

# Extra Results

## Classification of Weakly Labeled Data with Partial Equivalence Relations

### Additional Clustering Results

#### (A) Performance comparison for linear techniques on Yale dataset

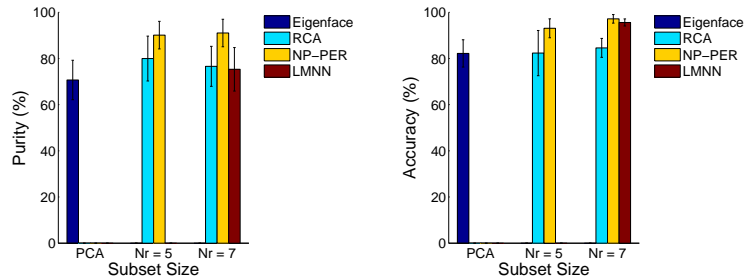


Figure 1: Clustering performance on Yale dataset with linear transformations. LMNN (Large Margin Nearest Neighbor [18]) is a supervised technique, and hence, tested only when  $N_r = 7$ .

#### (B) Performance comparison for kernel techniques on ORL dataset

Table 1: Clustering performance on ORL dataset with nonlinear transformations.

$N_r$	kRCA		kNP-PER	
	Purity (%)	Accuracy (%)	Purity (%)	Accuracy (%)
2	72.2 ( $\pm 4.2$ )	75.1 ( $\pm 3.9$ )	63.8 ( $\pm 3.4$ )	77.8 ( $\pm 2.0$ )
4	83.8 ( $\pm 3.6$ )	85.5 ( $\pm 3.1$ )	86.5 ( $\pm 2.4$ )	88.7 ( $\pm 2.0$ )
6	82.4 ( $\pm 2.7$ )	85.4 ( $\pm 1.8$ )	87.4 ( $\pm 2.2$ )	89.0 ( $\pm 1.7$ )

#### (C) Performance comparison for kernel techniques on FERET dataset

Table 2: Clustering performance on FERET dataset with nonlinear transformations.

$N_r$	kRCA		kNP-PER	
	Purity (%)	Accuracy (%)	Purity (%)	Accuracy (%)
2	79.4 ( $\pm 1.8$ )	82.0 ( $\pm 1.4$ )	86.8 ( $\pm 0.8$ )	87.4 ( $\pm 0.79$ )
3	99.0 ( $\pm 0.05$ )	99.0 ( $\pm 0.02$ )	99.0 ( $\pm 0.08$ )	99.0 ( $\pm 0.01$ )

# A Part of the Video Dataset Used for Face Recognition



Figure 2: Illustration of face extraction and warping from video frames. Each row shows 20 frames from a chunk. The left most image displays the first frame while the rest of the images display the extracted faces from the subsequent frames warped using thin-plate-spline.

## Face Warping Using Thin-Plate Splines

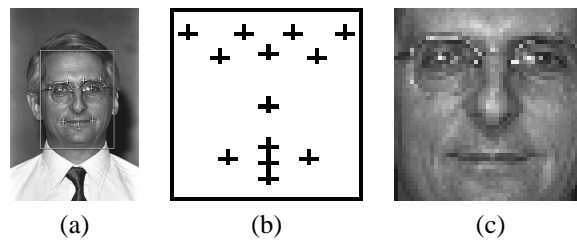


Figure 3: Illustration of face preprocessing in each frame. (a) Face detection and landmark extraction. (b) Warping of detected landmarks to the standard locations using a thin plate spline. (c) Final warped image obtained using bilinear interpolation.

# A Part of the Retrieval Dataset

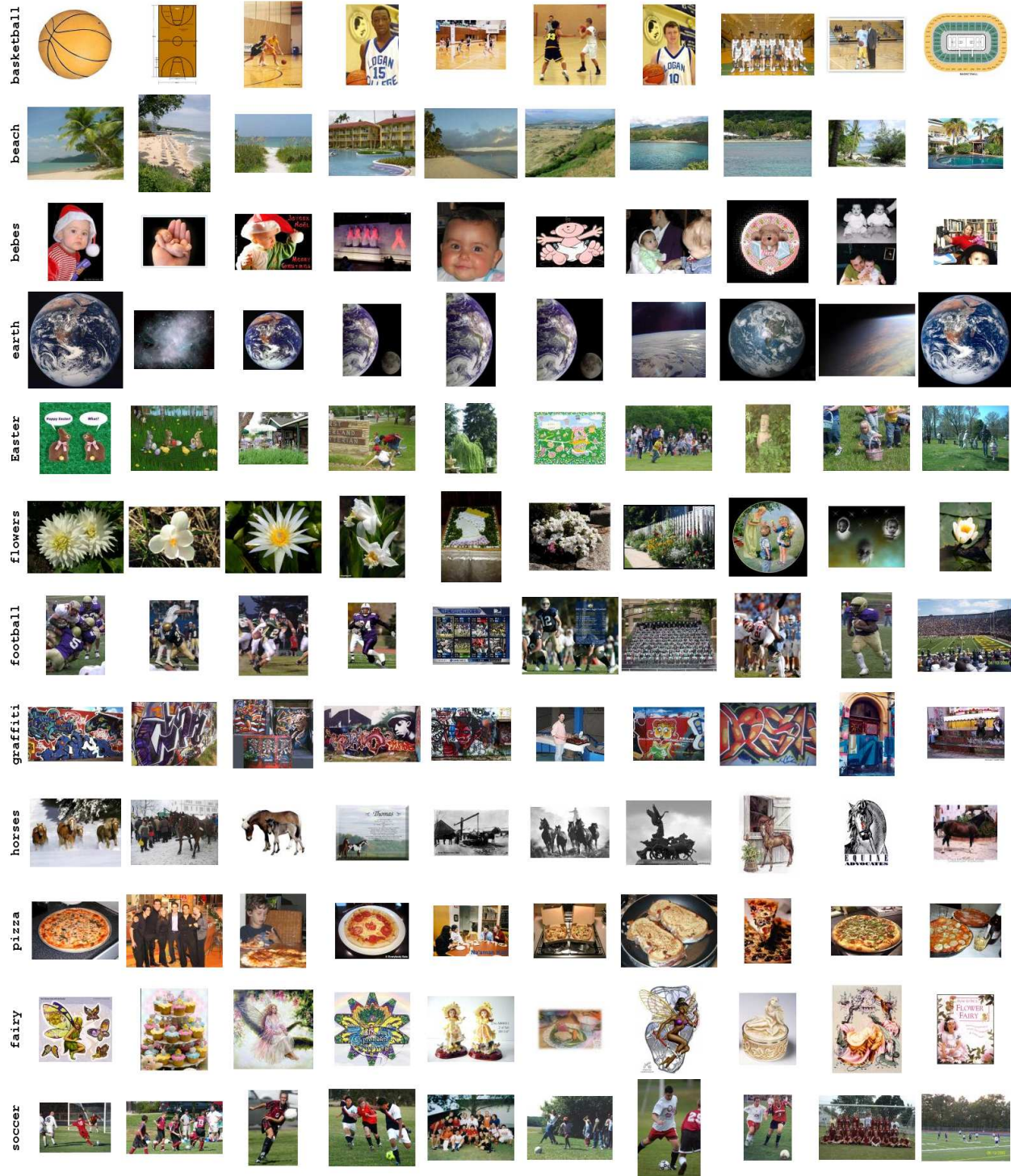


Figure 4: Example query terms and some of the images returned by a web search engine, that composed the retrieval dataset.