# Bootstrap aggregated sparse FPCA for classification

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# Simulation

- *Probability-enhanced effective dimension reduction for classifying sparse functional data*(Yao *et al.*)
- 700 curves are generated with 200 training set and 500 test set.
- Bagged classifers are obtained from 100 bootstrap resamples.
- We consider the following 2 cases.
  - Dense
  - Sparse

# Dense Simulation Results

**Table 1:** The average classification error with standard error in percentage from 10 Monte Carlo repetitions for dense data

| Method | Logistic Regression | LDA | QDA | Naive Bayes |
|---|---|---|---|---|
| Single | 6.9 (2.02) | 9.4 (2.60) | 20.5 (2.11) | 13.3 (2.72) |
| Majority vote | 5.4 (1.51) | 7.8 (1.90) | 17.0 (2.99) | 10.1 (2.48) |
| OOB weight | 5.4 (1.58) | 7.7 (1.98) | 16.8 (2.63) | 10.0 (2.55) |
| Paper(Single) | 17.0 (0.17) | 17.1 (0.18) | 17.2 (0.17) | - |

# Sparse Simulation Results

**Table 2:** The average classification error with standard error in percentage from 10 Monte Carlo repetitions for sparse data

| Method | Logistic Regression | LDA | QDA | Naive Bayes |
|---|---|---|---|---|
| Single | 17.9 (3.56) | 17.9 (3.84) | 19.7 (4.07) | 19.6 (4.27) |
| Majority vote | 16.0 (2.63) | 16.4 (2.96) | 17.6 (2.65) | 18.1 (3.82) |
| OOB weight | 16.2 (2.73) | 16.6 (3.10) | 17.9 (2.79) | 18.5 (3.87) |
| Paper(Single) | 17.6 (0.29) | 17.6 (0.23) | 18.2 (0.21) | - |