

Supplementary Table 1 – Hyperparameters used for AUROC-optimized Machine Learning models. N/A = Not Applicable.

BCLM Cluster	ML Model Description from <i>caret</i>	R Library::R Function	Hyperparameter	Description	Value
CD14+	Least Squares Support Vector Machine with Polynomial Kernel	<i>kernlab::svmPoly()</i>	degree	Polynomial Degree	1
			scale	Scale	0.01
			tau	Regularization Parameter	128
CD163+	Neural Network	<i>nnet::nnet()</i>	size	#Hidden Units	15
			decay	Weight Decay	0.00750
CD163+MMP9+	Bayesian Generalized Linear Model	<i>stats::glm()</i>	N/A	N/A	N/A
CD206+	Model Averaged Neural Network	<i>nnet::avNNet()</i>	size	#Hidden Units	5
			decay	Weight Decay	1e-04
			bag	Bagging	FALSE
CD31+	Least Squares Support Vector Machine with Polynomial Kernel	<i>kernlab::svmPoly()</i>	degree	Polynomial Degree	3
			scale	Scale	10
			tau	Regularization Parameter	32
CD4+PD1+	Boosted Generalized Linear Model	<i>mboost::glmboost()</i>	mstop	# Boosting Iterations	500
			prune	AIC Prune	No
CD56+	Boosted Generalized Linear Model	<i>mboost::glmboost()</i>	mstop	# Boosting Iterations	100
			prune	AIC Prune	No
CD68+	Neural Network	<i>nnet::nnet()</i>	size	#Hidden Units	3
			decay	Weight Decay	0.000562
CD68+CD163+CD206+	Quantile Random Forest	<i>randomForest::rf()</i>	mtry	#Randomly Selected Predictors	2
CD68+MMP9+	Boosted Generalized Linear Model	<i>mboost::glmboost()</i>	mstop	# Boosting Iterations	500
			prune	AIC Prune	No
CD8a+PD1+	k-Nearest Neighbors	<i>caret::knn()</i>	kmax	Max. #Neighbors	7
			distance	Distance	7
			kernel	Kernel	7

CD8a+PD1-	Neural Networks with Feature Extraction	<i>nnet::pcaNNet()</i>	size	#Hidden Units	3
			decay	Weight Decay	0.1
Collagen+	Boosted Generalized Linear Model	<i>mboost::glmboost()</i>	mstop	# Boosting Iterations	150
			prune	AIC Prune	No
E-cad+	Oblique Random Forest	<i>obliqueRF::ORFsvm()</i>	mtry	#Randomly Selected Predictors	6
HIF1 $\alpha$ +	Quantile Random Forest	<i>randomForest::rf()</i>	mtry	#Randomly Selected Predictors	3
Ki-67+	Bayesian Generalized Linear Model	<i>stats::glm()</i>	N/A	N/A	N/A
MMP9+	Boosted Generalized Linear Model	<i>mboost::glmboost()</i>	mstop	# Boosting Iterations	400
			prune	AIC Prune	No
PD-L1+	Model Averaged Neural Network	<i>nnet::avNNet()</i>	size	#Hidden Units	1
			decay	Weight Decay	1e-04
			bag	Bagging	False
pERK+	Boosted Generalized Linear Model	<i>mboost::glmboost()</i>	mstop	# Boosting Iterations	300
			prune	AIC Prune	no
$\alpha$ SMA+	Least Squares Support Vector Machine with Polynomial Kernel	<i>kernlab::svmPoly()</i>	degree	Polynomial Degree	2
			scale	Scale	1000
			tau	Regularization Parameter	64