Resampling Methods

Geog581 Satellite Digital Image Analysis
Portland State University
Dan Craver
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Why resample?

Geometric Correction

Analysis with GIS
How resample?

- Determine corresponding coordinates
- Assign value to pixel in output

Three methods

- Nearest Neighbor
- Bilinear Interpolation
- Cubic Convolution (aka “Bicubic” pg. 104)
Nearest Neighbor
Cubic Convolution (aka "Bicubic")

Cubic Convolution (aka "Bicubic")
Choices

- Application of corrected image
- Computer facilities available

Nearest Neighbor » 10 FLOPs per interpolated point
Bilinear Interpolation » 50 FLOPs per interpolated point
Cubic Convolution » 350 FLOPs per interpolated point

Applications

- Classification
- Visual Interpretation
- Discrete Data
- Continuous Data
Testing Interpolator Quality

Helmut Dersch
(der@fh-furtwangen.de)
Technical University Furtwangen
Revised June 30, 1999


Original  Nearest Neighbor

Bilinear Interpolation  Cubic Convolution
Resources

- http://en.wikipedia.org/wiki/Linear_interpolation
- http://www.path.unimelb.edu.au/%7Edersch/interpolator/interpolator.html
- ArcGIS Desktop Help

Questions

- 1. When transforming an image to geographic coordinates, why is it unlikely to directly transfer pixel values from the uncorrected to the corrected image?
- 2. For each of the three common resampling methods, how many pixels from the uncorrected image are used to calculate the single pixel value in the corrected image?
- 3. Which of the three common resampling methods requires the most computational time? Which one the least?
- 4. Should classification be performed before or after resampling and why?
- 5. Which resampling methods are best suited for images used solely for visual interpretation purposes?