**Table S7.** The tuned hyperparameters for all models

|  |  |  |
| --- | --- | --- |
| Model  |  Hyperparameters | Tuned Hyperparameters |
| LR | penalty: [l1, l2, elasticnet] | penalty: l2 |
| C: [0.001, 0.01, 0.1, 1, 10, 100] | C: 0.1 |
| solver: [newton-cg, lbfgs, saga, liblinear] | solver: saga |
| max\_iter: [100, 500, 1000] | max\_iter: 500 |
| KNN | n\_neighbors: [2, 3, 4] | n\_neighbors: 3 |
| algorithm: [auto, ball\_tree, kd\_tree, brute] | algorithm: brute |
| DT   | criterion: [gini, entropy] | criterion: Gini |
| max\_depth: [2, 3] | max\_depth: 3 |
| min\_samples\_leaf: [5, 6] | min\_samples\_leaf: 5 |
| RF     | n\_estimators: [50, 100, 150, 200] | n\_estimators: 150 |
| max\_depth: [None, 10, 20] | max\_depth: 10 |
| min\_samples\_split: [2, 5, 10] | min\_samples\_split: 5 |
| min\_samples\_leaf: [1, 2, 4] | min\_samples\_leaf: 2 |
| max\_features: [auto, sqrt, log2] | max\_features: log2 |
| SVM  | C: [0.5, 0.7, 0.9, 1] | C: 0.7 |
| kernel: [rbf, poly, sigmoid, linear] | kernel: sigmoid |
|  XGBoost       | learning\_rate: [0.01, 0.1, 0.2] | learning\_rate: 0.2 |
| n\_estimators: [50, 100, 200] | n\_estimators: 100 |
| max\_depth: [3, 4, 5] | max\_depth: 5 |
| min\_child\_weight: [1, 2, 3] | min\_child\_weight: 2 |
| subsample: [0.8, 1.0] | subsample: 0.8 |
| colsample\_bytree: [0.8, 1.0] | colsample\_bytree: 1.0 |
| CNN | number of filters: [32, 64, 128]  | number of filters: 64 |
| filter size: [(3, 3), (5, 5)]  | filter size: (3, 3) |
| pool size: [(2,2), (3, 3), (5, 5)]  | pool size: (3, 3) |
| dense neurons: [128, 256, 512]  | dense neurons: 128  |
| dropout rate: [0.25, 0.5, 0.75]  | dropout rate: 0.5  |
| DL | Optimizer: [adam, sgd, rmsprop] | Optimizer: adam |
| Learning rate: [0.001, 0.01, 0.1] | Learning rate: 0.1 |
| Batch size: [16, 32, 64] | Batch size: 32 |
| dropout rate: [0.25, 0.5, 0.75]  | dropout rate: 0.25  |