Demo of 2 Generalisation Processes Used To Create OS VectorMap District®

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1. Introduction

OS VectorMap District is a backdrop map covering Great Britain, specifically designed for web applications, easily allowing additional spatial information to be overlaid. The vector version can be customised by selecting and styling different features in different ways, and a raster version is also available with default styling. OS VectorMap District is available for free at the point of use as part of OS OpenData:

Download: https://www.ordnancesurvey.co.uk/opendatadownload/products.html
View: http://www.ordnancesurvey.co.uk/oswebsite/opendata/viewer/ (zoom in 5 times)

The beta version was released on 17th March 2011. This was derived completely automatically from the most detailed large-scale data, with no manual intervention, using algorithms developed by Ordnance Survey Research. This demo covers the two most advanced parts of the generalisation process.

2. Building Generalisation

On district-level mapping it is not possible to show individual buildings, since they are too small and granular. The requirement was just to give a general impression of built-up areas. An algorithm originally designed for creating 1:50 000 scale maps (Regnauld and Revell, 2007) was adapted for this purpose. The algorithm works on a principle of "growing tide" – the amalgamation starts by buffering inwards from the roads by a fixed distance in places where the buildings are in close proximity to the roads. Buildings that are further away from the roads are then amalgamated together either by the Minkowski algorithm of (Dammen and van Kreveld 2008), or the squared amalgamation of (Revell, 2004).

All the amalgams are combined, and simplification is applied only to those parts not touching the road casings. A final step treats any narrow gaps and narrow corridors in the amalgamated result. The whole process is orchestrated as an Agent process, which adapts the choice of amalgamation and simplification algorithms according to context.
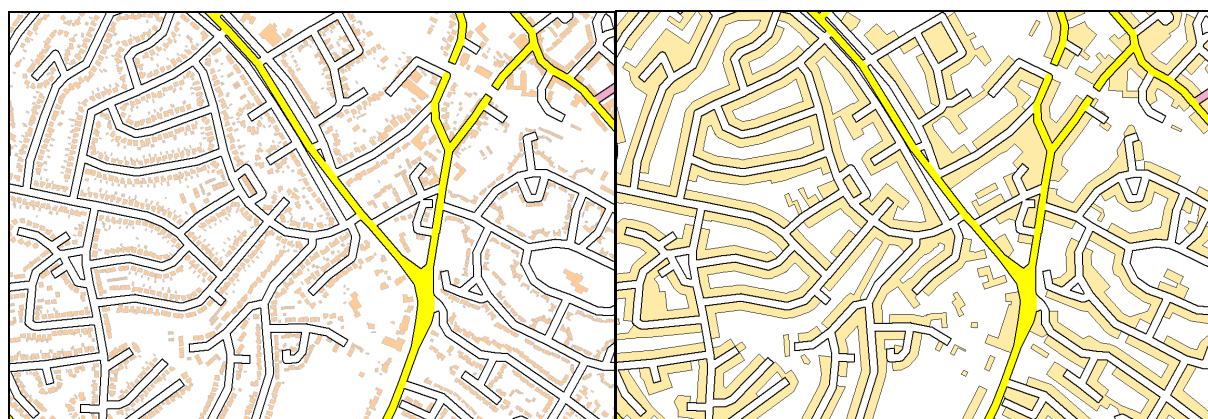
Figure 1. Buildings before (left) and after (right) generalisation

3. Coastline Generalisation

The large-scale coastline is too detailed for depiction on district-level mapping. The coastline is first simplified using the weighted effective area (WEA) algorithm of (Zhou and Jones, 2005). The result is then smoothed using Gaussian smoothing. The simplification and smoothing processes operates directly on the topology to ensure that inter-tidal and tidal water polygons are updated in synch with the coastline. In cases where the process causes a small self-intersecting loop, the loop is automatically removed. In cases where the process causes a line to intersect with another line, the original line is held in place in the vicinity of the error, while the remainder of the line is processed as normal.
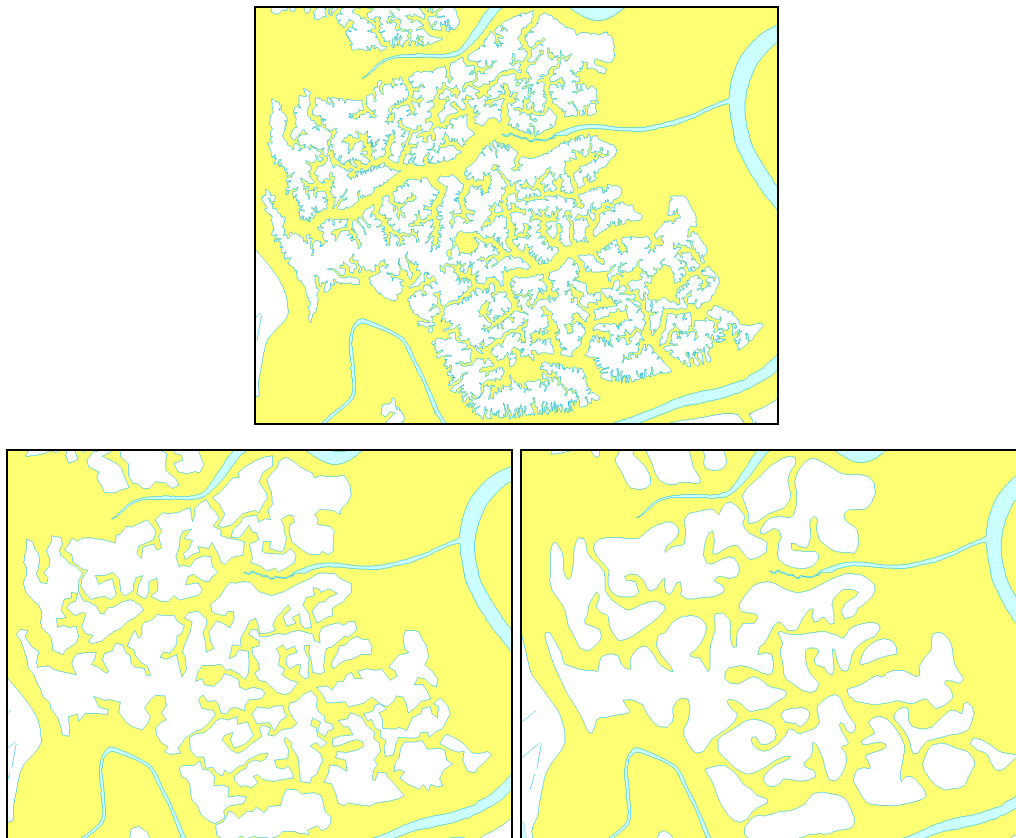
Figure 2. Original coastline (top), result of WEA (left) and then Gaussian smoothing (right)

References:

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http://aci.ign.fr/Leicester/paper/Revell-v2-ICAWorkshop.pdf

Zhou, S. and Jones, C.B. (2005) "Shape-Aware line generalisation with weighted effective area" Developments in Spatial Data Handling 11th International Symposium on Spatial Data Handling, Editor Peter Fisher, Springer, pp. 369-380. http://users.cs.cf.ac.uk/C.B.Jones/Zhou_JonesSDH04.pdf