

**Additional Table 2.** Average AUROC across terms and average  $F_{max}$ , Precision and Recall across genes of HTD and TPR ensemble variants using RANKS and SVMs as base learner and the UA integrated network. Results are estimated through 5-fold cross-validation. For each sub-ontology and each metric best results are highlighted in bold. Results significantly better than all the others methods according to the Wilcoxon Rank Sum test ( $\alpha = 10^{-6}$ ) are underlined.

| Subontology        | Method       | AUROC         | $F_{max}$     | Precision     | Recall        |
|--------------------|--------------|---------------|---------------|---------------|---------------|
| <b>Organ</b>       | RANKS        | 0.8493        | 0.3106        | 0.2407        | 0.4377        |
|                    | SVM          | 0.7128        | 0.1668        | 0.1688        | 0.1648        |
|                    | HTD-RANKS    | 0.8446        | 0.3411        | 0.2717        | 0.4583        |
|                    | HTD-SVM      | 0.8328        | 0.3155        | 0.2370        | 0.4718        |
|                    | TPR-T-RANKS  | <b>0.8646</b> | 0.3575        | 0.2933        | 0.4586        |
|                    | TPR-T-SVM    | 0.8240        | 0.3155        | 0.2370        | 0.4718        |
|                    | TPR-D-RANKS  | 0.8408        | <b>0.3773</b> | <b>0.3231</b> | 0.4538        |
|                    | TPR-D-SVM    | 0.7883        | 0.3209        | 0.2800        | 0.3782        |
|                    | TPR-TF-RANKS | 0.8420        | 0.3547        | 0.2880        | 0.4615        |
|                    | TPR-TF-SVM   | 0.7060        | 0.2359        | 0.2074        | 0.2736        |
|                    | TPR-W-RANKS  | 0.8377        | 0.3620        | 0.3025        | 0.4515        |
|                    | TPR-W-SVM    | 0.8238        | 0.3171        | 0.2343        | <b>0.4916</b> |
| <b>Inheritance</b> | RANKS        | 0.8715        | 0.5986        | 0.4709        | 0.8215        |
|                    | SVM          | 0.7637        | 0.1668        | 0.1688        | 0.1648        |
|                    | HTD-RANKS    | <b>0.8846</b> | 0.6034        | 0.4709        | 0.8396        |
|                    | HTD-SVM      | 0.7991        | 0.5429        | 0.3885        | 0.9008        |
|                    | TPR-T-RANKS  | 0.8708        | 0.6066        | <b>0.4795</b> | 0.8276        |
|                    | TPR-T-SVM    | 0.7909        | 0.5444        | 0.3892        | 0.9063        |
|                    | TPR-D-RANKS  | 0.8659        | 0.6064        | 0.4793        | 0.8278        |
|                    | TPR-D-SVM    | 0.7919        | 0.5441        | 0.3889        | 0.9063        |
|                    | TPR-TF-RANKS | 0.8675        | 0.6029        | 0.4757        | 0.8228        |
|                    | TPR-TF-SVM   | 0.7546        | 0.4480        | 0.2972        | <b>0.9099</b> |
|                    | TPR-W-RANKS  | 0.8636        | <b>0.6070</b> | 0.4769        | 0.8355        |
|                    | TPR-W-SVM    | 0.7900        | 0.5448        | 0.3897        | 0.9059        |
| <b>Onset</b>       | RANKS        | 0.8159        | 0.4494        | 0.3821        | 0.5455        |
|                    | SVM          | 0.7025        | 0.3978        | 0.2717        | 0.7421        |
|                    | HTD-RANKS    | <b>0.8253</b> | 0.4466        | 0.3563        | 0.5981        |
|                    | HTD-SVM      | 0.7781        | 0.4492        | 0.3374        | 0.6719        |
|                    | TPR-T-RANKS  | 0.8249        | 0.4631        | 0.3791        | 0.6021        |
|                    | TPR-T-SVM    | 0.7511        | 0.4517        | 0.3385        | 0.6813        |
|                    | TPR-D-RANKS  | 0.8170        | <b>0.4684</b> | 0.3839        | 0.6077        |
|                    | TPR-D-SVM    | 0.7513        | 0.4519        | 0.3394        | 0.6780        |
|                    | TPR-TF-RANKS | 0.8148        | 0.4553        | 0.3782        | 0.5718        |
|                    | TPR-TF-SVM   | 0.6788        | 0.3983        | 0.2714        | <b>0.7483</b> |
|                    | TPR-W-RANKS  | 0.7901        | 0.4682        | <b>0.3914</b> | 0.5856        |
|                    | TPR-W-SVM    | 0.7496        | 0.4522        | 0.3404        | 0.6757        |