Image Database:
Texture-Based Statistical Models for Object Detection

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**Approach**
- Cluster texture vectors from many example images.
- Retain clusters which best discriminate between target object and background.
- Evaluate probability of a test image using a Gaussian mixture model built from the minimal set of clusters.

**Advantages**
- Detection using both texture and high-level structure.
- Compact representation extracted from 1000's of example images.
- Robust to shape deformations.
- Handles large variations in illumination and pose.

**Disadvantages**
- Not real-time (currently).
- Requires many examples of both target and background images.

**Progress:**
- High detection rate for faces and cars.
- Finding faster methods for evaluating test images.
- Interfacing with the Gatekeeper.

**Next Steps:**
- Build models of objects with highly variable shape (i.e., pedestrians, clothing).
- Build rotation-invariant model.
- Apply hierarchy of simple models to improve speed.

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**Finding faces in an image database**

Training Set

Current: positive detection

Next step: rotation invariance

Note scale of axes

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**Finding cars in an image database**

Training Set

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**Finding faces in the Gatekeeper**