Bootstrap aggregated sparse FPCA for classification

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Simulation

- 3 different simulations
    - The classifiers applied sparse FPCA for 100 simulated data
    - The classifiers with bootstrap aggregating for 1 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	SVM(Linear)	SVM(Gaussian)	SVM(Sigmoid)	SVM(Poly)
2	0.715	0.714	0.657	0.681	0.640
3	0.785	0.788	0.742	0.761	0.724
4	0.832	0.832	0.785	0.804	0.774
5	0.855	0.853	0.819	0.835	0.808
6	0.875	0.874	0.844	0.856	0.833
7	0.889	0.891	0.864	0.869	0.857
8	0.902	0.898	0.869	0.879	0.863
9	0.905	0.907	0.885	0.885	0.871
10	0.904	0.905	0.877	0.884	0.873
11	0.911	0.913	0.889	0.891	0.879
12	0.912	0.912	0.893	0.893	0.883
13	0.914	0.917	0.896	0.900	0.890
14	0.917	0.918	0.889	0.899	0.887
15	0.920	0.919	0.892	0.897	0.887
16	0.922	0.922	0.893	0.898	0.893
17	0.919	0.918	0.896	0.899	0.891
18	0.922	0.922	0.896	0.905	0.891
Average	0.882	0.883	0.852	0.861	0.844

Simulation results

Table 2: The accuracy of classifiers with bootstrap aggregated curves

No. of obs	Logistic	SVM(Linear)	SVM(Gaussian)	SVM(Sigmoid)
2	0.75	0.75	0.74	0.70
3	0.76	0.76	0.75	0.74
4	0.78	0.79	0.78	0.78
5	0.71	0.73	0.73	0.72
6	0.77	0.77	0.76	0.76
7	0.85	0.85	0.85	0.84
8	0.77	0.76	0.81	0.77
9	0.77	0.80	0.77	0.80
10	0.82	0.82	0.82	0.83
11	0.86	0.83	0.83	0.86
12	0.83	0.86	0.83	0.83
13	0.81	0.81	0.80	0.81
14	0.83	0.78	0.81	0.84
15	0.80	0.81	0.80	0.76
16	0.81	0.77	0.80	0.80
17	0.81	0.76	0.78	0.76
18	0.80	0.82	0.81	0.81
Average	0.796	0.792	0.792	0.789

Simulation results

Table 3: The accuracy of classifiers with bootstrap aggregated FPC scores

No. of obs	Logistic	SVM(Linear)	SVM(Gaussian)	SVM(Sigmoid)	SVM(Poly)
2	0.710	0.700	0.680	0.660	0.760
3	0.740	0.750	0.710	0.710	0.730
4	0.770	0.740	0.650	0.740	0.760
5	0.700	0.700	0.690	0.730	0.700
6	0.780	0.780	0.770	0.770	0.800
7	0.820	0.850	0.800	0.830	0.790
8	0.770	0.800	0.780	0.770	0.780
9	0.800	0.780	0.780	0.770	0.770
10	0.810	0.820	0.810	0.800	0.790
11	0.860	0.880	0.840	0.790	0.870
12	0.830	0.840	0.820	0.800	0.840
13	0.810	0.800	0.840	0.810	0.810
14	0.820	0.830	0.810	0.780	0.840
15	0.800	0.810	0.830	0.780	0.830
16	0.810	0.790	0.810	0.780	0.810
17	0.810	0.810	0.830	0.780	0.820
18	0.800	0.810	0.830	0.790	0.810
Average	0.791	0.794	0.781	0.770	0.795