Image Database:

Texture-Based Statistical Models for Object Detection

Tom Rikert, Mike Jones, and Paul Viola

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:

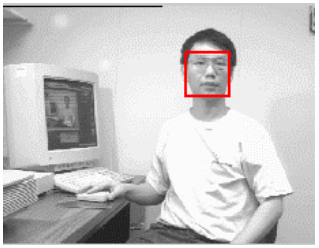
• Build models of objects with highly variable shape (i.e. pedestrians, clothing).

•Build rotation-invariant model.

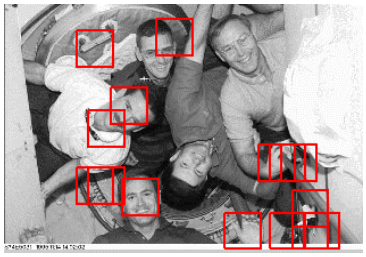
•Apply hierarchy of simple models to improve speed.

Finding faces in an image database

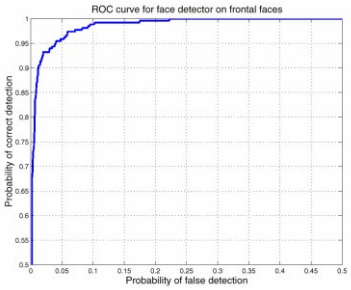
Training Set



Current: positive detection

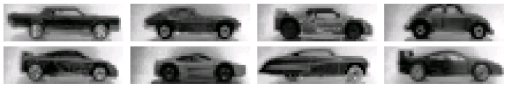


Next step: rotation invariance

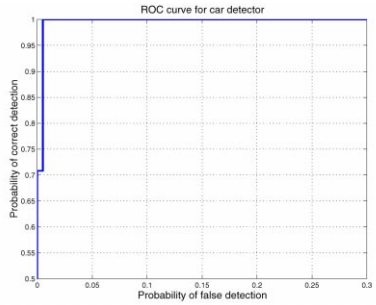


Note scale of axes

Finding cars in an image database



Training Set



Finding faces in the Gatekeeper