Capturing hurricane Katrina Data for Analysis and Lessons-Learned

Accomplishments to Date

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Overview of Accomplishments

Geographic Information Science and Technology

• Survey of reported international efforts for applications of geospatial technology for disaster management
  – Final report; Poster.
  – Manuscript in preparation for peer-reviewed journal.

• HPC based high resolution image analysis for debris mapping
  – Initial algorithm; Analysis prototype; HPC implementation.
  – Two international conference papers.

• Development of geospatial data collection plan for social resiliency analysis
  – Two international conference papers.
  – Manuscript in submission for peer-reviewed journal.

• Coordination with DHS S&T Customers and others
  – FEMA Disaster Operations.
  – DHS Office of the CIO/CTO.
  – NASA research at University of South Carolina.
Hurricane Katrina

Geographic Information Science and Technology

Predicted Path
PRE and POST Event Imagery

Geographic Information Science and Technology

Sep 30, 2003

IKONOS PAN Images

Sep 1, 2005
Imagery Based Change Cues

Legend
- No Damage
- Damage
- Significant Damage

Before

Change Cue

After
Image Feature Extraction

Gabor Filter Patterns
- Scale and Orientation tunable filters used to capture underlying structural information in the image
- The energy of the filter response at 3 scale and 6 orientations are encoded.

Local Binary Pattern
- Threshold a 3x3 spatial neighborhood by the intensity value of the center pixel
- Encode the binary pattern into a feature.
- Invariant to monotonic gray level changes

Local Edge Pattern
- Encode pattern similar to LBP but on the edge map
- Unique patterns capture spurious edges due to debris