# *Supplementary Material*

## 1 Supplementary

### Supplementary Table.

**Supplementary Table1:** Ranking of variable importance based on Recursive Feature Elimination (RFE) feature reduction strategies.

| Variables | Rank in MES | MES-SMOTE | Rank in UCEIS | UCEIS-SMOTE |
|---|---|---|---|---|
| Albumin | 1 | 1 | 1 | 1 |
| CRP/ALB | 2 | 2 | 2 | 2 |
| Urea | 3 | | - | - |
| Disease duration | - | - | 4 | 9 |
| Hematocrit | 4 | 5 | 14 | 10 |
| CRP | 5 | 8 | 6 | 4 |
| ESR | 6 | 4 | 5 | 3 |
| Platelets | 7 | 9 | 7 | 7 |
| Monocyte | 8 | 11 | 12 | 12 |
| Pulse rate | 9 | 6 | 11 | 5 |
| White blood cells | 10 | 16 | 8 | 13 |
| Plateletcrit | 11 | 14 | 13 | 14 |
| Stool frequency | 12 | 3 | 19 | 11 |
| Hemoglobin | 13 | 18 | 16 | 17 |
| Neutrophils | 14 | 12 | 3 | 8 |
| Mean corpuscular volume | 15 | 10 | - | - |
| Lymphocyte | 16 | 20 | 15 | 15 |
| Weight | 17 | 19 | 9 | 16 |
| Rectal bleeding | 18 | 7 | 17 | 6 |
| Mean platelet volume | 19 | 21 | 10 | 18 |
| Decrease of weight | 20 | 22 | 18 | 19 |
| Hormone | 21 | 17 | 21 | 22 |
| Disease location | 22 | 13 | 20 | 20 |
| 5-ASA | - | - | 23 | 23 |
| Immunomodulator therapy | 23 | 23 | 22 | 21 |

ESR: erythrocyte sedimentation rate; CRP: C-reactive protein; ALB: Albumin; 5-ASA: 5-aminosalicylic acid.

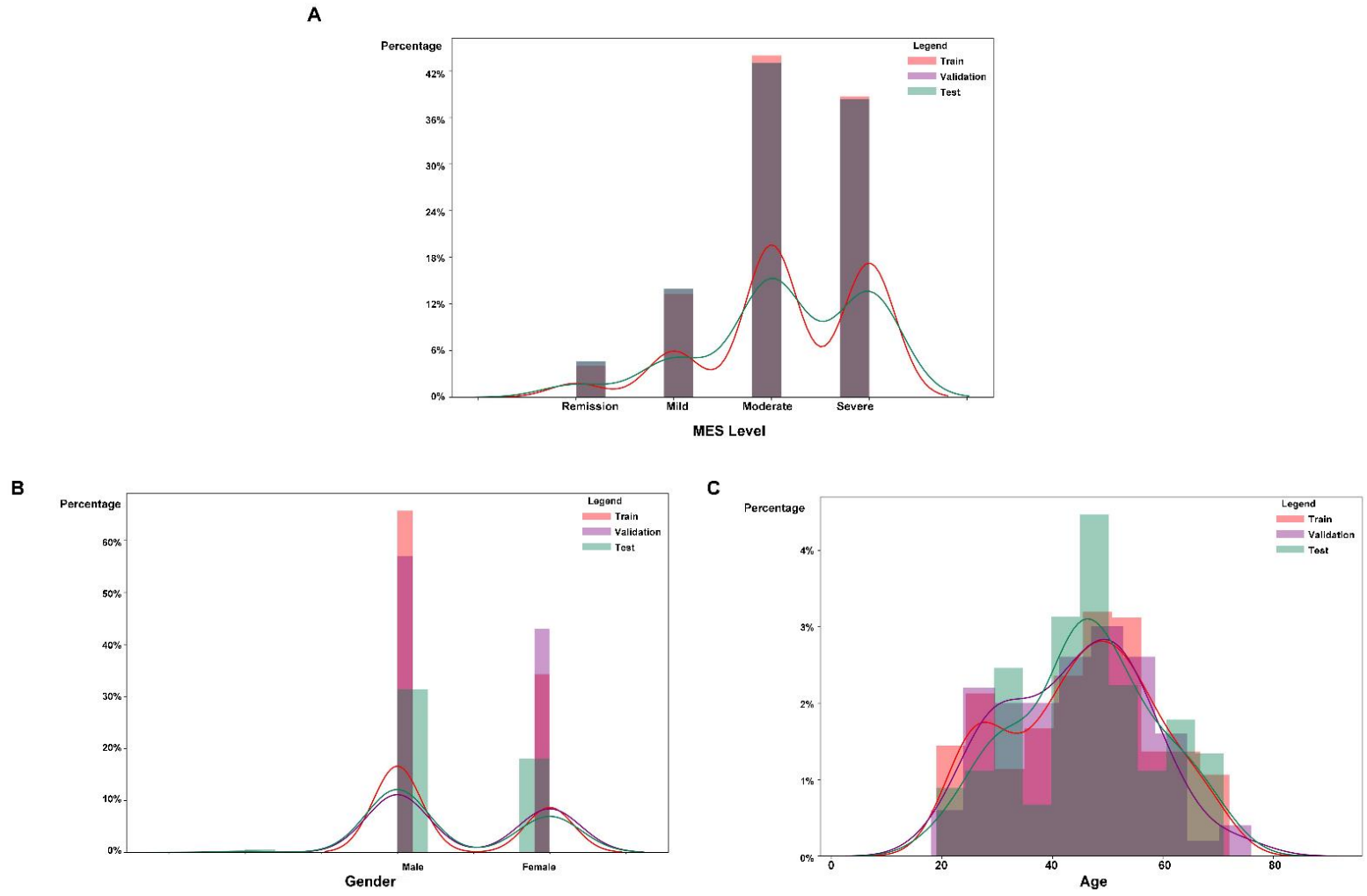
**Supplementary Table 2.**

**Supplementary Table 2:** Optimization results of hyperparameters for each model.

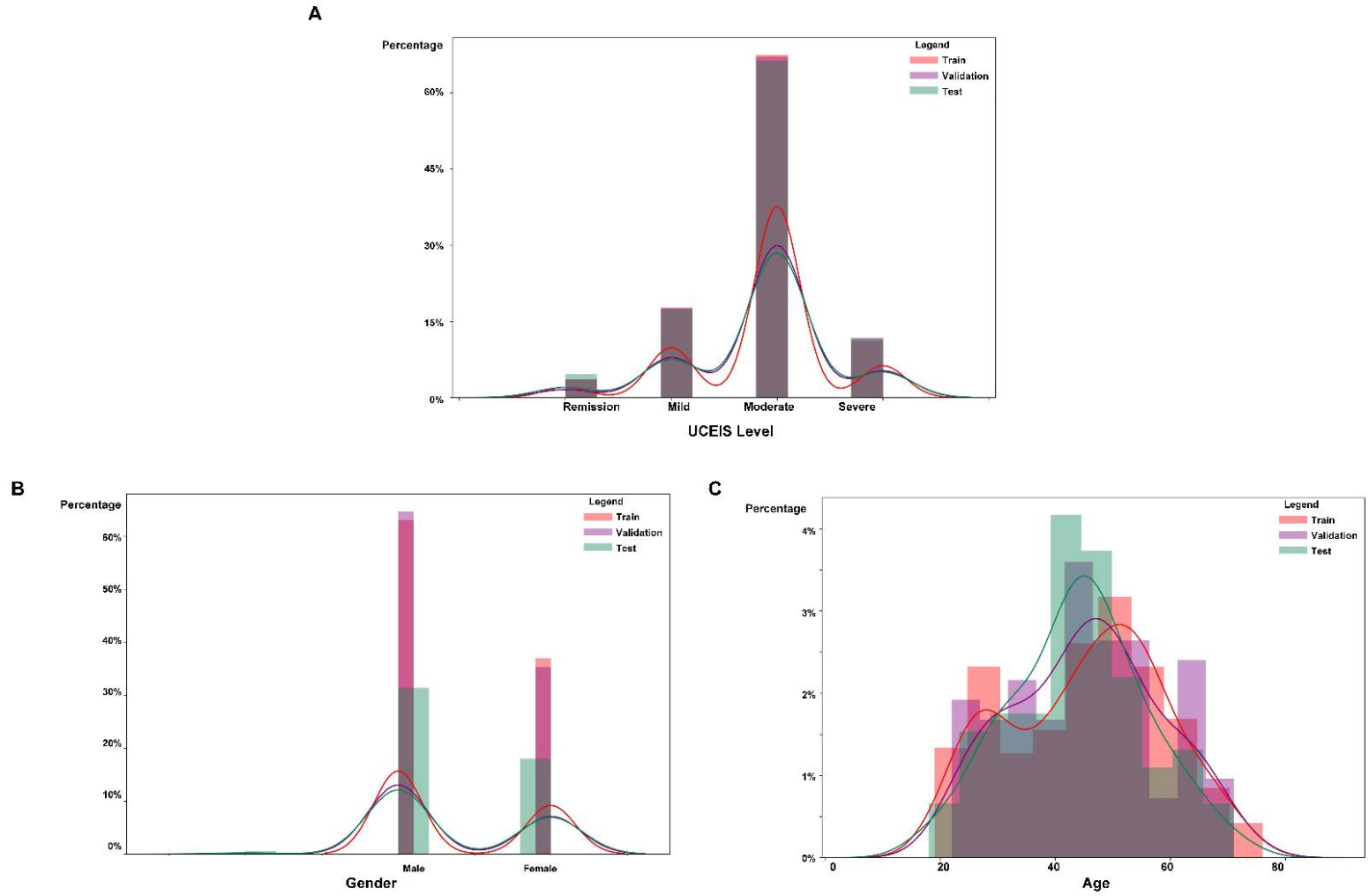
| Algorithms | Parameters | MES Original | MES SMOTE | UCEIS Original | UCEIS SMOTE |
|---|---|---|---|---|---|
| **RF** | Number of trees （n_estimators） | 36 | 44 | 50 | 64 |
| | Maximum tree depth (max_depth) | 12 | 8 | 11 | 16 |
| | Max features (max_features) | 5 | 9 | 6 | 4 |
| | Minimum number of samples required to split an internal leaf node (min_samples_split) | 2 | 2 | 2 | 2 |
| **XGBoost** | Number of trees (n_estimators) | 52 | 26 | 36 | 88 |
| | Learning rate (eta) | 0.1 | 0.1 | 0.1 | 0.1 |
| | Maximum tree depth (max_depth) | 1 | 4 | 4 | 4 |
| | Number of iterations （num_boost_round） | 1 | 1 | 1 | 1 |
| **MLP** | Hidden layers | 1 | 1 | 1 | 1 |
| | Number of nodes | 46 | 40 | 54 | 38 |

RF: random forests; XGBoost, extreme gradient boost; MLP: multilayer perceptron; MES: mayo endoscopic subscore; UCEIS: ulcerative colitis endoscopic index of severity; SMOTE: synthetic minority oversampling technique.

**Supplementary Figures.**




**Supplementary Figure 1.** Distribution of MES level (A), gender (B), and age (C) of patients in the training set, validation set, and test set in MES data. The area of the bar represents the percentage of this category in the total population, and the lines represent distribution curves. The distribution of patients in the training set, validation set, and test set are basically the same.




**Supplementary Figure 2.** Distribution of UCEIS level (A), gender (B), and age (C) of patients in the training set, validation set, and test set in UCEIS data. The area of the bar represents the percentage of this category in the total population, and the lines represent distribution curves. The distribution of patients in the training set, validation set, and test set are basically the same.