CO-330

COLLAGEN: COLLABORATION BETWEEN AUTOMATIC CARTOGRAPHIC GENERALISATION PROCESSES

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BACKGROUND AND OBJECTIVES

The aim of cartographic generalisation is to produce legible maps at smaller scales from more detailed data, summarising the geographical information. Many automated cartographic generalisation processes have been developed for the past years of research, each process being more or less specialised to a particular problem: a landscape pattern like urban or rural areas, a data theme like land use or vegetation, a cartographic conflict like linear symbol overlap or most of the time of mix of landscape, theme and conflict. But none is actually able to deal with the generalisation of a map in its entirety (heterogeneous landscapes, themes and conflicts). Rather than developing a different model able to cope with the entire generalisation of a map, we propose to make the most of the existing processes and find a way to make them collaborate to produce an entire map. Thus, the CollaGen model aims at automating a collaborative generalisation that uses the available processes on the part of data they suit to.

APPROACH AND METHODS

The CollaGen model can be seen as a six steps approach, considering the simplified workflow of Figure 1. The first steps consists in dividing data in geographic spaces (e.g. urban area, rural area, river network, vegetation, mountain roads) on which the generalisation processes will be applied.

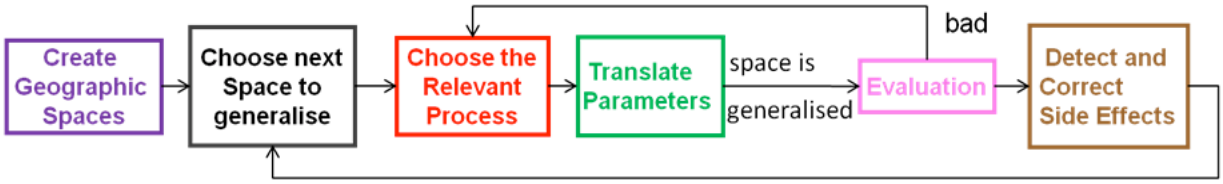

Figure 1. Six steps CollaGen workflow.Then, while spaces remain ungeneralised or badly generalised, a space type is inferred from orchestration rules, to be generalised. The orchestration rules are derived from generalisation knowledge (Ruas and Plazanet, 1996) and are selected by the CollaGen user (e.g. 'the road network space has to be generalised after urban spaces').

The relevant process for a given space is determined with a registry mechanism. Registered formal process descriptions are mapped to the actual conflicts inside a space to find the appropriate processes and rank them.

Formal constraints are used to capture map specifications homogeneously. The chosen processes are parameterised according to these constraints thanks to translating functions that fill their particular parameters by information derived from the constraints.

After the generalisation on the chosen space processed, the result inside the space is evaluated globally to determine if the map advanced to a global satisfying state: the global quality is evaluated (if the specifications are met) as well as the intern quality of the process (if it really generalised like it was supposed to).

Finally, CollaGen checks if the generalisation did cause new conflicts with objects just outside the space (i.e. side effects). If some are identified, they are corrected: a balance between the initial state and the generalised (thus better inside the space) state is searched.

The interoperability between the CollaGen components and the processes is guaranteed by referring to a generalisation domain ontology (Touya et al, 2010). For instance, the constraints on building refer to the building ontology concept as well the translations to parameterise a process.

RESULTS

CollaGen was tested on French 1 m resolution data to produce 1:50k maps. Figure 2 shows some results where three processes were used to generalise the map. CollaGen was also compared to benchmark data from (Stöter et al, 2009) with promising results.

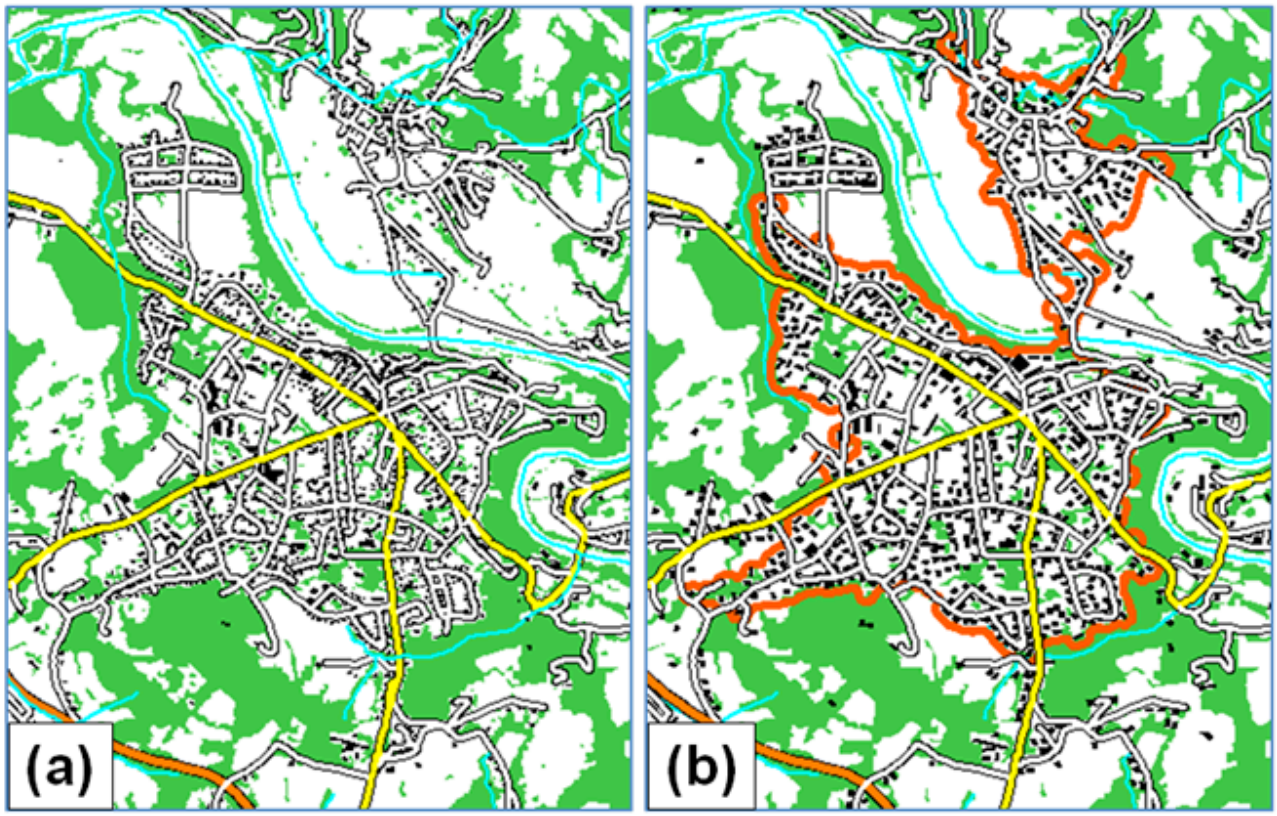

Figure 2. (a) initial data. (b) 1:50k generalised map with mainly AGENT, CartACom, Least squares and the Beams (urban space is delineated with the thick outline).

CONCLUSION AND FUTURE PLANS

CollaGen, a model to allow collaboration between different generalization processes to produce an entire map was presented. An interoperability model for generalisation processes, a fitness-to-space determination method and a global generalisation evaluation method are contributions of this work.

To go further, the side effects management has to be better tested and CollaGen should be applied to different applications to check its genericity.

REFERENCES

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