**Supplemental File 2. Difference between each deep-leaning and machine-learning prediction model**

1. Supplemental material table 2-1. Characteristics of prediction models

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 　 | **Multivariable logistic regression** |  | **Random forest** |  | **Support****vector machine** |  | **Bayesian inference** |  | **Deep neural network** |
| 　 | **HR (95% CI)** | ***p*** | **Dev.diff.** |  | **Mean decrease Gini** |  | **Sens. analysis** |  | **HR (95% credible intervals)** | **Dev.diff.** |  | **AUC diff.** |
| **Demographics** | 　 | 　 | 　 | 　 | 　 |
|  Age (years) | 1.034 (1.022–1.047) | <0.001 | 31.4  | 　 | 57.81  | 　 | 0.207  | 　 | 1.036 (1.025–1.049) | 31.3  | 　 | 0.0117  |
|  Male | 2.222 (1.662–2.987) | <0.001 | 29.8  | 　 | 6.62  | 　 | 0.000  | 　 | 2.166 (1.798–2.851) | 29.7  | 　 | 0.0036  |
|  BMI (kg/m2) | 0.891 (0.855–0.928) | <0.001 | 32.0  | 　 | 52.66  | 　 | 0.236  | 　 | 0.884 (0.858–0.923) | 31.9  | 　 | 0.0065  |
| **Vital signs** 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
|  SBP(mmHg) | 0.983 (0.973–0.992) | <0.001 | 13.6  | 　 | 54.11  | 　 | 0.020  | 　 | 0.983 (0.974–0.992) | 13.5  | 　 | 0.0176  |
|  DBP(mmHg) | 1.012 (0.998–1.025) | .082 | 3.0  | 　 | 34.86  | 　 | 0.012  | 　 | 1.012 (0.999–1.028) | 2.9  | 　 | 0.0097  |
|  HR (/min) | 1.014 (1.009–1.019) | <0.001 | 28.3  | 　 | 17.58  | 　 | 0.026  | 　 | 1.014 (1.009–1.018) | 28.2  | 　 | 0.0063  |
| **Electrocardiography** | 　 | 　 | 0.7999  |
|  AF (%) | 1.085 (0.796–1.473) | 0.603 | 0.3  | 　 | 5.27  | 　 | 0.001  | 　 | 1.069 (0.775–1.349) | 0.2  | 　 | 0.0115  |
|  QRS duration (ms) | 1.009 (1.003–1.015) | 0.001 | 10.1  | 　 | 26.62  | 　 | 0.013  | 　 | 1.008 (1.003–1.013) | 10.0  | 　 | 0.0135  |
|  QTc (ms) | 0.995 (0.991–0.998) | 0.002 | 10.2  | 　 | 17.98  | 　 | 0.078  | 　 | 0.995 (0.992–0.999) | 10.1  | 　 | 0.0095  |
| **Echocardiography**　 | 　 | 　 | 　 | 　 | 　 |
|  LAD (mm) | 1.046 (1.034–1.059) | <0.001 | 54.3  | 　 | 68.48  | 　 | 0.019  | 　 | 1.047 (1.035–1.056) | 54.2  | 　 | 0.0055  |
|  LVDd (mm) | 1.042 (1.007–1.077) | 0.017 | 5.7  | 　 | 42.81  | 　 | 0.018  | 　 | 1.046 (1.000–1.076) | 5.6  | 　 | 0.0106  |
|  LVDs (mm) | 0.949 (0.918–0.981) | 0.002 | 9.4  | 　 | 44.58  | 　 | 0.013  | 　 | 0.948 (0.920–0.986) | 9.3  | 　 | 0.0098  |
|  EF (%) | 0.988(0.975–1.002) | 0.097 | 2.8  | 　 | 44.55  | 　 | 0.007  | 　 | 0.989 (0.973–1.004) | 2.7  | 　 | 0.0180  |
| **Laboratory test**　 | 　 | 　 | 　 | 　 | 　 |
| WBC (/mL) | 1.000 (1.000–1.000) | <0.001 | 258.4  | 　 | 155.01  | 　 | 0.109  | 　 | 1.000 (1.000–1.000) | 258.3  | 　 | 0.0234  |
| Hb (g/dL) | 0.859 (0.793–0.930) | <0.001 | 14.2  | 　 | 68.40  | 　 | 0.011  | 　 | 0.869 (0.802–0.925) | 14.1  | 　 | 0.0067  |
|  Platelets (/mL) | 1.000 (1.000–1.000) | <0.001 | 119.0  | 　 | 117.10  | 　 | 0.014  | 　 | 1.000 (1.000–1.000) | 288.4  | 　 | 0.0143  |
|  Alb(g/dL) | 0.131 (0.101–0.168) | <0.001 | 288.5  | 　 | 154.37  | 　 | 0.019  | 　 | 0.128 (0.098–0.164) | 118.9  | 　 | 0.0150  |
|  Sodium (mmol/L) | 1.022 (0.997–1.048) | 0.087 | 3.0  | 　 | 88.96  | 　 | 0.095  | 　 | 1.027 (1.002–1.053) | 2.9  | 　 | 0.0094  |
| Potassium (mmol/L) | 1.464 (1.191–1.802) | <0.001 | 13.1  | 　 | 43.33  | 　 | 0.013  | 　 | 1.496 (1.257–1.806) | 13.0  | 　 | 0.0035  |
| BUN(mg/dL) | 1.034 (1.026–1.042) | <0.001 | 69.3  | 　 | 93.74  | 　 | 0.015  | 　 | 1.035 (1.029–1.043) | 69.2  | 　 | 0.0126  |
| Cr (mg/dL) | 0.715 (0.619–0.815) | <0.001 | 29.0  | 　 | 72.78  | 　 | 0.061  | 　 | 0.707 (0.614–0.783) | 28.9  | 　 | 0.0092  |
|  Glucose (mg/dL) | 1.006 (1.004–1.008) | <0.001 | 43.5  | 　 | 56.78  | 　 | 0.015  | 　 | 1.006 (1.004–1.008) | 43.4  | 　 | 0.0083  |

2. Supplemental material table 2-2. Variable importance of each prediction model

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rank | **Logistic regression** | **Random Forest** | **Support vector machine** | **Bayesian Network** | **Deep-learning** |
| 1 | Alb | WBC | BMI | PLT | WBC |
| 2 | WBC | Alb | Age | WBC | EF |
| 3 | PLT | PLT | WBC | Alb | SBP |
| 4 | BUN | BUN | Sodium | BUN | Alb |
| 5 | LAD | Sodium | QTc | LAD | PLT |
| 6 | Glucose | Cr | Cr | Glucose | QRS |
| 7 | BMI | LAD | HR | BMI | BUN |
| 8 | Age | Hb | SBP | Age | Age |
| 9 | Sex | Age | LAD | Sex | Afib |
| 10 | Cr | Glucose | Alb | Cr | LVDd |
| 11 | HR | SBP | LVDd | HR | LVDs |
| 12 | Hb | BMI | Glucose | Hb | DBP |
| 13 | SBP | LVDs | BUN | SBP | QTc |
| 14 | Potassium | EF | PLT | Potassium | Sodium |
| 15 | QTc | Potassium | LVDs | QTc | Cr |
| 16 | QRS | LVDd | QRS | QRS | Glucose |
| 17 | LVDs | DBP | Potassium | LVDs | Hb |
| 18 | LVDd | QRS | DBP | LVDd | BMI |
| 19 | DBP | QTc | Hb | DBP | HR |
| 20 | Sodium | HR | EF | Sodium | LAD |
| 21 | EF | Sex | Afib | EF | Sex |
| 22 | Afib | Afib | Sex | Afib | Potassium |