Euclidean Distance And Plan for Evaluation Experiments

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Part 1: Summary of a Euclidean Distance Paper

- Liwei Wang, Yan Zhang, Jufu Feng. *On the Euclidean Distance of Images* (TMI, August 2005)
- IMage Euclidean Distance (IMED): Robust to small perturbations
- Terminology in the paper is very similar to ours
- Similar figures that show degradation and measures of distance
- Context is Eigenfaces and face recognition using the Face Recognition Technology (FERET) database and digit classification
- Compete with tangent distance and Hausdorff distance
- Fast (simple to compute), maybe obeys the triangle inequality
- Efficiently embedded in powerful image recognition techniques (SVM, LDA, PCA, etc.)
- Standardizing Transform (ST) – transform domain smoothing
- Smoothing noiseless images can increase recognition rate
- The method is said to be efficient, but no evidence is included

Part 2: Planned Experiments

Values in blue needs to be agreed upon

- We wish to take a registered set, perturb it, and then evaluate its model
- Given a perturbation method which behaves the way we expect,
  - Run a series of [10] instantiations. This means re-selecting random warps and averaging the results to get smoother curves.
    - Run a series of progressively increasing warps. A large enough series is required in order to sample the model quality curve. The more points, the smoother the curve; [7] point might be a reasonable number.
      - Try a variety of shuffle distances in the evaluation, e.g. Euclidean, 5 neighbours, 9, and 12 neighbours? (totalling in [4] shuffle radii)
      - Investigate the inclusion of a different number of modes in the evaluation. Will just [1] choice (say [5] principal modes) suffice?
- Compare results with overlap measures
- **Open questions:** which results to compare specifically? How can different results, corresponding to different parameters, be composed in a single figure?