Fractal Dimension of Paths

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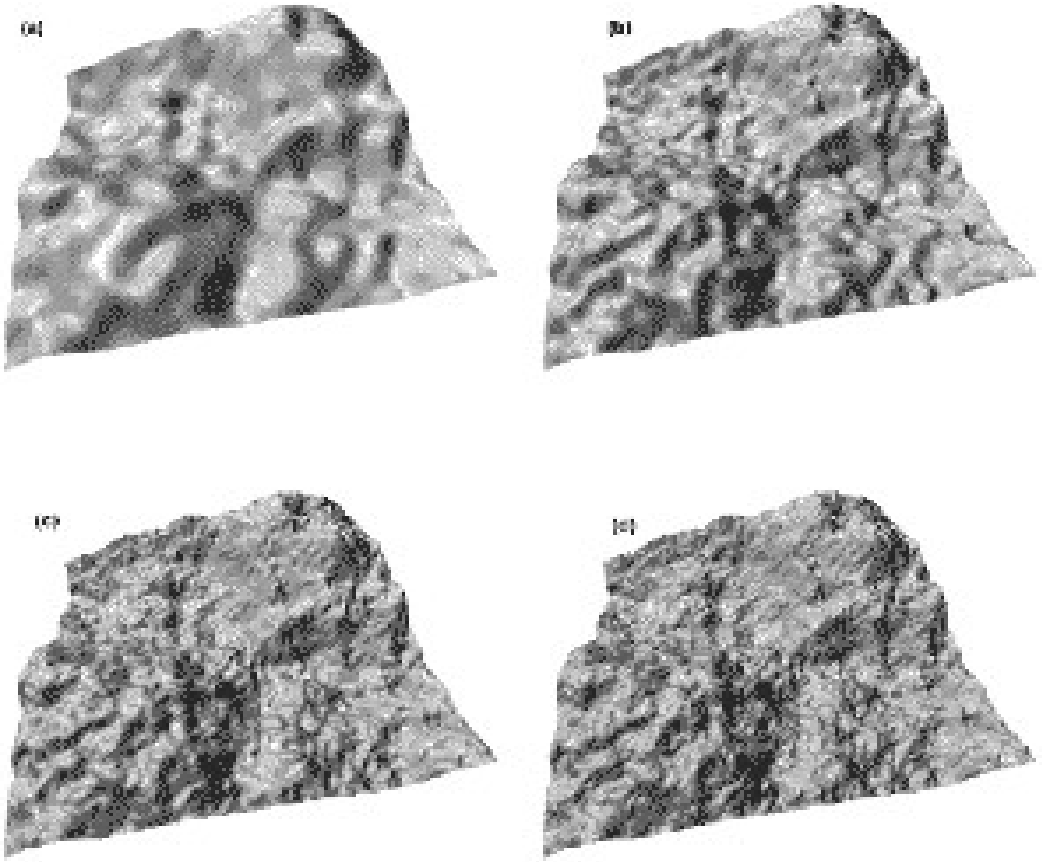
Background

- Fractal Dimension is sometimes used as an index of irregularity



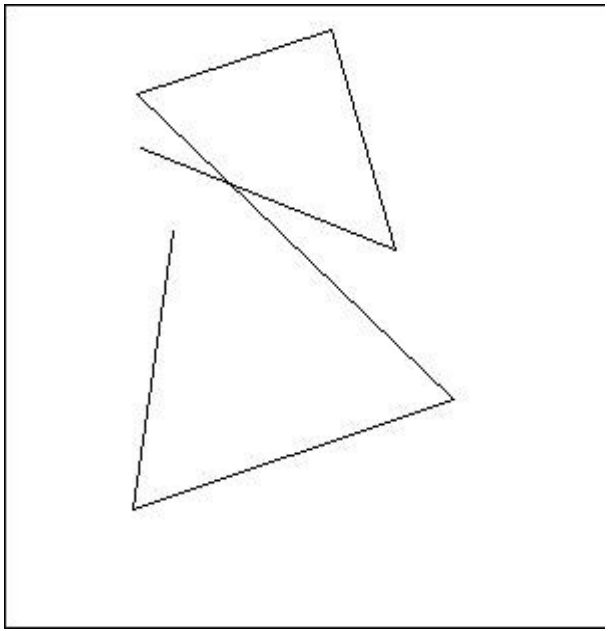
http://www.soi.city.ac.uk/~jwo/phd/06res.php

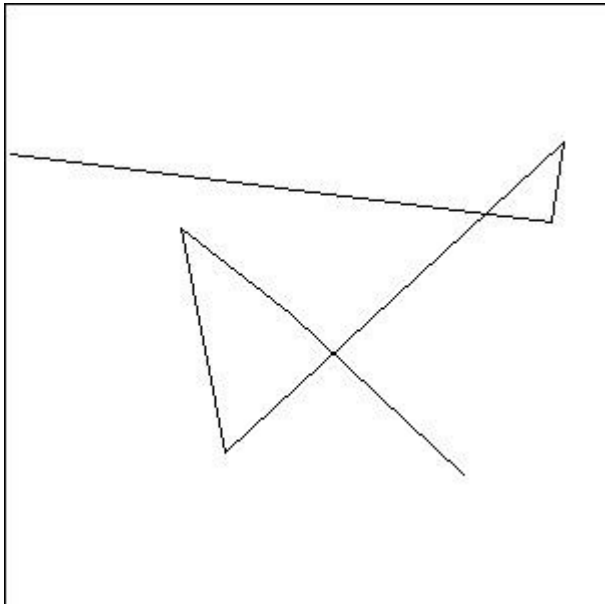
Background

- Many researchers test the correlation between fractal dimension and some property of an object
- Usually, the object occurs naturally and exhibits self-similarity
- Ferns, trees, diffusion, metal fractures

Paths

- Data – from map, using coordinates of major cities
- Program walks through all possible paths between any 2 points
- Program creates images of each path





My project

- Find relationship between path length and path complexity/irregularity, assuming that fractal dimension measures complexity/irregularity in this application
- Correlated or not?

Minkowski-Bouligand Dimension

- Algorithm for calculating fractal dimension
- Also called “box-counting” method
- Separates an image by increasingly small grids
- Counts number of grid boxes needed to cover image

Programming

- Processing to create images
- C for everything else