



Model Optimization and Tuning Phase Template

Date	17 July 2024
Team ID	xxxxxx
Project Title	Detection of Autistic Spectrum Disorder: Classification
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.





Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters
Logistic Regression	C: Regularization strength C: Controls the regularization strength. Smaller values specify stronger regularization. C: Controls the regularization strength. Smaller values specify stronger regularization. ### Controls the regularization strength to use for optimization. #### Controls the regularization strength to use for optimization. ###################################





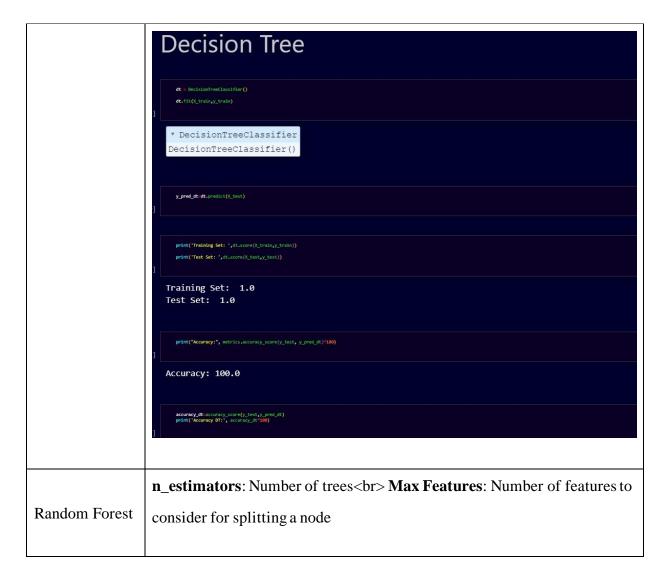
C: Regularization parameter
 Kernel: Type of kernel used

br> Gamma: Kernel coefficient **SVC** from sklearn.svm import SVC
svm=SVC(kernel='rbf', random_state=0) svm.fit(X_train, y_train) SVC SVC(random state=0) **SVM** y_pred_svc=svm.predict(X_test) print('Training Set: ', svm.score (X_train,y_train)) print('Testing Set:',svm.score(X_test,y_test)) Training Set: 0.9530516431924883 Testing Set: 0.9453551912568307 accuracy_SVC=svm.score(X_test,y_test) print('Accuracy_SVM:', accuracy_SVC*100) Max Depth: Maximum depth of the tree

Split: **Decision Tree** Minimum number of samples required to split an internal node

















Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Logistic Regression	C: Controls the regularization strength. Smaller values specify stronger regularization. Solver: Algorithm to use for optimization.
SVM	C: Controls the trade-off between achieving a low training error and a low testing error. Kernel: Defines the type of kernel function. Gamma: Determines the influence of a single training example.
Decision Tree	Max Depth: Limits the depth of the tree to prevent overfitting. Min Samples Split: Ensures that nodes are split only if a minimum number of samples is met.
Random Forest	n_estimators: The number of trees in the forest. The number of features to consider when looking for the best split
KNN	n_neighbors: The number of neighbors to use for classification. Metric: The distance metric used for finding neighbors.