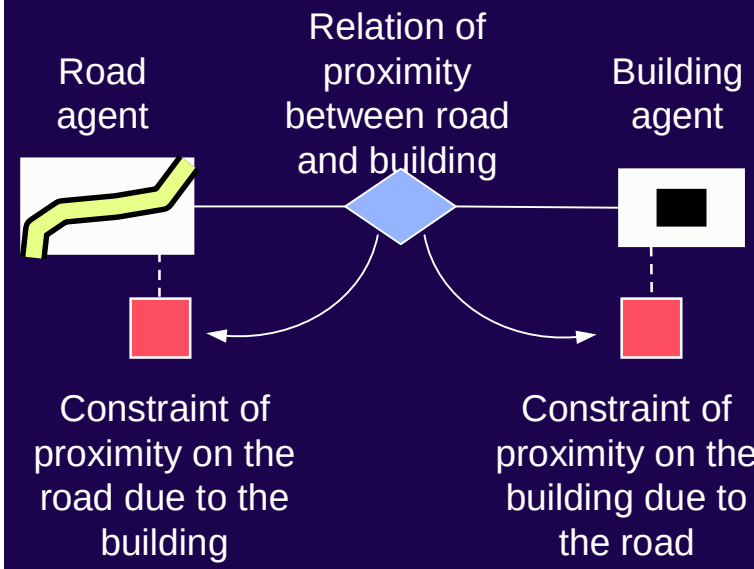


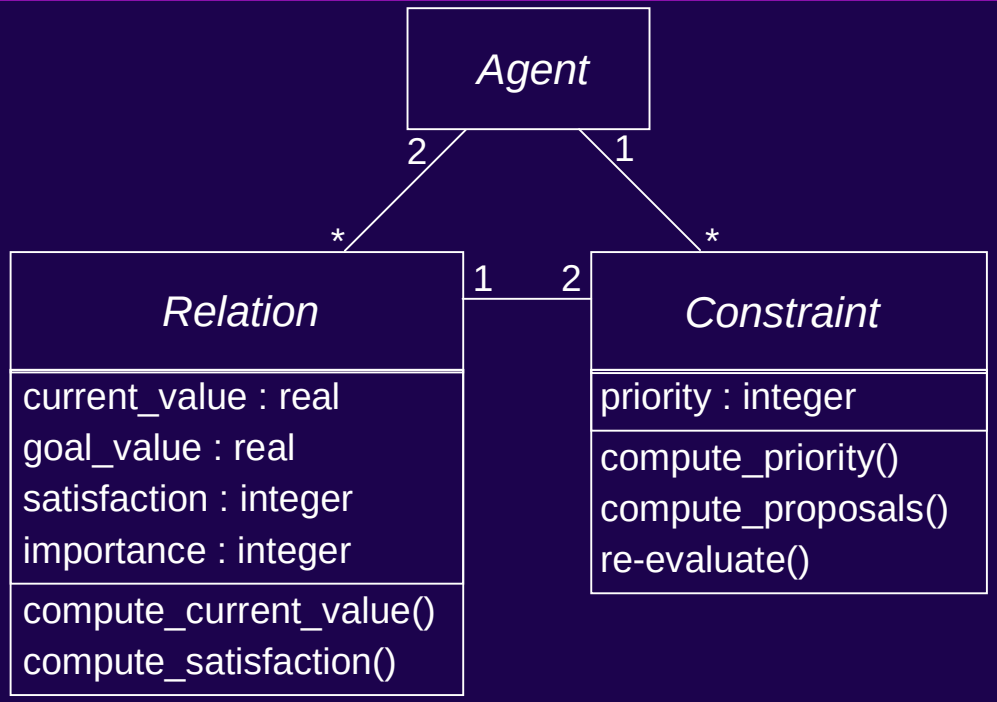
Main novelties in the model since last year

- A generic model to represent the relational constraints
- A generic behaviour of the agents, guided by their relational constraints
- Two new generic operations:
  - Self-elimination
  - Propagation of deformations to the topologically connected agents

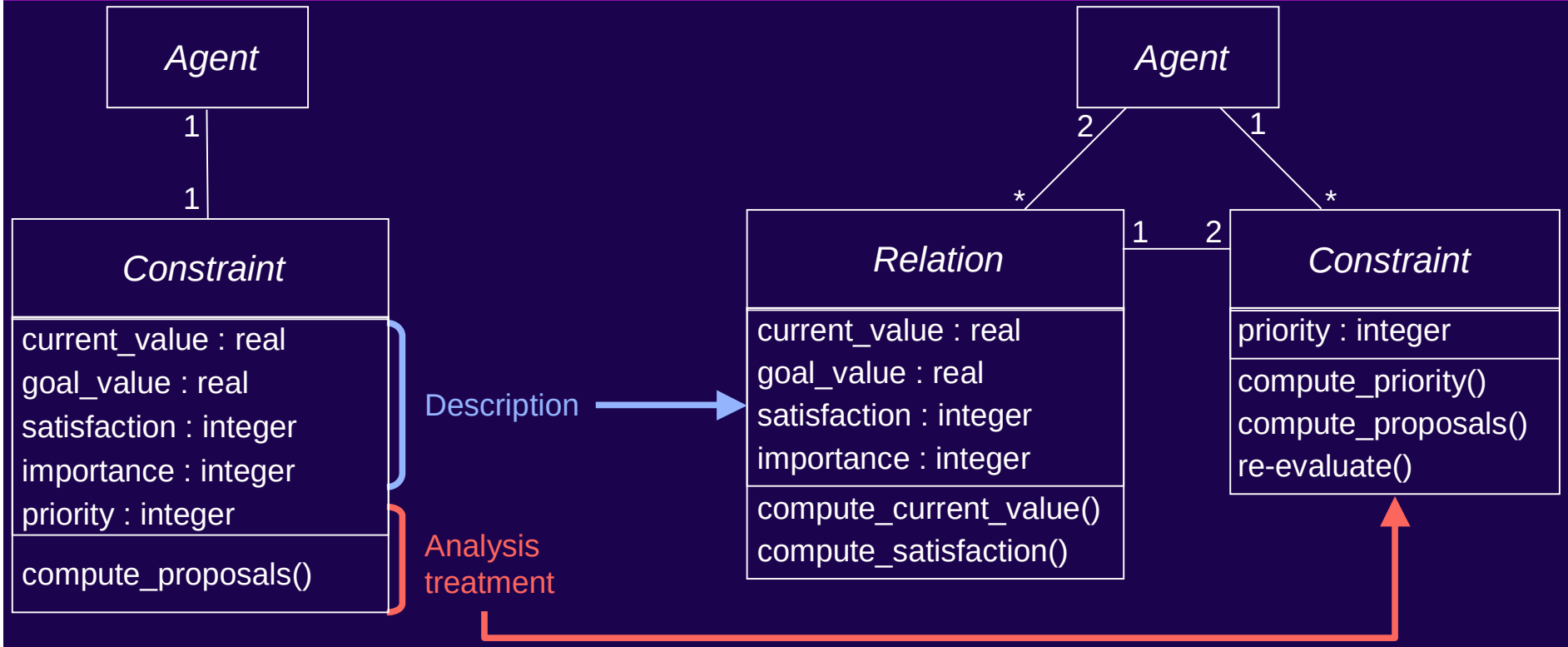
Modelling relational constraints







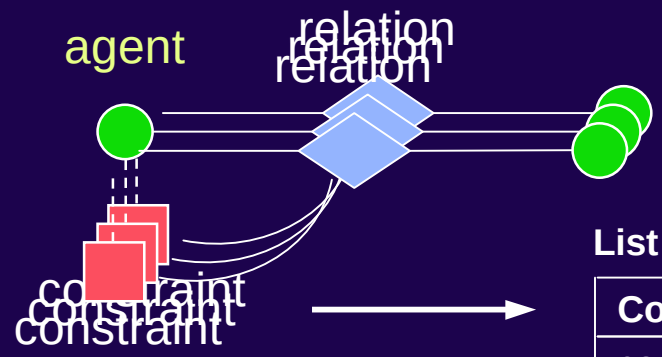
Modelling relational constraints



AGENT model

CartACom model

Use of relational constraints



List of possible actions

Constraint	Who acts	Algorithm	Parameters
contrainte1	me	algo1	param1
contrainte2	the other	algo2	param2
contrainte3	me	algo3	param3

Constraint
priority : integer
compute_priority() compute_proposals() re-evaluate()

Apply a generalisation algorithm to oneself :
name, [parameters]

Ask the other agent to apply a generalisation algorithm to itself :
nom, [parameters]

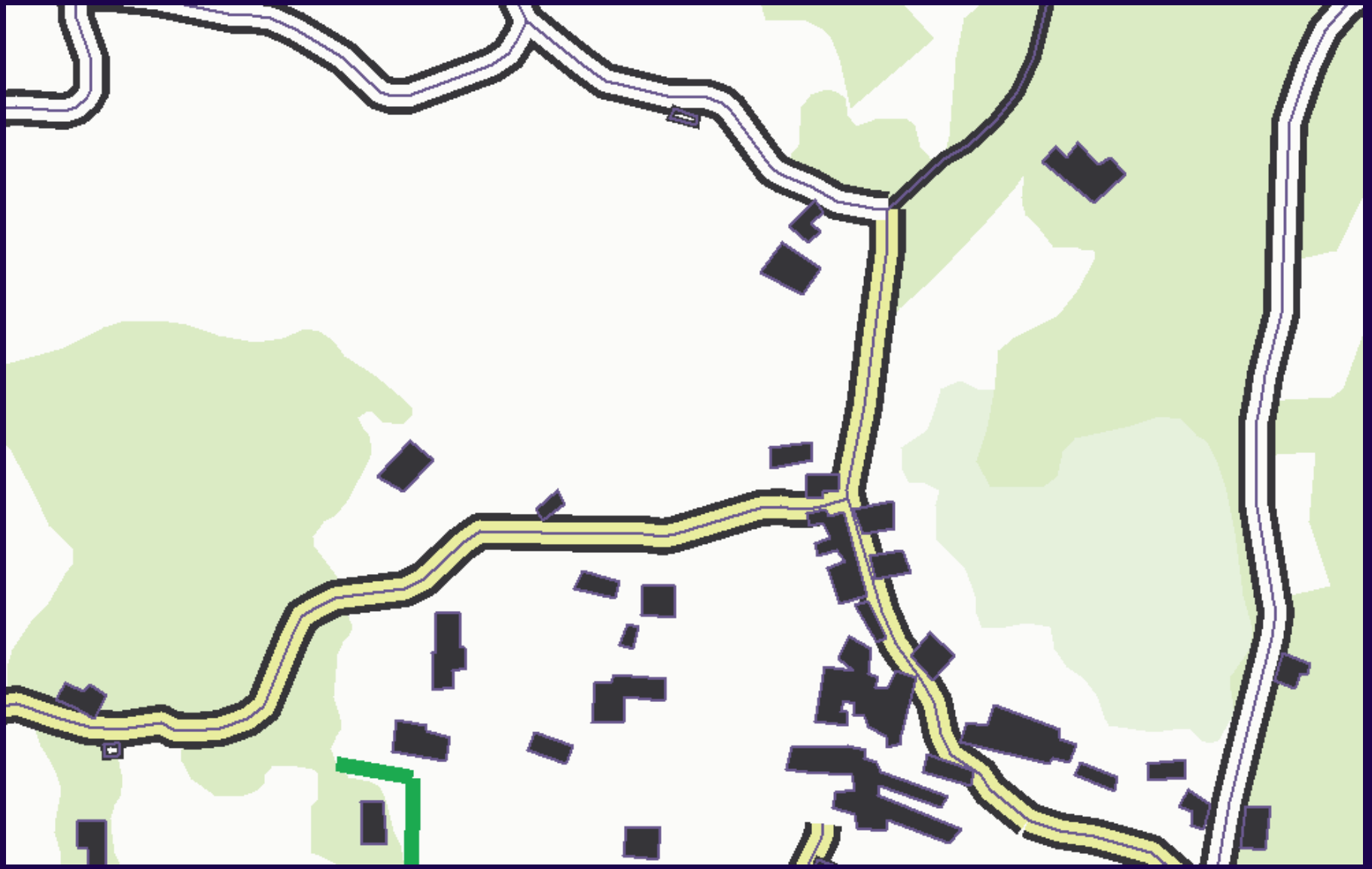
Working example

- Hamlet *Les Boyers* (close to Aix-en-Provence)
- 49 handled agents :
  - 9 roads
  - 1 footpath
  - 35 buildings
  - 4 topological faces bounded by networks
- 19 "following" agents
  - 2 hedges
  - 17 land use parcels
- Some data on execution
  - Execution time : 63s
  - 178 activations of agents
  - 431 conversations : 37 requests for action, 394 information

Working example

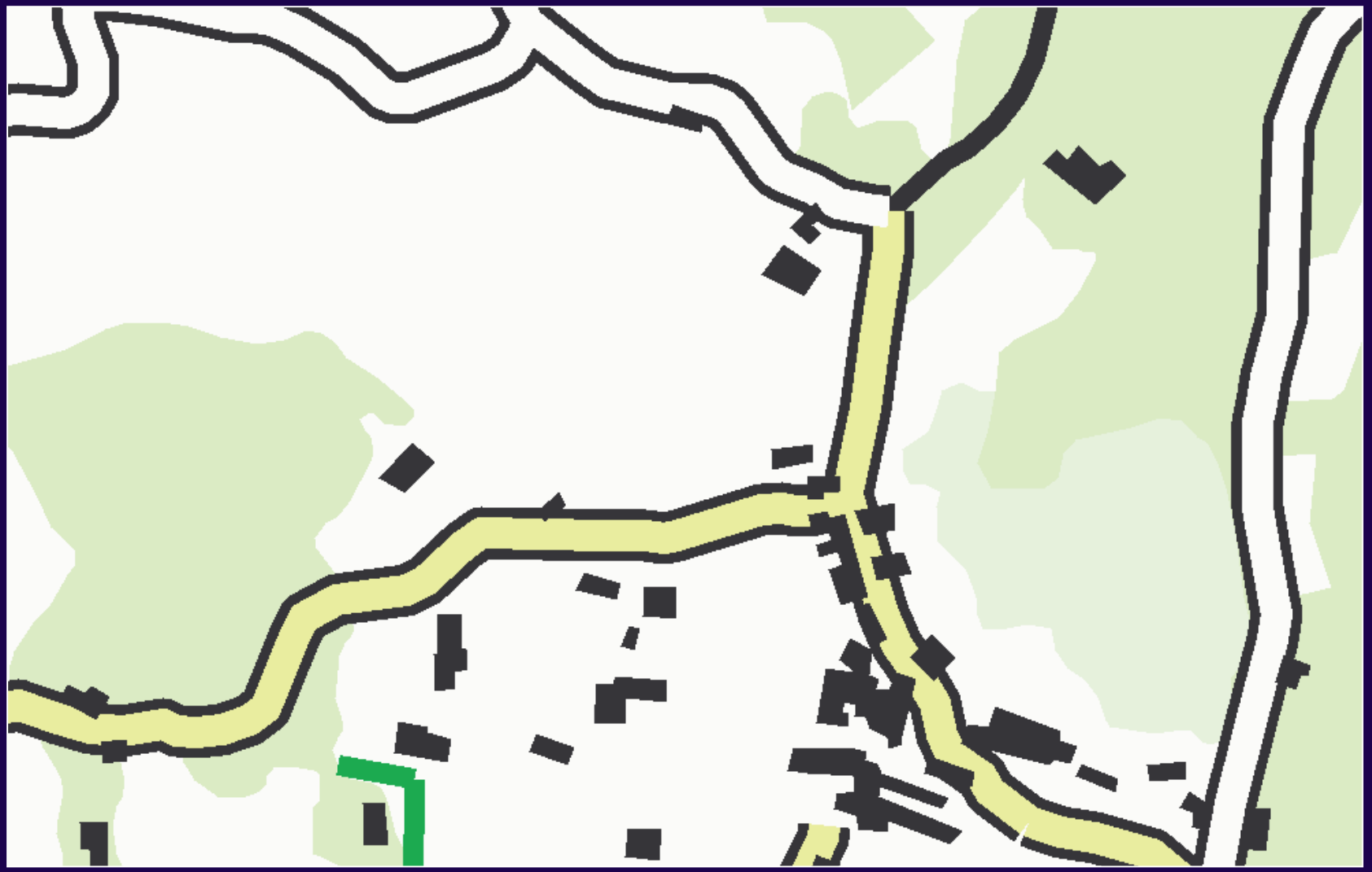
- Considered relational constraints:
  - Non overlapping
  - Preservation of relative position (road-building)
  - Exaggeration of parallelism (road-building)
- Used operations
  - Buildings: displacement, rotation, self-elimination
  - Roads and buildings: internal generalisation (AGENT plug-in)

Working example



Other results - high density of buildings

Scale 1 : 35 000



Other results - high density of buildings

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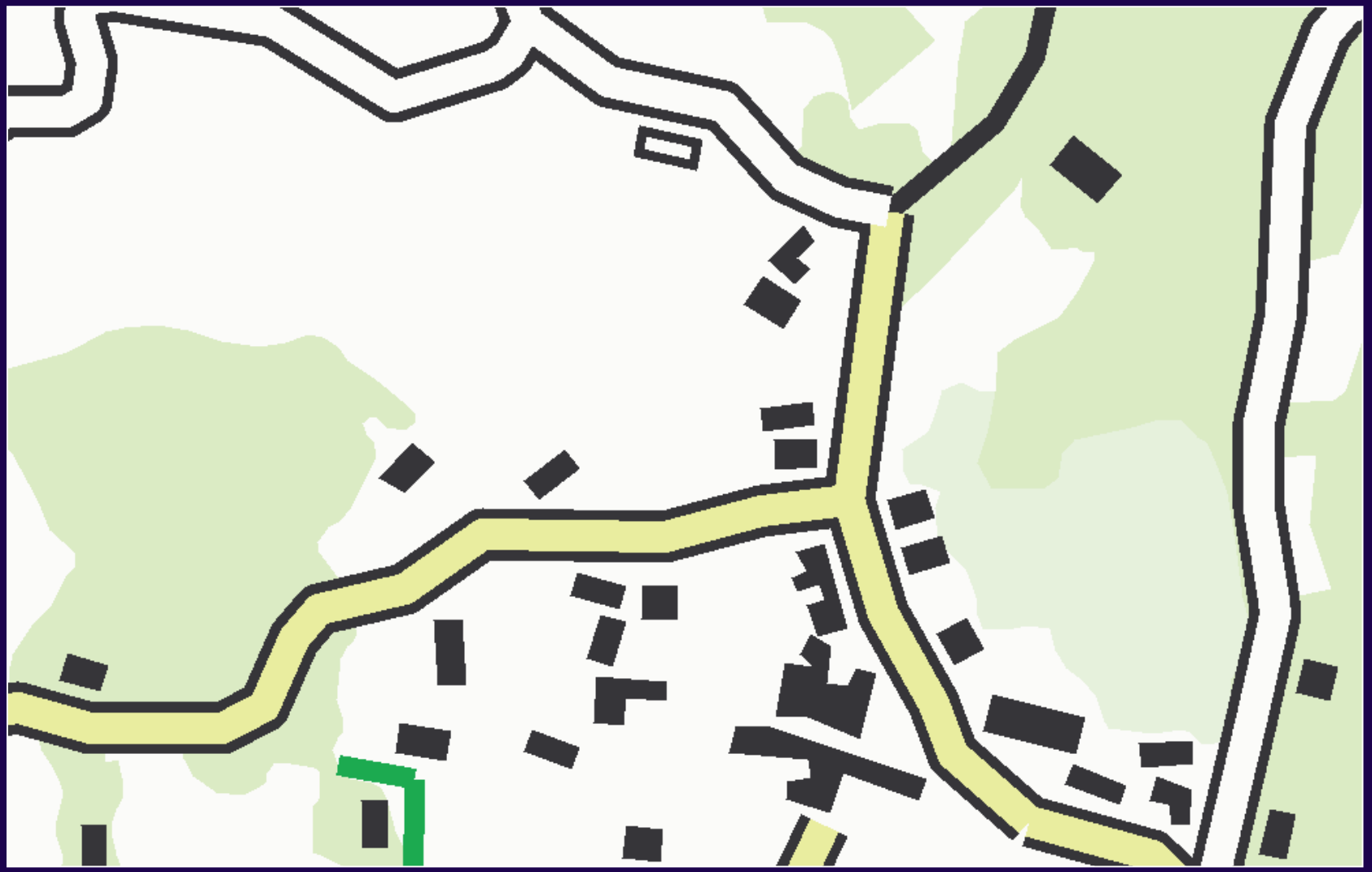
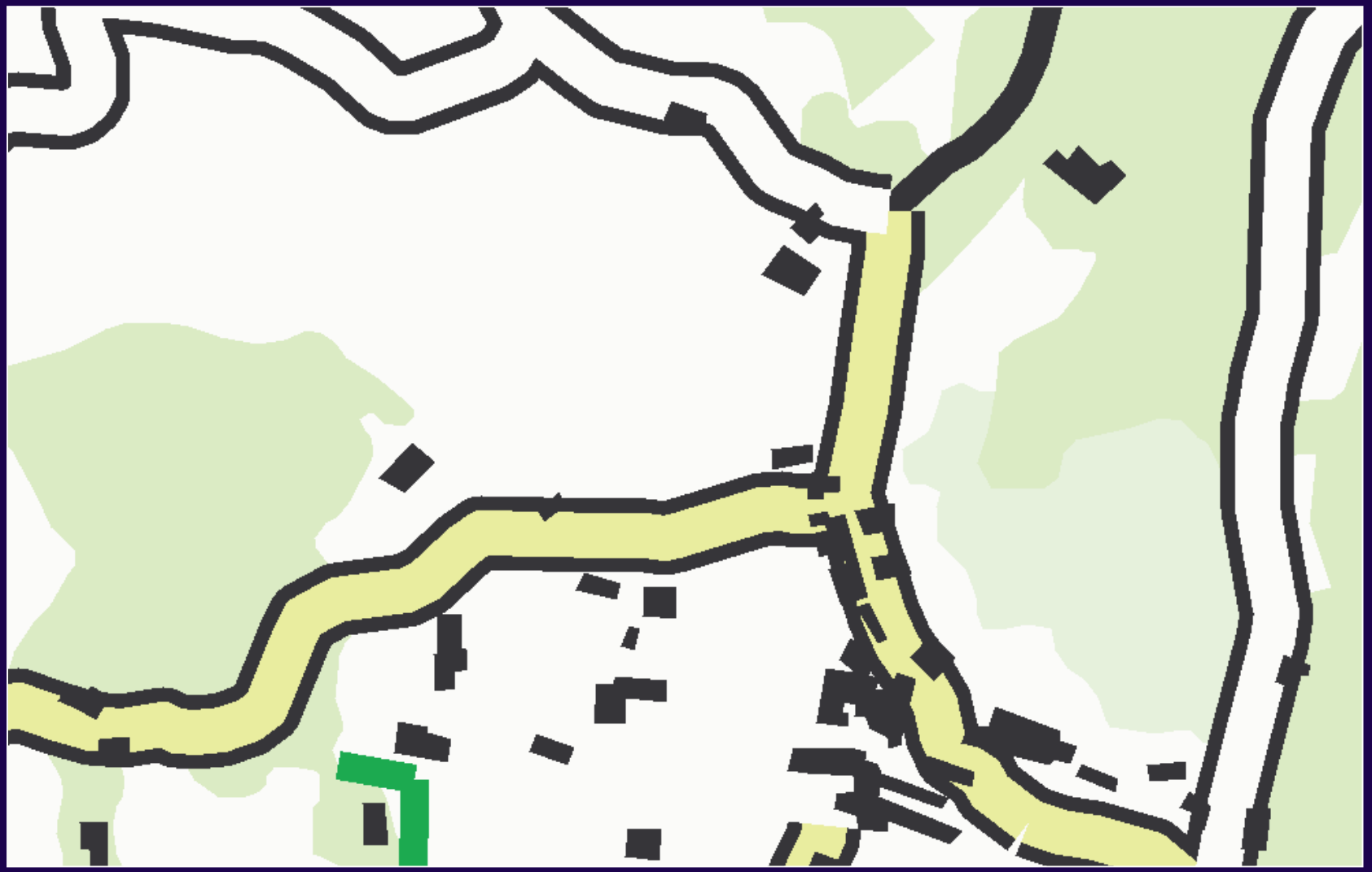


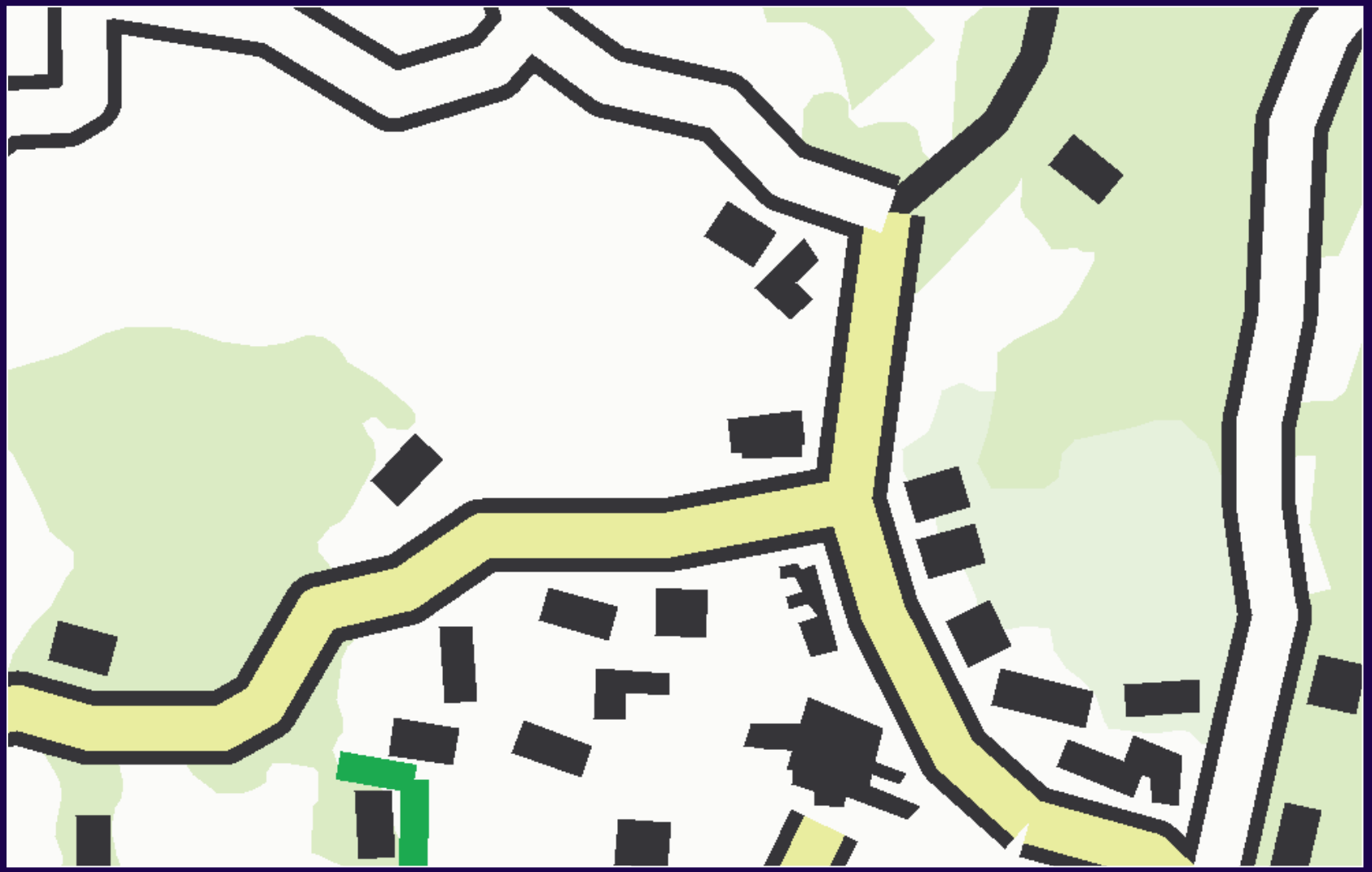
Other results - high density of buildings

Scale 1 : 50 000



Other results - high density of buildings

Scale 1 : 50 000

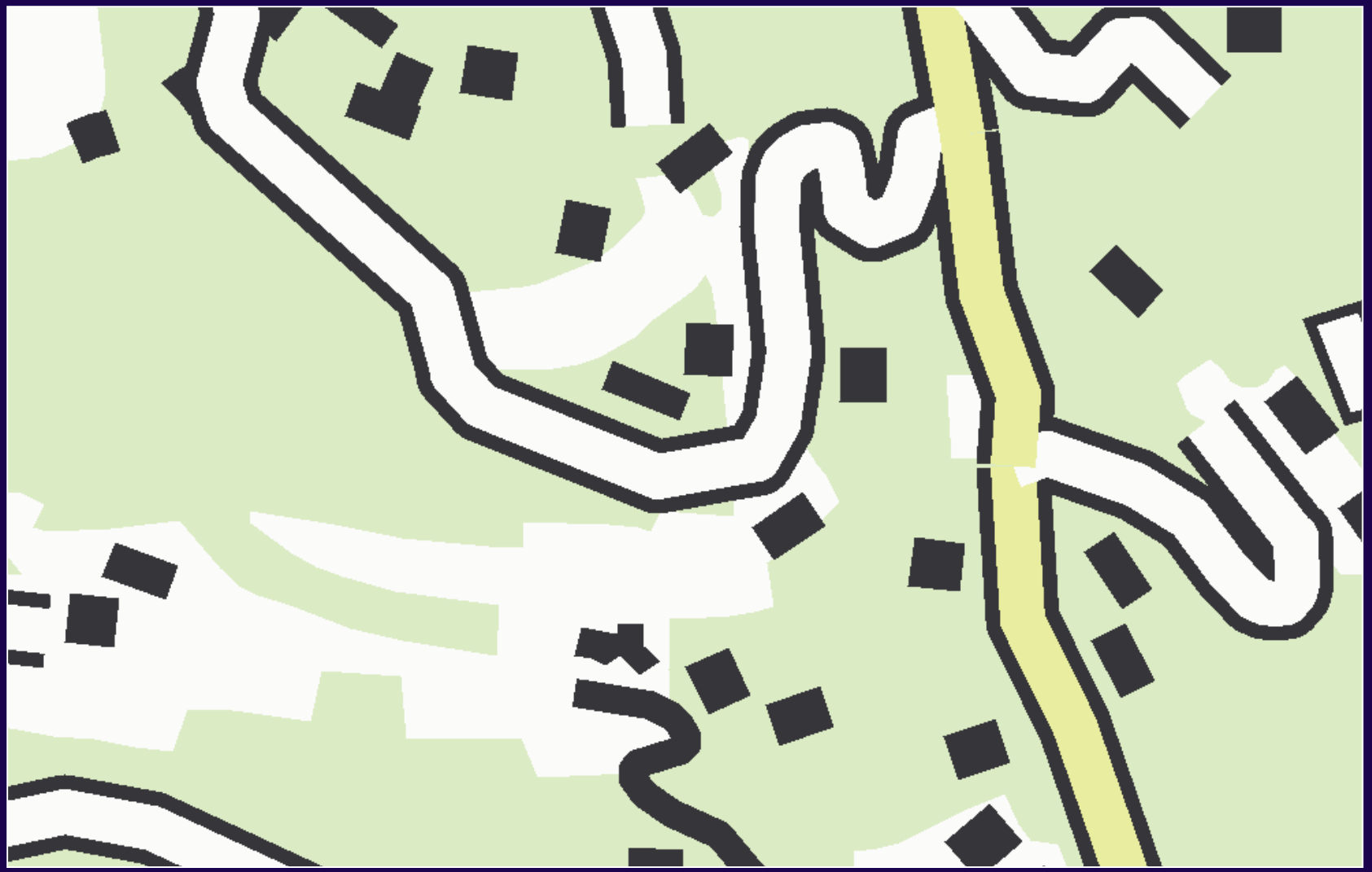


Other results - low density of buildings

Scale 1 : 50 000

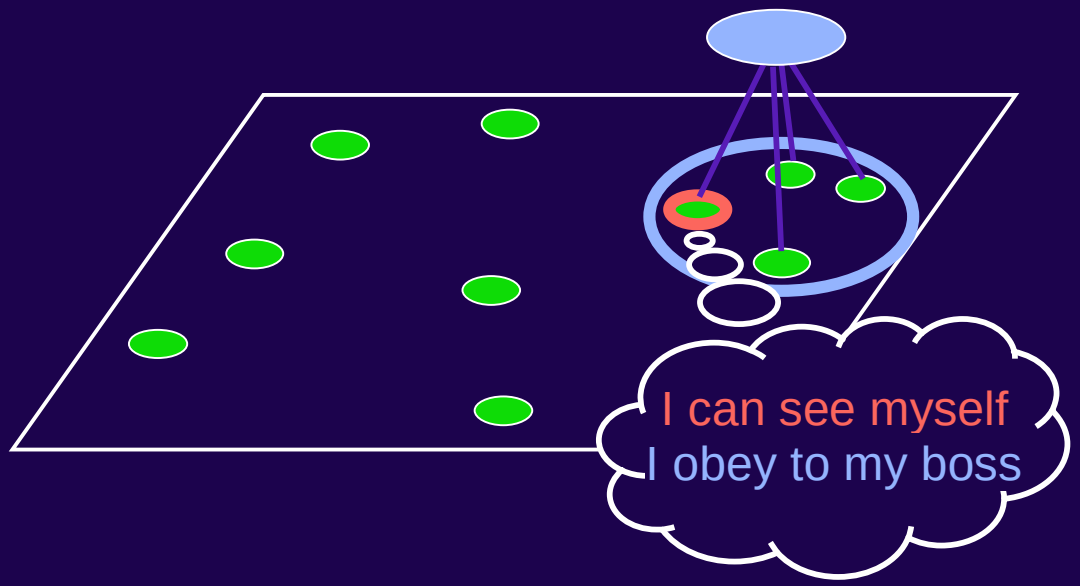
Other results - high density of buildings

Scale 1 : 50 000



Conclusion

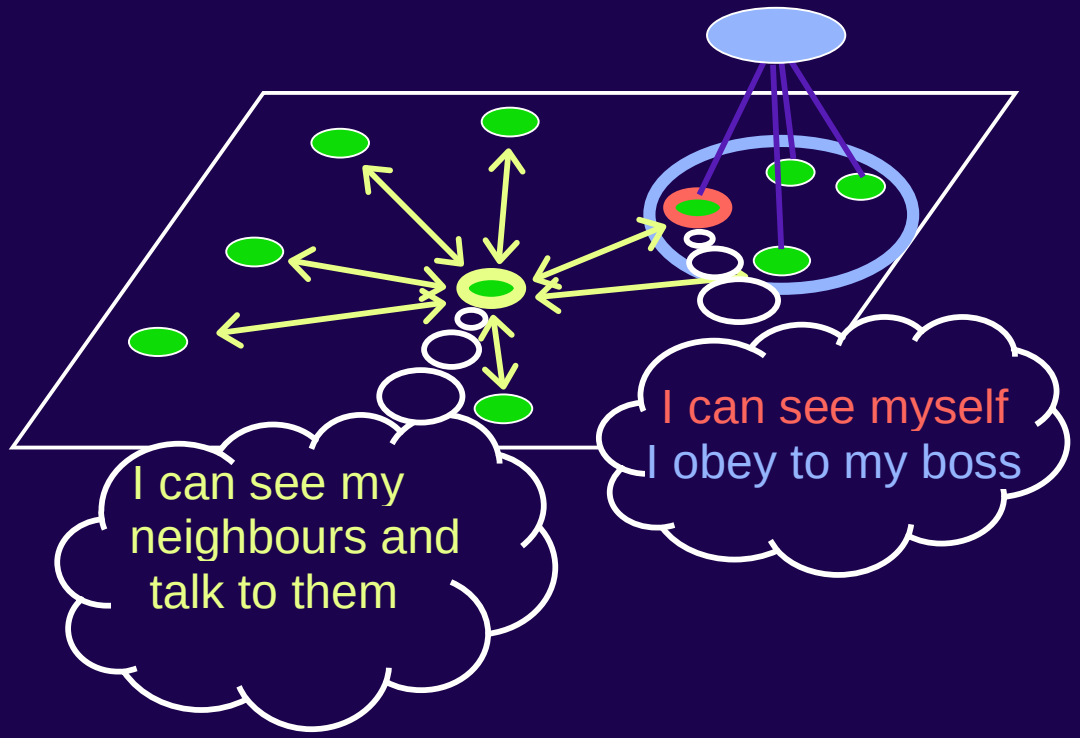
Conclusion



AGENT

AGENT - meso level

Conclusion

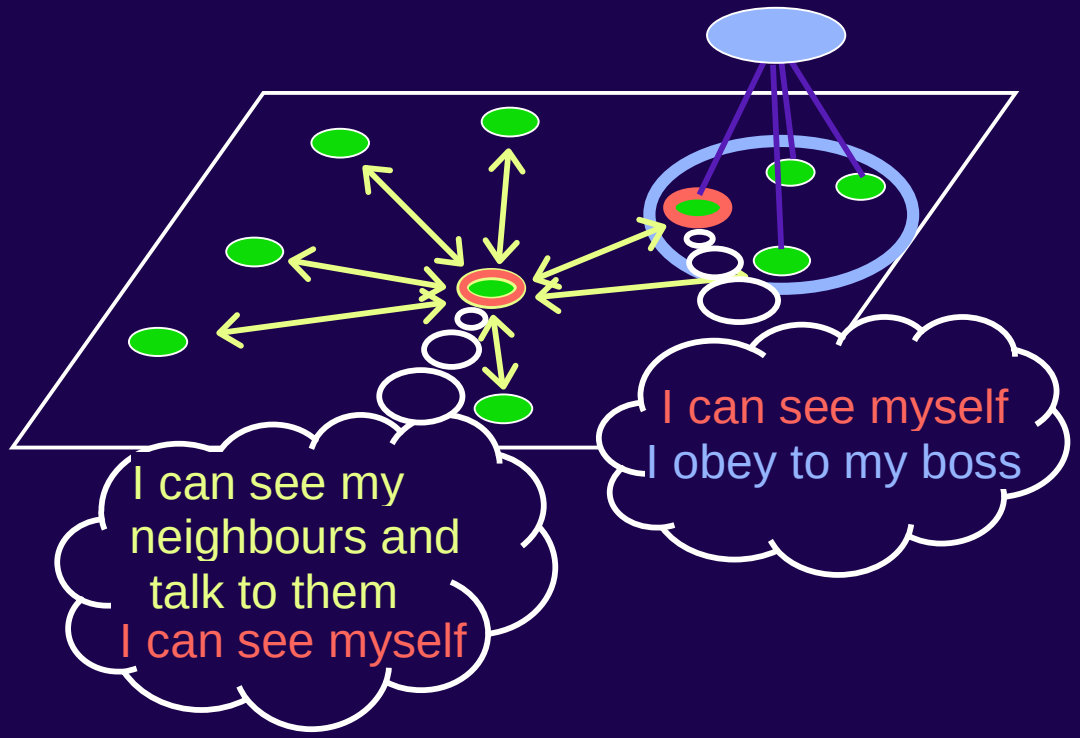


AGENT

AGENT - meso level

CartACom

Conclusion



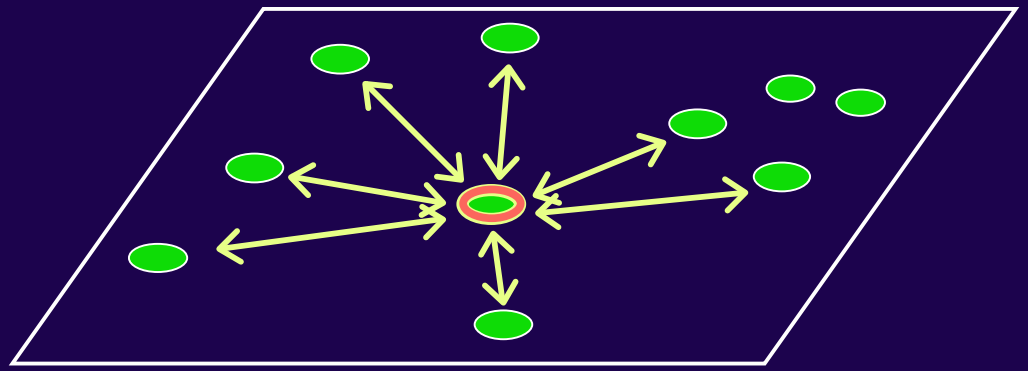
AGENT

AGENT - meso level

CartACom

Next steps

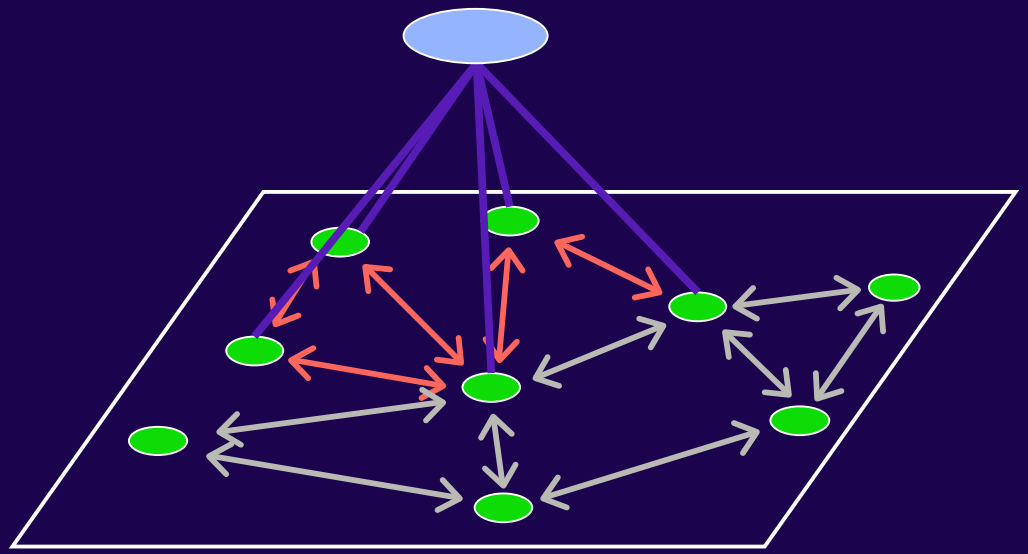
Combine the AGENT and CartACom models



Handle internal and relational constraints in a combined way

Next steps

Combine the AGENT and CartACom models

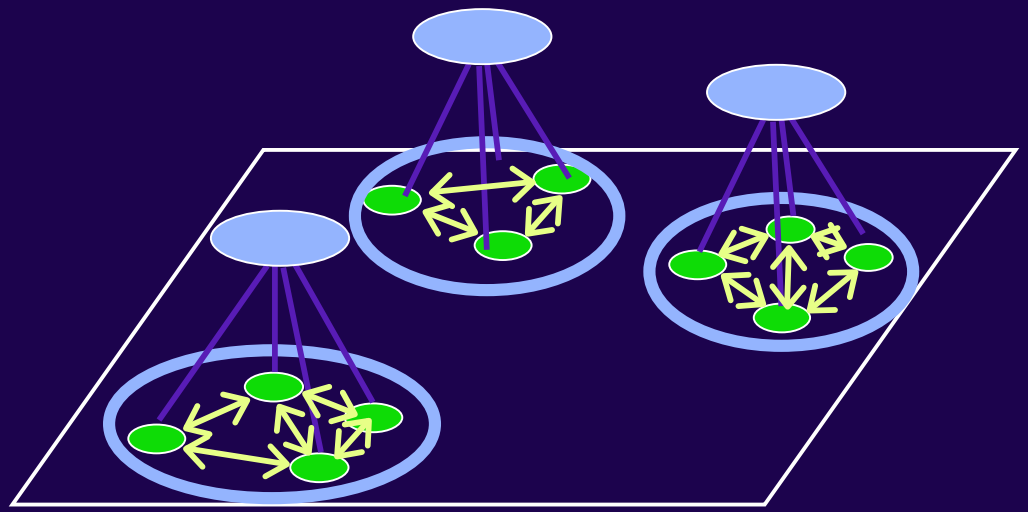


Handle internal and relational constraints in a combined way

Use a group treatment during a CartACom activation

Next steps

Combine the AGENT and CartACom models



Handle internal and relational constraints in a combined way

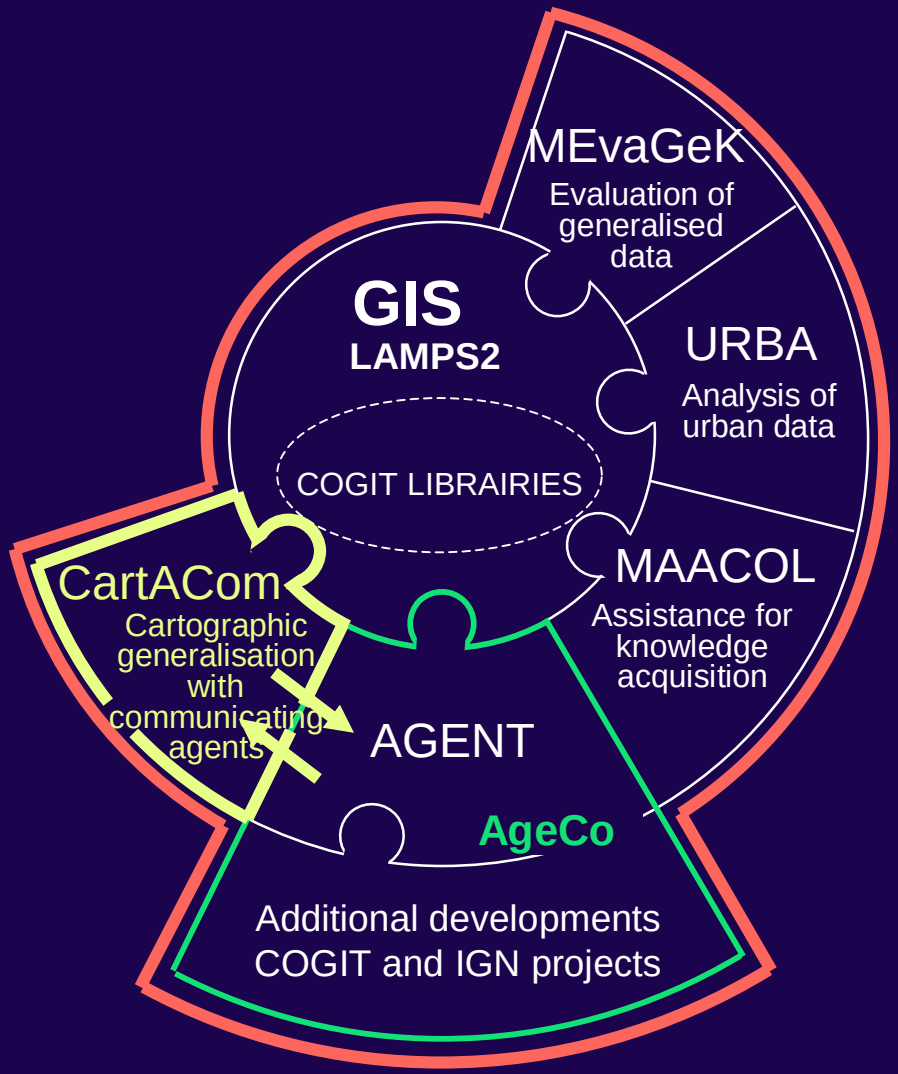
Use a group treatment during a CartACom activation

And the contrary

Next steps

AGIT :

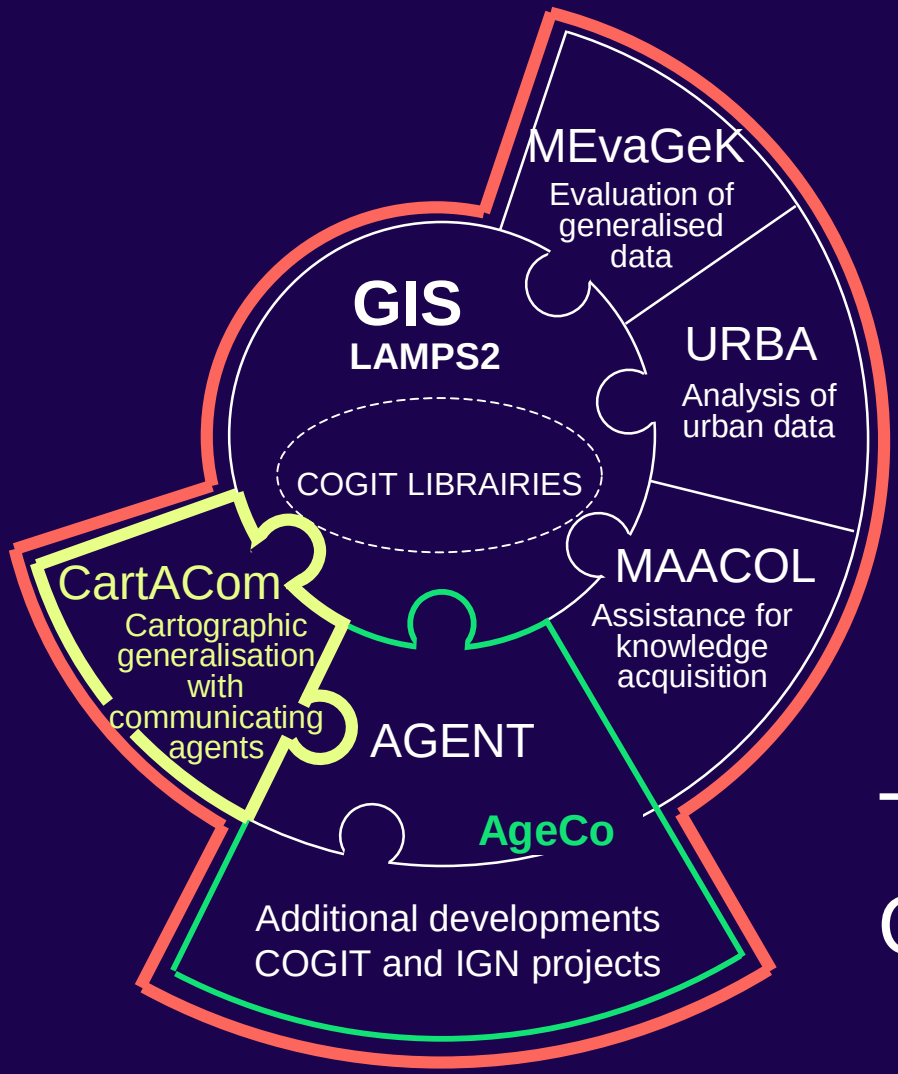
COGIT laboratory's platform for research and studies in generalisation



Next steps

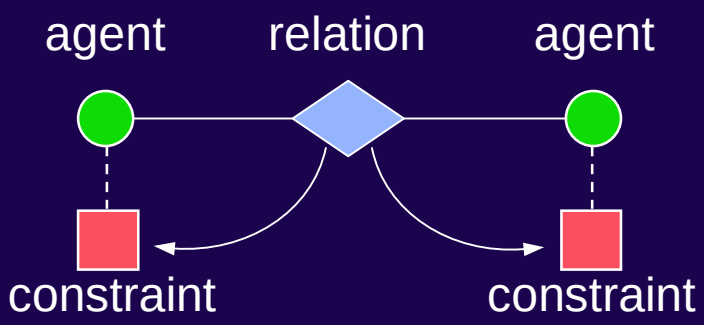
AGIT :

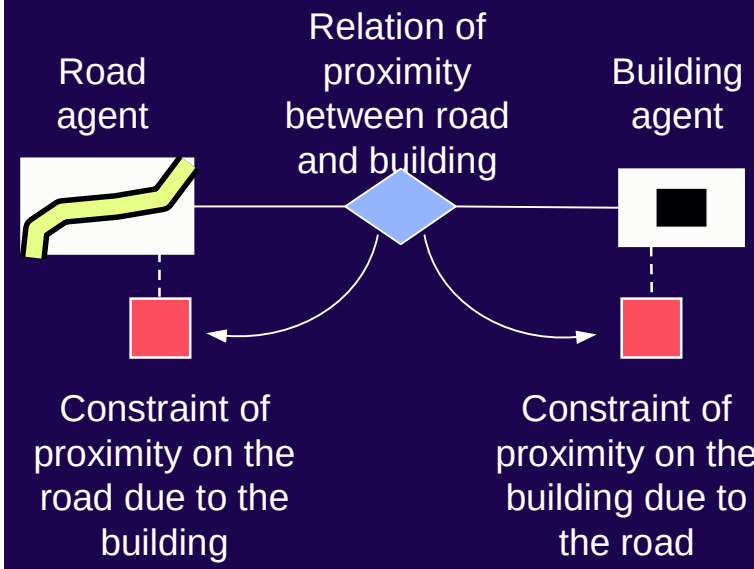
COGIT laboratory's platform for research and studies in generalisation

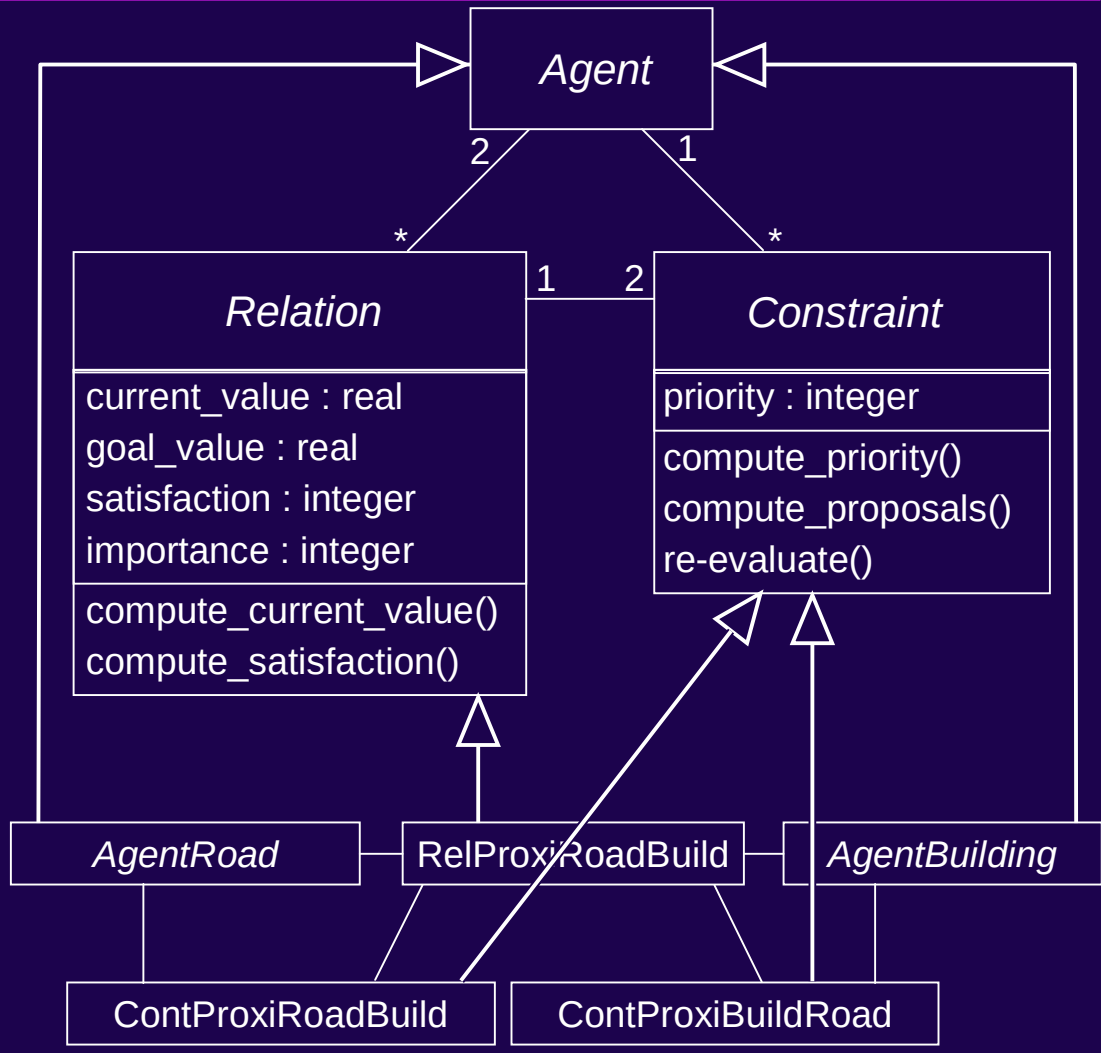


Thank you !
Questions?

Modelling relational constraints







Perspectives (2)

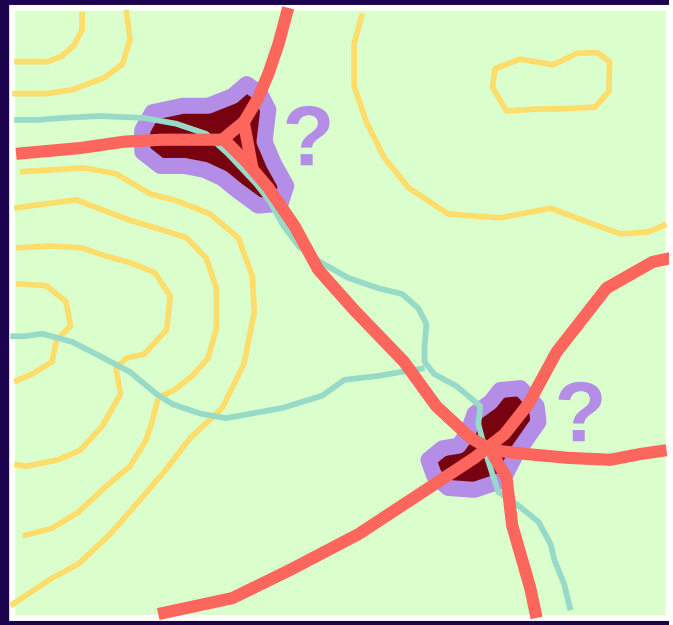
To go further

Interface

In the AGIT platform…

- AGENT + [Trévisan 04]
- AGENT "meso" + [Boffet 01]
- **CartACom**

[Galanda 03]
[Bader 01]
[Harrie et Sarjakoski 02] …



Combine approaches for a complete process

Introduce des constrained elements (relief)

Help to parameterisation of the result [Hubert 2003]
of the process