



Faculty Profile

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Shiva Reddy Koti holds M.Tech in Geomatics Engg. from IIT, Roorkee and B.E in Information Technology from Govt. Engg. College , Bilaspur (C.G).

His area of expertise is in the field of geospatial software development , and Health GIS. He has been actively involved in the teaching and R&D activities in GIS, Health GIS, Web GIS, Programming , Data Mining and Databases.

He is QGIS 3 contributor and the author of popular QGIS plugin “*QRealTime*”. His FOSS4G contributions can be followed at <https://github.com/shivareddyiiirs/>

Data Inputting and Editing in GIS

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How we used to collect spatial data



How we collect spatial data now



DATA INPUT and Sources

Manually digitizing from image or map sources

- manually drawn maps



- legal records
- coordinate lists with associated tabular data
- Aerial photographs

Field coordinate measurement

- Coordinate Surveying
- GPS

Image data

- Manual or automated classification
- direct raster data entry

A detailed topographic map of a region featuring Big Marine Lake. The lake is a large, irregularly shaped body of water, colored in shades of blue, with depth contours marked at 5, 10, 15, and 20 feet. To the west of the lake, the text "BIG MARINE LAKE" is printed in large, bold, black capital letters. The surrounding land is depicted with green and brown contour lines indicating elevation. Several smaller lakes and ponds are scattered throughout the area, some labeled with numbers like 28, 29, 32, 33, 34, and 37. A road, shown as a dashed line, runs through the landscape. A specific location is marked with a red dot and labeled "Air Scout Camp". Elevation points are noted with numbers such as 966, 950, 944, 935, 922, and 906. The map also includes a grid system with horizontal and vertical lines, and various symbols for terrain features like ridges and depressions.

Plotted and
printed
carefully

Field Measurement

Coordinate Surveying



(courtesy NGS)

GPS



Satellite and Aerial Imagery

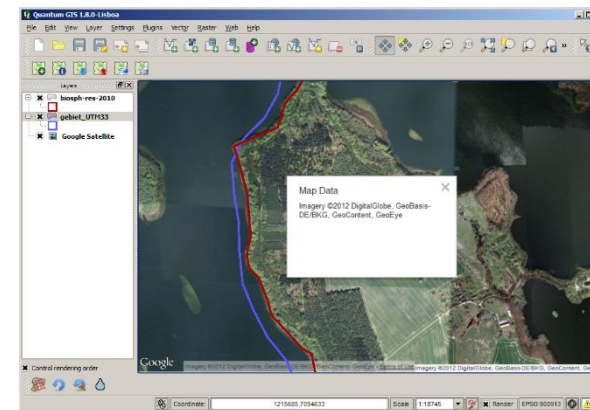
Image Data



Spatial Data in a GIS



Scanner and Digitiser





Scanner

- Drum Scanner
- Flat Bed Design

Scanner Quality (dpi):
dpi: Dot per Inch



Quiz

1. If Scanner properties are as below:

Scanner pixels: 1000X1000

And paper size : 10cm X 10 cm

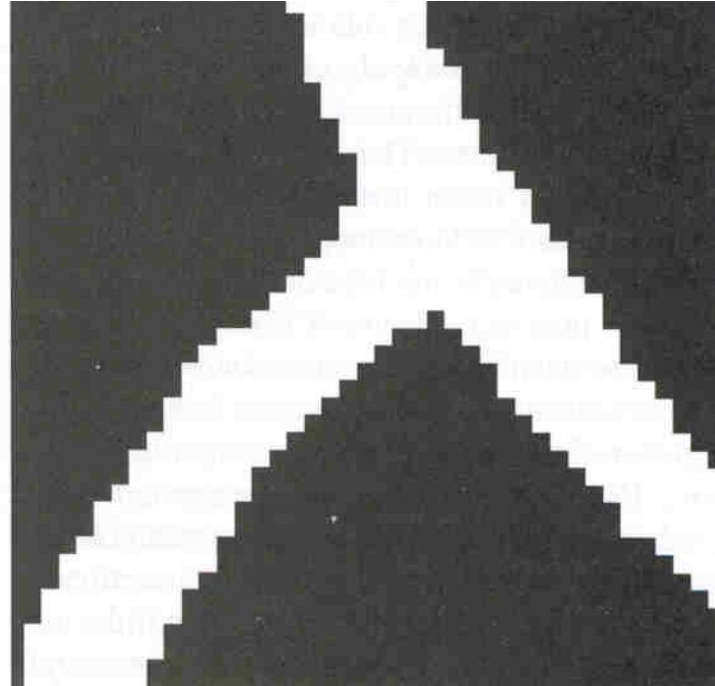
What is the DPI of the scanner?

- a) 254
- b) 25.4
- c) 2.54
- d) None of the above

Manual Digitisation Overview

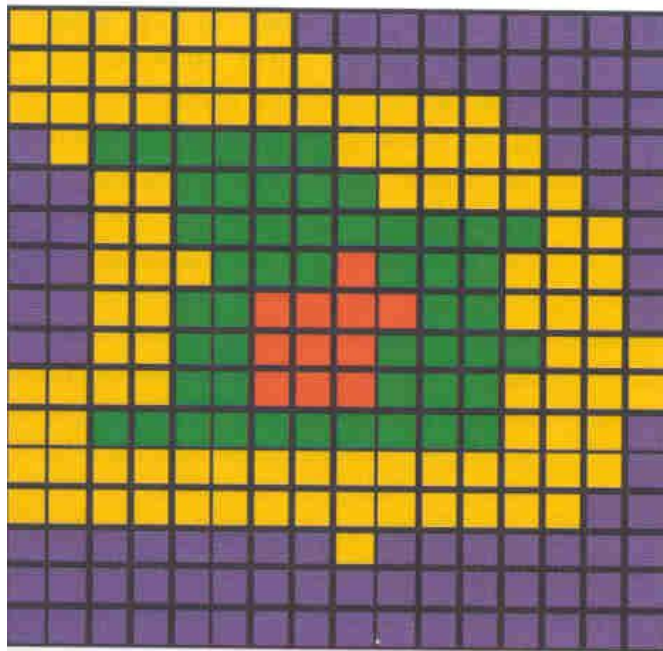
1. Scan map or image
2. If image not referenced, collect ground coordinates of control points
3. Digitize control points (tics, reference points, etc.) of known location
4. Transform (register) image to known coordinate system
5. Digitize feature boundaries in stream or point mode

Scanning



Scanning Line : Multiple Pixels

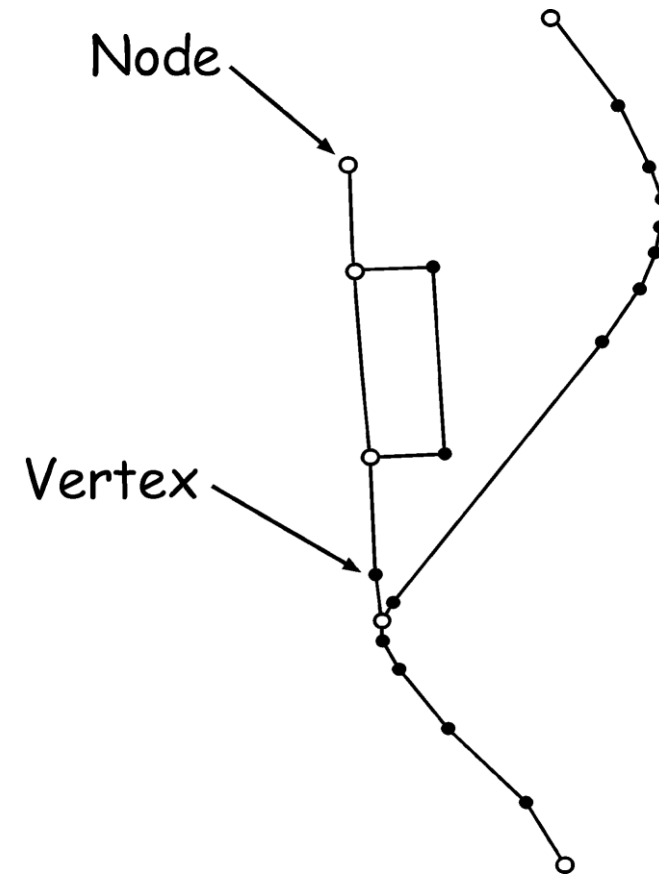
Scanning and Digitisation



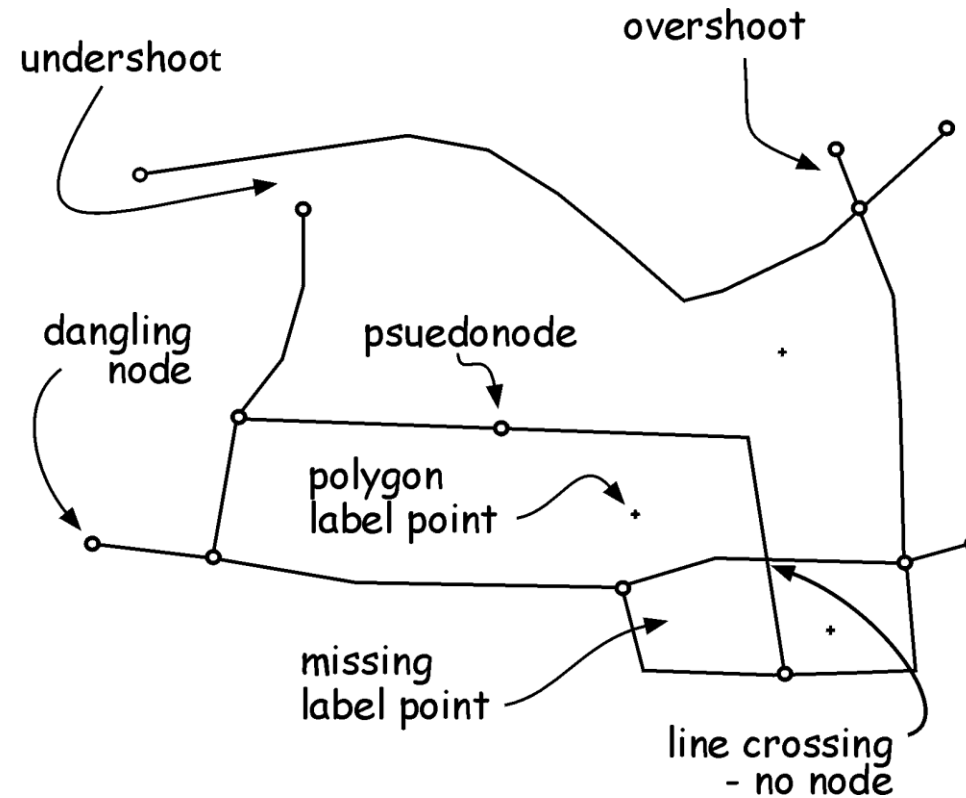
Manual and Automatic Digitisation

Manual Digitizing

- nodes at line endpoints
- vertices define line shape



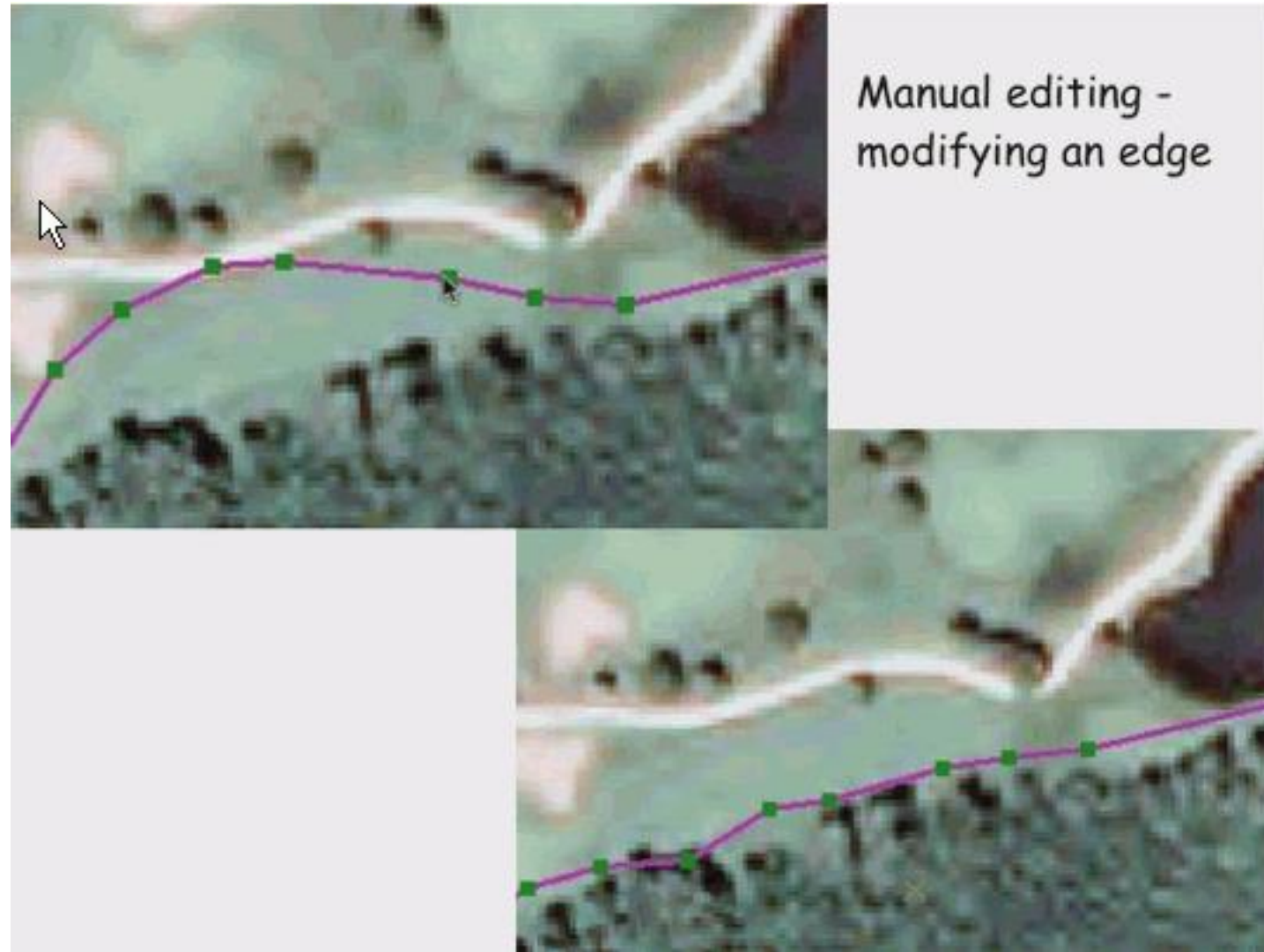
Manual Digitizing common errors that require editing





Correcting errors





Editing

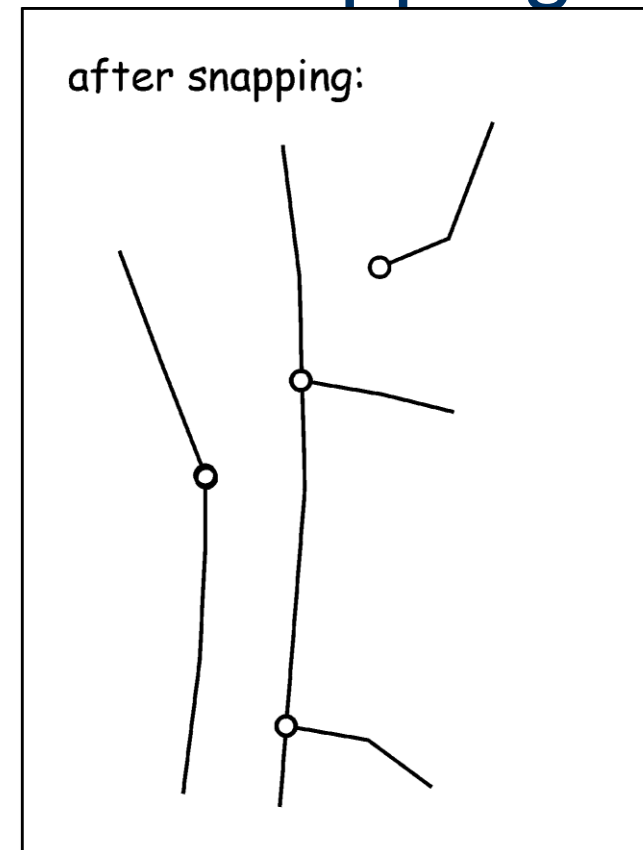
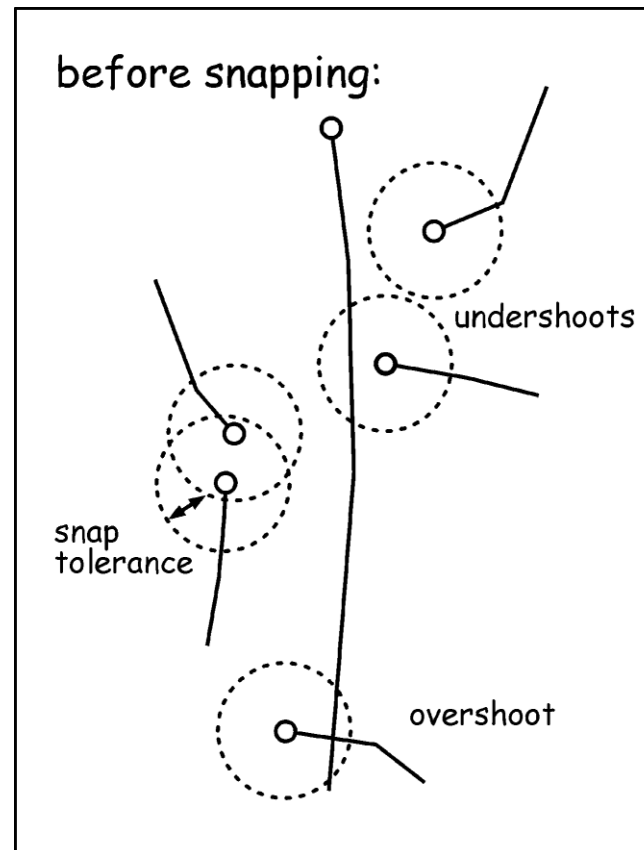
Line snapping:

When a vertex or node is “close” to a line or end point, the lines are “snapped” together

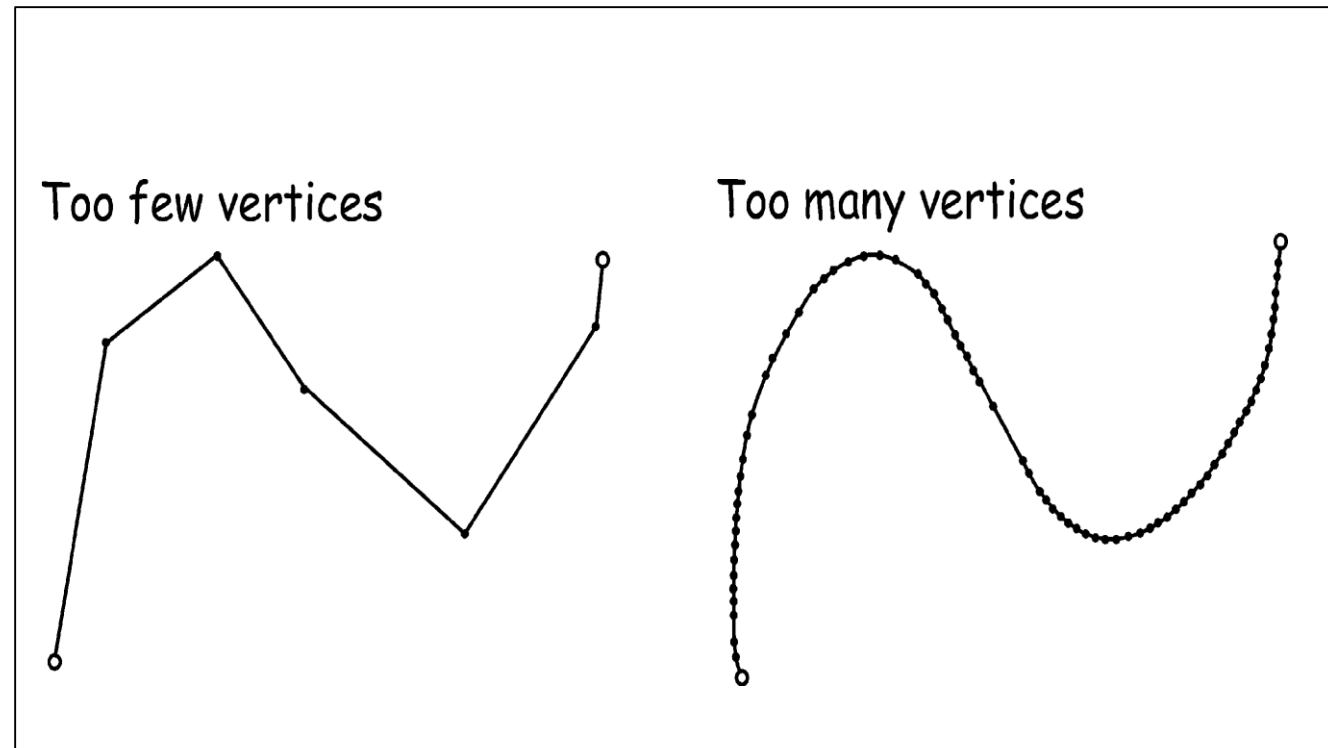
Point snapping:

Points which fall within a specified distance of each other are snapped (typically, on point eliminated).

Snapping



Manual Digitizing – Vertex Density



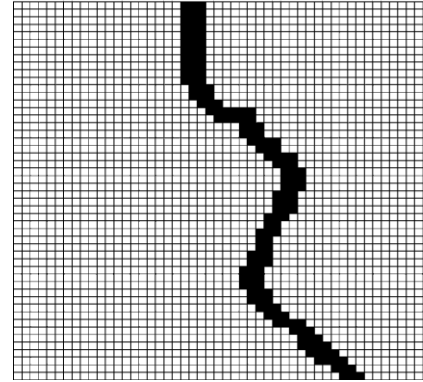
Automated Digitisation

Digitizing Maps - Automated Scanners

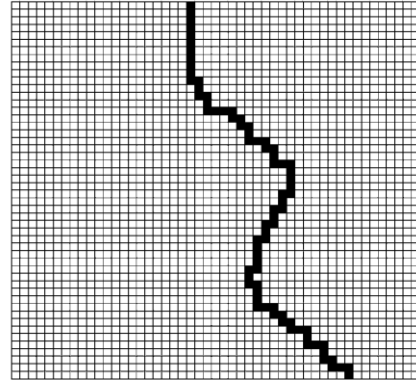
- Suitable thresholding allows determination of line or point features from the hardcopy map.
- Scanners work best when very clean map materials are available
- Significant editing still required (thinning, removing unwanted features)

Cell Thinning and Vectorizing– After Scan-Digitizing

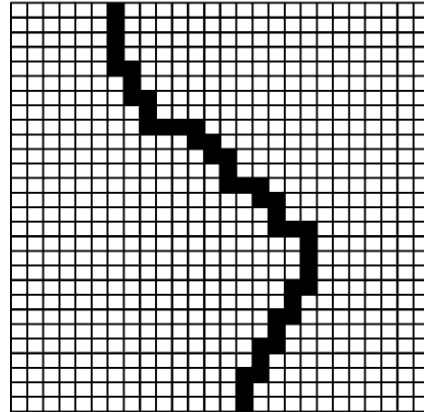
before thinning



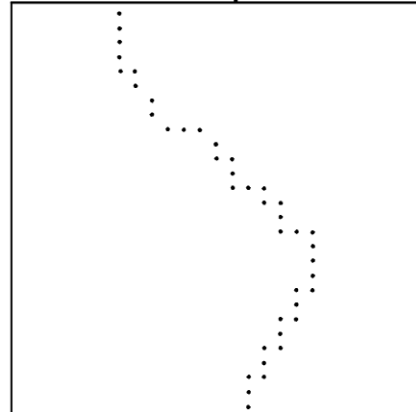
after thinning



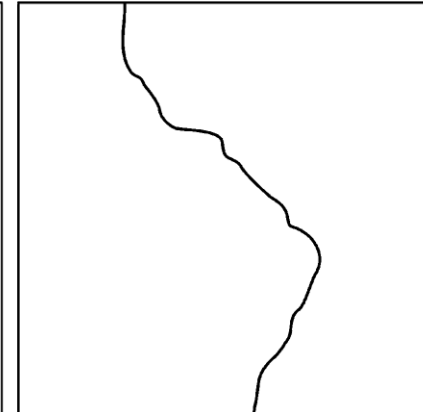
Raster



Cell center points



Smoothed line



Direct Vector and Raster Digital Data input

- GPS Files
- ASCII/EXCEL files
- Geocoded Satellite Image
- Image Classification outputs
- Vectorisation of raster



Summary

Digitisation Overview

- Scan map or image
- If image not referenced, collect ground coordinates of control points
- Digitize control points (tics, reference points, etc.) of known location
- Transform (register) image to known coordinate system
- Digitize feature boundaries in stream or point mode.
- Edit

Thank You

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