

Supplementary file for Deep collaborative learning with application to brain development study

TABLE S1: The comparison of classification performance (age classification using rest-emoId combination). The full names of the measures are: area under ROC curve (AUC), accuracy (ACC), sensitivity (SEN), specificity (SPF), precision (PRC), F1 score (F1).

| Classifier | AUC | ACC | SEN | SPF | PRC | F1 |
|------------|--------|--------|--------|--------|--------|--------|
| DCL+SVM | 0.9941 | 0.9687 | 0.9520 | 0.9856 | 0.9854 | 0.9681 |
| DCL+DT | 0.9895 | 0.9666 | 0.9460 | 0.9876 | 0.9874 | 0.9656 |
| DCL+RF | 0.9923 | 0.9656 | 0.9443 | 0.9877 | 0.9872 | 0.9645 |
| SVM | 0.9631 | 0.9027 | 0.9361 | 0.8762 | 0.8820 | 0.9051 |
| DT | 0.8960 | 0.8275 | 0.8980 | 0.7597 | 0.7874 | 0.8373 |
| RF | 0.9743 | 0.9357 | 0.9300 | 0.9424 | 0.9419 | 0.9349 |
| Logist | 0.8811 | 0.8057 | 0.8671 | 0.7454 | 0.7712 | 0.8159 |
| CR+SVM | 0.9865 | 0.9386 | 0.9600 | 0.9239 | 0.9246 | 0.9394 |
| DNN+SVM | 0.9212 | 0.8465 | 0.9162 | 0.7874 | 0.8170 | 0.8562 |
| DCCA+SVM | 0.6814 | 0.5851 | 0.5470 | 0.6456 | 0.7443 | 0.5063 |

TABLE S2: The comparison of classification performance (age classification using nback-emoId combination).

| Classifier | AUC | ACC | SEN | SPF | PRC | F1 |
|------------|--------|--------|--------|--------|--------|--------|
| DCL+SVM | 0.9961 | 0.9842 | 0.9698 | 1.0000 | 1.0000 | 0.9845 |
| DCL+DT | 0.9961 | 0.9823 | 0.9660 | 1.0000 | 1.0000 | 0.9825 |
| DCL+RF | 0.9973 | 0.9833 | 0.9680 | 1.0000 | 1.0000 | 0.9835 |
| SVM | 0.9738 | 0.9106 | 0.9306 | 0.9006 | 0.8962 | 0.9095 |
| DT | 0.9380 | 0.8717 | 0.9010 | 0.8428 | 0.8547 | 0.8768 |
| RF | 0.9869 | 0.9488 | 0.9214 | 0.9781 | 0.9768 | 0.9478 |
| Logist | 0.9627 | 0.9065 | 0.8948 | 0.9197 | 0.9121 | 0.9022 |
| CR+SVM | 0.9871 | 0.9560 | 0.9718 | 0.9464 | 0.9408 | 0.9545 |
| DNN+SVM | 0.9734 | 0.9181 | 0.9495 | 0.8938 | 0.8920 | 0.9174 |
| DCCA+SVM | 0.6924 | 0.5575 | 0.4235 | 0.7010 | 0.7810 | 0.4086 |

TABLE S3: The comparison of classification performance (WRAT classification using rest-nback combination).

| Classifier | AUC | ACC | SEN | SPF | PRC | F1 |
|------------|--------|--------|--------|--------|--------|--------|
| DCL+SVM | 0.9091 | 0.8413 | 0.8199 | 0.8681 | 0.8758 | 0.8444 |
| DCL+DT | 0.9105 | 0.8389 | 0.8123 | 0.8715 | 0.8774 | 0.8415 |
| DCL+RF | 0.9126 | 0.8467 | 0.8123 | 0.8878 | 0.8907 | 0.8480 |
| SVM | 0.7419 | 0.6775 | 0.7557 | 0.6054 | 0.6512 | 0.6974 |
| DT | 0.7713 | 0.7115 | 0.8172 | 0.5936 | 0.6942 | 0.7494 |
| RF | 0.9041 | 0.8305 | 0.8772 | 0.7808 | 0.8185 | 0.8443 |
| Logist | 0.6465 | 0.5964 | 0.7068 | 0.4904 | 0.5748 | 0.6323 |
| CR+SVM | 0.7735 | 0.7070 | 0.8071 | 0.6124 | 0.6696 | 0.7305 |
| DNN+SVM | 0.7072 | 0.6298 | 0.8133 | 0.4539 | 0.5927 | 0.6837 |
| DCCA+SVM | 0.6120 | 0.5639 | 0.7106 | 0.4068 | 0.6490 | 0.5890 |

TABLE S4: The comparison of classification performance (WRAT classification using rest-emoId combination).

| Classifier | AUC | ACC | SEN | SPF | PRC | F1 |
|------------|--------|--------|--------|--------|--------|--------|
| DCL+SVM | 0.9264 | 0.8574 | 0.8489 | 0.8687 | 0.8675 | 0.8562 |
| DCL+DT | 0.9172 | 0.8648 | 0.8178 | 0.9142 | 0.9066 | 0.8575 |
| DCL+RF | 0.9217 | 0.8520 | 0.8124 | 0.8974 | 0.8902 | 0.8453 |
| SVM | 0.7114 | 0.6529 | 0.7693 | 0.5466 | 0.6407 | 0.6921 |
| DT | 0.8035 | 0.7352 | 0.8661 | 0.6056 | 0.6901 | 0.7665 |
| RF | 0.8982 | 0.8247 | 0.9180 | 0.7341 | 0.7780 | 0.8394 |
| Logist | 0.7653 | 0.7097 | 0.8098 | 0.6099 | 0.6774 | 0.7360 |
| CR+SVM | 0.7729 | 0.6908 | 0.8116 | 0.5730 | 0.6645 | 0.7270 |
| DNN+SVM | 0.6942 | 0.6108 | 0.8470 | 0.3723 | 0.5853 | 0.6886 |
| DCCA+SVM | 0.6332 | 0.5342 | 0.7665 | 0.3244 | 0.5804 | 0.5774 |

TABLE S5: The comparison of classification performance (WRAT classification using nback-emoind combination).

| Classifier | AUC | ACC | SEN | SPF | PRC | F1 |
|-------------------|------------|------------|------------|------------|------------|-----------|
| DCL+SVM | 0.9448 | 0.8761 | 0.8510 | 0.9025 | 0.9039 | 0.8749 |
| DCL+DT | 0.9455 | 0.8768 | 0.8408 | 0.9155 | 0.9141 | 0.8740 |
| DCL+RF | 0.9501 | 0.8831 | 0.8473 | 0.9213 | 0.9185 | 0.8804 |
| SVM | 0.8017 | 0.7080 | 0.7572 | 0.6754 | 0.6838 | 0.7110 |
| DT | 0.8289 | 0.7578 | 0.8220 | 0.6916 | 0.7345 | 0.7750 |
| RF | 0.9336 | 0.8610 | 0.8795 | 0.8426 | 0.8543 | 0.8644 |
| Logist | 0.7537 | 0.6854 | 0.7496 | 0.6325 | 0.6511 | 0.6920 |
| CR+SVM | 0.8349 | 0.7472 | 0.8408 | 0.6672 | 0.6978 | 0.7596 |
| DNN+SVM | 0.7749 | 0.6921 | 0.8535 | 0.5491 | 0.6336 | 0.7250 |
| DCCA+SVM | 0.6186 | 0.5345 | 0.4677 | 0.6076 | 0.6858 | 0.3950 |