An Approach for Recognizing Text Labels in Raster Maps

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Exploiting Text Labels in Raster Maps…

- Raster maps are available for areas around the globe
- Raster maps can be a great source of toponomy
- But the labels of toponomy are locked in the raster format

Utilizing our previous work on map and imagery conflation, we can identify the geospatial extent of a map and georeference the text labels

- Fusing raster maps with imagery using the road layer
- Identifying the geospatial extent of the map and

Finding a match on the imagery

Extracting road-intersection templates

Conflating the map to the imagery

Hillsdale

Unstructured labels
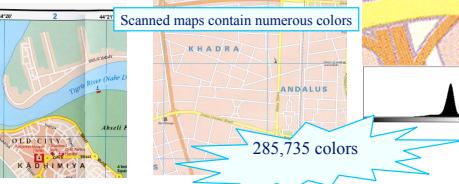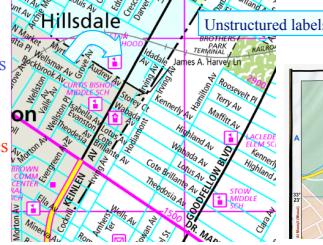
Difficulties for Identifying Text Labels in Raster Maps

Unstructured labels: multi-oriented labels with various font types and sizes
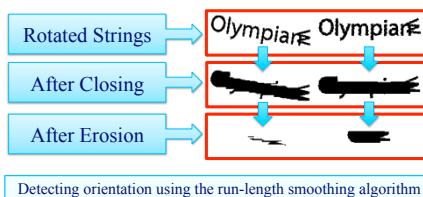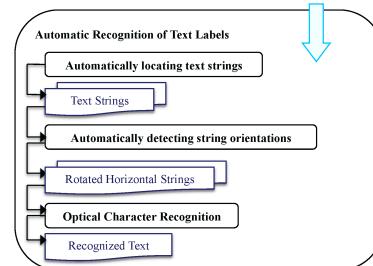
Poor image quality

Lack of metadata

Scanned maps contain numerous colors

285,735 colors

Approach for Recognizing Text Labels in Raster Maps

Preprocessing: Color quantization for the user to select text colors for extracting text pixels

Automatic Recognition of Text Labels

- Automatically locating text strings
  - Text Strings
- Automatically detecting string orientations
  - Rotated Horizontal Strings
- Optical Character Recognition
  - Recognized Text

Grouping characters using the dilation operator

Rotated Strings	Olympian Olympian
After Closing	
After Erosion	

Detecting orientation using the run-length smoothing algorithm

Splitting merged strings

WASHINGTON
Olympian
Hadley
Wy

Experimental Results

- We tested our approach on maps from two sources:
  - A computer-generated map (850x850 pixels) published by Rand McNally covering St. Louis, MO.
  - A map tile (2750x2372 pixels) cropped from a scanned map (350 dot-per-inch) published by International Travel Maps covering Baghdad, Iraq.
  - The two maps contain a total of 1,656 characters and 296 words (four words are curved strings).

Table 1. OCR results (P. is precision and R. is recall)

Map	Char. P.	Char. R.	Word P.	Word R.
RM	95.6%	93.1%	76.3%	79.3%
ITM	96.3%	95%	81.5%	85.2%