Bootstrap aggregated sparse FPCA for classification

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Simulation

- 3 different simulations
  - The classifiers applied sparse FPCA for 1st simulated data
  - The classifiers with bootstrap aggregating for 1st simulated data
    - Bootstrapping to curves
    - Bootstrapping to FPC scores
- The number of FPCs are selected by the proportion of variance explained(PVE) with over 99%.

Simulation results

Table 1: The accuracy of classifiers after FPCA

No. of obs	Logistic Regression	SVM (Linear)	SVM (Gaussian)	SVM (Sigmoid)	KNN	LDA	QDA	Naive Bayes
2	0.750	0.750	0.760	0.750	0.770	0.760	0.770	0.740
3	0.730	0.740	0.720	0.760	0.830	0.730	0.690	0.670
4	0.750	0.770	0.750	0.750	0.880	0.720	0.710	0.700
5	0.780	0.750	0.750	0.760	0.800	0.760	0.740	0.750
6	0.800	0.820	0.810	0.820	0.880	0.820	0.800	0.730
7	0.800	0.820	0.840	0.840	0.880	0.830	0.830	0.760
8	0.790	0.770	0.790	0.800	0.830	0.780	0.780	0.740
9	0.790	0.790	0.780	0.740	0.860	0.770	0.780	0.720
10	0.900	0.840	0.900	0.880	0.850	0.850	0.910	0.830
11	0.820	0.810	0.820	0.820	0.890	0.820	0.830	0.780
12	0.840	0.840	0.840	0.840	0.890	0.820	0.850	0.790
13	0.810	0.790	0.790	0.770	0.850	0.820	0.820	0.750
14	0.810	0.800	0.830	0.790	0.850	0.810	0.830	0.780
15	0.810	0.810	0.810	0.750	0.870	0.810	0.820	0.750
16	0.810	0.800	0.780	0.780	0.840	0.800	0.840	0.780
17	0.810	0.770	0.790	0.800	0.870	0.810	0.850	0.760
18	0.800	0.780	0.830	0.810	0.860	0.800	0.860	0.770
Average	0.800	0.791	0.799	0.792	0.853	0.795	0.806	0.753

Simulation results

Table 2: The accuracy of classifiers with bootstrap aggregated curves

No. of obs	Logistic Regression	SVM (Linear)	SVM (Gaussian)	SVM (Sigmoid)	KNN	LDA	QDA	Naive Bayes
2	0.740	0.740	0.700	0.740	0.930	0.750	0.730	0.700
3	0.750	0.740	0.740	0.730	0.860	0.730	0.730	0.720
4	0.770	0.780	0.740	0.780	0.900	0.800	0.800	0.760
5	0.700	0.690	0.710	0.710	0.860	0.720	0.730	0.740
6	0.770	0.760	0.780	0.770	0.880	0.770	0.760	0.740
7	0.860	0.850	0.810	0.840	0.890	0.860	0.830	0.780
8	0.780	0.790	0.810	0.770	0.870	0.770	0.810	0.780
9	0.770	0.800	0.770	0.790	0.850	0.790	0.820	0.750
10	0.810	0.820	0.800	0.820	0.910	0.830	0.840	0.760
11	0.840	0.840	0.840	0.820	0.860	0.870	0.870	0.760
12	0.840	0.840	0.830	0.840	0.890	0.830	0.840	0.770
13	0.820	0.810	0.810	0.810	0.910	0.810	0.840	0.810
14	0.830	0.810	0.820	0.820	0.870	0.820	0.860	0.760
15	0.800	0.800	0.810	0.780	0.890	0.810	0.840	0.750
16	0.810	0.790	0.800	0.800	0.890	0.810	0.840	0.760
17	0.810	0.810	0.810	0.790	0.900	0.800	0.860	0.780
18	0.800	0.800	0.820	0.800	0.900	0.800	0.860	0.760
Average	0.794	0.792	0.788	0.789	0.886	0.798	0.815	0.758