Adaptive sparse and dense hybrid representation with nonconvex optimization

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Problems & Ideas

- Problems of sparse and dense hybrid representation(SDR) framework in classification
  - over-emphasizes the sparsity and overlooks the correlation information in class-specific dictionary
  - the original rank minimization leads to a suboptimal solution in SDR
- Ideas: Adaptive Sparse and Dense Hybrid Representation with Nonconvex Optimization(ASDR-NO)
  - The trace norm is adopted in class-specific dictionary which benefits from both l1-norm and l2-norm
  - a nonconvex surrogate is used to approximate the rank function in dictionary decomposition in order to avoid a suboptimal solution of the original rank minimization

Main Contributions

- **Face recognition accuracy versus density of salt and pepper noise on Feret**

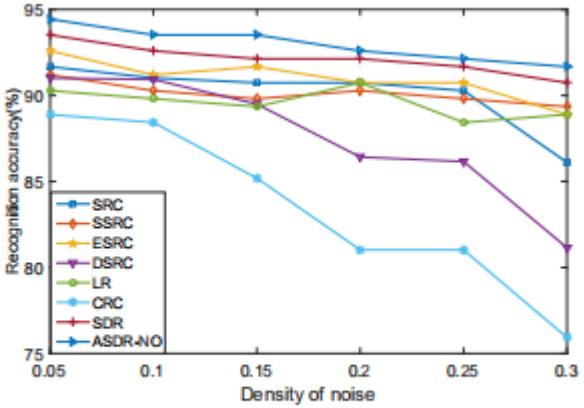

Fig. 4 Face recognition accuracy versus density of salt and pepper noise on Feret database.

- **Face recognition accuracy versus percentage of occlusion on Cropped Yale B database**

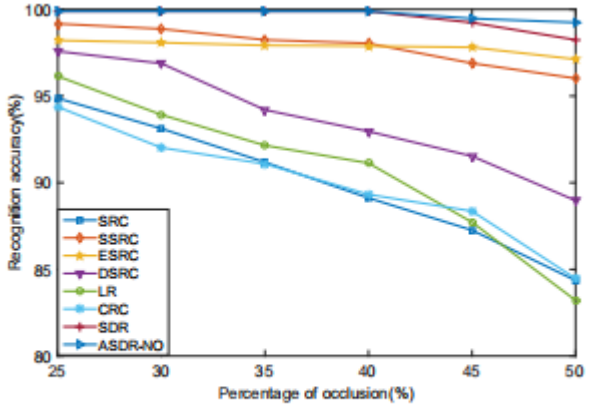

Fig. 6 Face recognition accuracy versus percentage of occlusion on Cropped Yale B database.

- Average accuracy and standard deviation on UCI data sets

Table 6 Average accuracy and standard deviation on UCI data sets

Data Sets	Diabetes	Breast	Heart	Cleve	Ionosphere	Spectf
SRC	65.07±4.78	69.47±6.87	78.15±7.24	70.34±9.54	90.16±6.47	68.57±10.78
SSRC	61.32±2.76	68.57±5.38	77.04±7.58	80.16±5.74	86.37±6.53	78.67±11.64
ESRC	65.82±4.72	70.17±1.14	81.13±4.57	77.29±5.73	88.53±6.13	78.52±7.67
DSRC	69.53±3.24	70.05±2.41	83.83±4.26	80.85±6.72	92.37±3.66	81.48±9.39
LR	68.85±3.46	67.48±7.17	79.48±5.87	71.68±6.52	84.71±1.32	76.18±7.46
CRC	65.87±2.32	70.37±1.23	82.53±4.78	81.10±9.57	93.53±3.52	79.56±11.61
SDR	72.43±3.56	71.74±3.28	85.91±4.52	82.37±8.37	94.27±3.45	84.16±7.49
ASDR-NO	**75.84**±4.37	**73.92**±5.61	**86.93**±6.37	**84.68**±7.56	**96.85**±4.32	**89.46**±8.89