Attributes Reduction applied to Leather Defects Classification

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• Experiments
  • Defects classification
    – Raw-Hide
    – Wet-Blue
  • Attribute reduction in Raw-Hide and Wet-Blue
    – FisherFace
    – Chen’s LDA (CLDA)
    – Direct LDA (DLDA)
    – Yang’s LDA (YLDA)
    – Kernel LDA (KLDA)
  • Defects classification compared to human experts.

Figure 1. Examples of wet-blue and raw-hide leather defects: (a) scabies (b) ticks (c) hot-iron marks and (d) cuts.

Figure 2. Examples of images manually marked with colors red for defect, yellow for background and green for no detect region.
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- Attribute reduction in Raw-Hide and Wet-Blue. *best results

Figure 3. Correct Classification results in Wet-Blue

Figure 4. Correct Classification results in Raw-Hide
Dense Correspondence with Regional Support for Stereo Vision Systems

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• Stereo vision systems
  • Depth information from:
    – Calibration
    – Correspondence
    – Reconstruction

• Main problem: Correspondence
  – Common approach: window correlation based on intensity
  – Our approach: window correlation based on intensity plus regional support provided by high frequency components
Dense Correspondence with Regional Support for Stereo Vision Systems

Right image

Ground truth

Reference result

Our result
Vehicle Counting and Trajectory Detection Based on Particle Filtering

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Main Achievements

1. Detection of moving vehicle:
Moving vehicles are detected by the proposed segmentation method.

2. Classification of the detected vehicles:
The vehicles are counted and classified according to the size of their area.

3. Tracking of the detected vehicles:
The vehicles are tracked by a particle filtering algorithm.

4. Trajectory analysis:
The vehicular trajectories are classified and visualized over the roadway.
A probabilistic map is calculated using the vehicular position information.

State of the Art

- Vehicular motion detection using mixture of Gaussians or nonparametric methods (segmentation);
- Vehicular tracking using Kalman Filter or Particle filter.

New Insights

- Vehicular motion segmentation based on \( \alpha \)-trimmed filter and nonparametric probabilistic methods.
- New particle filter approach using vehicular motion segmentation information.
- Vehicular classification and trajectory analysis.
Experimental Results

A typical frame of traffic videos.

Segmentation results.

Detection lines and interest regions.

Trajectory of the tracked vehicles.