Background Model Estimation

- Heuristic: The Gaussian with the most supporting prior evidence and least variance $\equiv$ background
- Order the Gaussians by π_j/σ_j (greater prob, less variability: less change, suggests background)
- First B distributions: background
- $B = argmin_b \sum_{j=1}^{b} \pi_j > Thresh$, (scene dependent)
  - $Thresh$: scene dependent (rel % of image: bg)
  - Low $Thresh$: unimodal bg, use most prob model
  - High $Thresh$: multimodal: repetitive bg motion (leaves, flag): > 1 colour in bg model accepted

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The Algo In Perspective

- (+): Each pixel (2.5σ) treated diff, adaptively
- (+): Objects allowed to be a part of the bg, without changing the existing bg model
- (-): Cannot handle sudden lighting changes
- (-): Initialisation of the Gaussians is important
- (-): Many parameters need to be selected smartly

- The $\sim 2.5\sigma$ threshold: per pixel, per distributions
  - Diff regions, diff lighting: objects in shaded regions not much noise as in lighted regions
  - Surveillance cam: diff lighting in FOV, diff times

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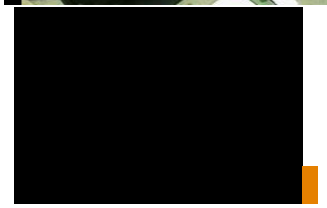
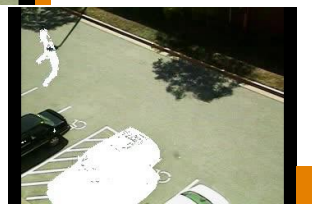
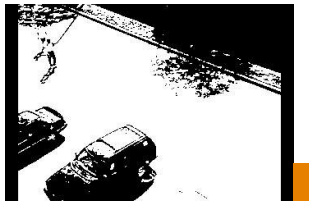
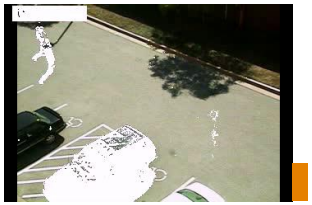
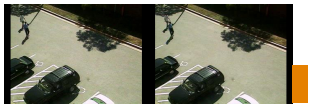
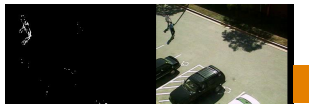
Results with Diff Parameters

- Reversing vehicle (also entering the shadows), loitering loafers, trees swaying in the wind





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