Supplementary Material

**Ensemble Learning Enhances the Precision of Preliminary Detection of Primary Hepatocellular Carcinoma Based on Serological and Demographic Indices**

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# Hyperparameter Details of the ML models

The hyperparameters of each model used in the study are listed in the following table:

|  |  |  |
| --- | --- | --- |
| Model | Parameter | Value |
| RF | max\_depth | None |
| n\_estimators | 100 |
| criterion | gini |
| min\_samples\_leaf | 1 |
| min\_samples\_split | 2 |
| LightGBM | n\_estimators  num\_leaves | 100  31 |
| min\_child\_weight | 1e-3 |
| min\_child\_samples | 20 |
| learning\_rate | 0.1 |
| Xgboost | max\_depth  n\_estimators | 6  100 |
| colsample\_bytree | 1.0 |
| min\_child\_weight | 1 |
| learning\_rate | 0.3 |
| Catboost | iterations  depth | 1000  6 |
| loss\_function | LogLoss |
| learning\_rate | 0.03 |
| MLP | hidden\_layer\_sizes | (100,) |
| activation | relu |
| solver | adam |
| max\_iter  learning\_rate | 200  0.001 |
| KNN | n\_neighbors | 5 |
| weights | uniform |
| leaf\_size | 30 |
| metric | minkowski |
| SVM | kernel | rbf |
| degree  cache\_size  decision\_function\_shape | 3  200  ovr |