Detecting Road Signs

Jan Durakiewicz
Motivation

• Driving is complicated
Background

- Quite a bit of existing work in detecting road signs:
  - Gaussian models, SVMs, edge-detection, etc.

- None perfect – slow, inaccurate, etc.
Assumptions

- Prior knowledge of signs: color, shape
- Sign is completely visible, and has the right color
- Signs visible for more than a few frames
- Real-time operation
- Video feed:
  - Vehicle interior
  - ‘Okay’ quality
Method

- Implementation OpenCV
- Frame-by-frame:
  - Convert to HSV space
  - Threshold on ‘major’ sign color (hue)
    - Eliminate useless saturation and value as well
  - Morphological opening (erosion + dilation)
  - Contour analysis:
    - Find large contours
    - Find their boundary
    - Compare boundary shapes to known sign contour (Hu invariants)
- After enough ‘positive’ frames, report a find
Example: Original Video
Example: Color Processing
Example : Morphology Processing
Example : Contour Processing
Results: Day
Results: Day
Results : Day
Results: Day
Results: Day
Results : Day
Results : Day
Results: Day
Results: Day
Results: Night
Results : Night
Results : Night
Results: Night
Challenges: Hue is noisy
Challenges: Text modifies contours
Challenges: Too many blobs
Questions?
Suggestions?