| Dataset | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|---|---------------------------------|-----------------------------------|---------------------------------|----------------------------------|-----------------------------------|---------------------------------|-----------------------------------|
| glass4 | 0.750 ± 0.158 | 0.904 ± 0.142 | 0.905 ± 0.142 | 0.779 ± 0.148 | 0.843 ± 0.163 | 0.794 ± 0.131 | 0.866 ± 0.152 |
| ecoli- 0 - 2 - 3 - 4 - vs - 5 | 0.890 ± 0.083 | 0.910 ± 0.078 | 0.908 ± 0.078 | $0.908 \stackrel{-}{\pm} 0.079$ | 0.907 ± 0.078 | $0.910 \stackrel{-}{\pm} 0.081$ | 0.906 ± 0.078 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.522 ± 0.062 | 0.676 ± 0.132 | 0.643 ± 0.124 | 0.712 ± 0.136 | $0.739 \stackrel{7}{\pm} 0.101$ | 0.737 ± 0.099 | 0.738 ± 0.096 |
| ecoli-0-1-vs-5 | 0.891 ± 0.089 | $0.918 \stackrel{1,3}{\pm} 0.074$ | $0.916 \stackrel{1}{\pm} 0.073$ | 0.906 ± 0.078 | 0.914 ± 0.077 | 0.913 ± 0.077 | 0.914 ± 0.073 |
| yeast-1-4-5-8-vs-7 | 0.501 ± 0.010 | 0.547 ± 0.075 | 0.553 ± 0.077 | 0.556 ± 0.081 | 0.593 ± 0.081 | 0.600 ± 0.102 | 0.613 ± 0.096 |
| ecoli4 | 0.894 ± 0.100 | $0.918 \stackrel{1}{\pm} 0.094$ | 0.917 ± 0.094 | $0.925 \stackrel{1}{\pm} 0.090$ | 0.933 ± 0.086 | 0.927 ± 0.080 | 0.927 ± 0.083 |
| led7 digit - 0 - 2 - 4 - 5 - 6 - 7 - 8 - 9 - vs - 1 | 0.635 ± 0.077 | 0.899 ± 0.066 | 0.857 ± 0.121 | $0.585 \overset{2,3}{\pm} 0.091$ | 0.657 ± 0.088 | $0.867 \stackrel{4}{\pm} 0.080$ | $0.871 \stackrel{4}{\pm} 0.058$ |
| glass5 | 0.648 ± 0.165 | $0.823 \stackrel{all}{\pm} 0.196$ | 0.823 ± 0.203 | 0.824 ± 0.187 | 0.870 ± 0.172 | 0.795 ± 0.187 | 0.875 ± 0.171 |
| ecoli-0-3-4-6-vs-5 | 0.895 ± 0.094 | $0.908 \stackrel{1,6}{\pm} 0.089$ | 0.906 ± 0.089 | 0.893 ± 0.087 | $0.901 \stackrel{1}{\pm} 0.093$ | $0.908 \stackrel{1}{\pm} 0.090$ | 0.897 ± 0.092 |
| yeast - 0 - 5 - 6 - 7 - 9 - vs - 4 | 0.649 ± 0.074 | $0.793 \stackrel{7}{\pm} 0.065$ | 0.797 ± 0.061 | 0.764 ± 0.062 | 0.795 ± 0.053 | $0.800 \stackrel{7}{\pm} 0.057$ | 0.805 ± 0.051 |
| yeast6 | 0.757 ± 0.091 | $0.821\overset{1,4}{\pm}0.087$ | 0.818 ± 0.083 | $0.821 \stackrel{1}{\pm} 0.083$ | $0.835 \stackrel{1,4}{\pm} 0.086$ | 0.874 ± 0.063 | 0.879 ± 0.059 |
| ecoli-0-6-7-vs-5 | 0.840 ± 0.108 | 0.876 ± 0.101 | 0.865 ± 0.100 | 0.865 ± 0.098 | 0.869 ± 0.105 | 0.873 ± 0.096 | 0.868 ± 0.108 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.668 ± 0.151 | 0.868 ± 0.157 | 0.853 ± 0.165 | 0.794 ± 0.175 | 0.898 ± 0.145 | 0.795 ± 0.169 | 0.897 ± 0.145 |
| ecoli-0-1-3-7-vs-2-6 | 0.850 ± 0.200 | $0.841 \overset{1,4}{\pm} 0.197$ | $0.843 \stackrel{1}{\pm} 0.198$ | $0.849 \stackrel{1}{\pm} 0.200$ | $0.840\overset{1,4}{\pm}0.205$ | $0.718 \stackrel{1}{\pm} 0.203$ | 0.825 ± 0.195 |
| yeast - 0 - 2 - 5 - 6 - vs - 3 - 7 - 8 - 9 | 0.756 ± 0.042 | 0.790 ± 0.041 | 0.788 ± 0.042 | 0.759 ± 0.052 | 0.789 ± 0.047 | 0.778 ± 0.052 | 0.780 ± 0.048 |
| ecoli-0-1-4-7-vs-5-6 | 0.865 ± 0.098 | 0.894 ± 0.085 | 0.894 ± 0.076 | 0.888 ± 0.081 | 0.900 ± 0.076 | 0.900 ± 0.065 | 0.903 ± 0.060 |
| yeast5 | $0.821 \stackrel{-}{\pm} 0.064$ | 0.929 ± 0.052 | 0.929 ± 0.048 | 0.906 ± 0.064 | 0.938 ± 0.052 | $0.938 \stackrel{-}{\pm} 0.044$ | 0.965 ± 0.032 |
| shuttle- $c2$ - vs - $c4$ | 0.585 ± 0.177 | $0.995 \stackrel{1}{\pm} 0.034$ | $0.995 \stackrel{1}{\pm} 0.034$ | $0.710 \stackrel{1}{\pm} 0.231$ | 0.930 ± 0.166 | 0.580 ± 0.161 | 0.930 ± 0.166 |
| ecoli-0-1-4-7-vs-2-3-5-6 | 0.833 ± 0.100 | 0.852 ± 0.077 | 0.857 ± 0.076 | 0.855 ± 0.082 | 0.858 ± 0.082 | 0.839 ± 0.077 | 0.839 ± 0.071 |
| $yeast \hbox{-} 0 \hbox{-} 3 \hbox{-} 5 \hbox{-} 9 \hbox{-} vs \hbox{-} 7 \hbox{-} 8$ | 0.641 ± 0.058 | 0.707 ± 0.064 | 0.697 ± 0.070 | 0.629 ± 0.053 | 0.659 ± 0.062 | 0.702 ± 0.067 | 0.722 ± 0.055 |
| yeast-1-vs-7 | 0.529 ± 0.043 | 0.631 ± 0.098 | 0.634 ± 0.099 | 0.620 ± 0.087 | 0.632 ± 0.101 | 0.644 ± 0.105 | 0.671 ± 0.111 |
| yeast-1-2-8-9-vs-7 | 0.508 ± 0.024 | $0.623 \stackrel{1}{\pm} 0.085$ | 0.634 ± 0.088 | $0.574 \stackrel{1}{\pm} 0.075$ | $0.643 \stackrel{1}{\pm} 0.092$ | $0.630 \stackrel{1}{\pm} 0.096$ | 0.688 ± 0.086 |
| ecoli- 0 - 1 - 4 - 6 - vs - 5 | 0.886 ± 0.091 | 0.914 ± 0.073 | 0.913 ± 0.077 | 0.899 ± 0.087 | 0.909 ± 0.075 | 0.898 ± 0.088 | $0.909 \stackrel{all}{\pm} 0.074$ |
| $glass\hbox{-}0\hbox{-}1\hbox{-}5\hbox{-}vs\hbox{-}2$ | 0.533 ± 0.066 | 0.670 ± 0.135 | 0.658 ± 0.131 | 0.708 ± 0.138 | 0.739 ± 0.108 | 0.711 ± 0.107 | 0.717 ± 0.107 |
| yeast-2-vs-4 | 0.820 ± 0.066 | 0.873 ± 0.061 | 0.873 ± 0.062 | 0.835 ± 0.063 | 0.852 ± 0.064 | 0.862 ± 0.062 | 0.884 ± 0.059 |
| $glass\hbox{-} 0\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.714 ± 0.194 | 0.950 ± 0.086 | 0.945 ± 0.103 | 0.767 ± 0.183 | $0.900 \stackrel{1}{\pm} 0.133$ | 0.761 ± 0.182 | 0.905 ± 0.131 |
| glass2 | 0.547 ± 0.083 | 0.707 ± 0.129 | 0.712 ± 0.116 | 0.735 ± 0.129 | 0.760 ± 0.118 $1,2,3,6,7$ | 0.729 ± 0.122 | 0.749 ± 0.109 |
| yeast-2-vs-8 | 0.774 ± 0.114 | 0.774 ± 0.106 | 0.786 ± 0.105 | 0.773 ± 0.115 | 0.771 ± 0.116 | 0.781 ± 0.115 | 0.788 ± 0.108 |
| vowel0 | 0.970 ± 0.038 | 0.990 ± 0.026 | 0.991 ± 0.026 | $0.836 \stackrel{5}{\pm} 0.060$ | 0.948 ± 0.058 | 0.963 ± 0.037 | 0.966 ± 0.042 |
| $glass\hbox{-} 0\hbox{-} 4\hbox{-} vs\hbox{-} 5$ | 0.744 ± 0.204 | 0.956 ± 0.096 | 0.959 ± 0.091 | 0.835 ± 0.164 | 0.957 ± 0.075 $1,4,6$ | 0.857 ± 0.165 | 0.957 ± 0.075 $1,4,6$ |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 4\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.518 ± 0.062 | 0.700 ± 0.131 | 0.691 ± 0.140 | 0.697 ± 0.133 | 0.739 ± 0.125 | 0.729 ± 0.107 | 0.741 ± 0.108 |
| yeast4 | 0.555 ± 0.043 | 0.717 ± 0.076 | 0.718 ± 0.080 | 0.716 ± 0.060 | 0.740 ± 0.069 | 0.768 ± 0.068 | 0.803 ± 0.064 |
| ecoli-0-4- 6 - vs - 5 | 0.901 ± 0.084 | 0.916 ± 0.081 | 0.912 ± 0.082 | 0.907 ± 0.079 | 0.907 ± 0.082 | 0.907 ± 0.081 | $0.905 \stackrel{all}{\pm} 0.082$ |
| page-blocks-1-3-vs-4 | 0.818 ± 0.106 | $3,4,5,6,7 \\ 0.912 \pm 0.091$ | 0.903 ± 0.094 | 0.770 ± 0.106 | 0.837 ± 0.086 | 0.908 ± 0.082 | 0.909 ± 0.082 |
| yeast - 0 - 2 - 5 - 7 - 9 - vs - 3 - 6 - 8 | 0.892 ± 0.042 | 0.896 ± 0.038 | 0.895 ± 0.039 | 0.898 ± 0.041 | 0.902 ± 0.041 | 0.894 ± 0.034 | 0.891 ± 0.036 |
| ecoli- 0 - 1 - vs - 2 - 3 - 5 | 0.833 ± 0.093 | 0.877 ± 0.089 | 0.873 ± 0.090 | 0.850 ± 0.092 | 0.857 ± 0.089 | 0.861 ± 0.089 | 0.852 ± 0.093 |
| ecoli-0-6-7-vs-3-5 | 0.792 ± 0.119 | 0.863 ± 0.099 | 0.866 ± 0.095 | 0.827 ± 0.104 | 0.830 ± 0.108 | 0.833 ± 0.100 | 0.833 ± 0.091 |
| ecoli-0-3-4-7-vs-5-6 | 0.869 ± 0.097 | 0.893 ± 0.075 | 0.893 ± 0.076 | 0.874 ± 0.082 | 0.898 ± 0.078 | 0.897 ± 0.086 | 0.900 ± 0.074 |
| ecoli-0-2-6-7-vs-3-5 | 0.797 ± 0.125 | 0.859 ± 0.091 | 0.862 ± 0.081 | 0.832 ± 0.102 | $0.829 \overset{2,3}{\pm} 0.101$ | 0.841 ± 0.090 | 0.840 ± 0.082 |
| shuttle-c0-vs-c4 | 0.996 ± 0.008 | 0.996 ± 0.008 | 0.996 ± 0.008 | $0.996 \stackrel{5}{\pm} 0.008$ | 0.996 ± 0.008 | 0.996 ± 0.008 | $0.996 \stackrel{1}{\pm} 0.008$ |
| ecoli-0-3-4- vs -5 | 0.903 ± 0.105 | 0.912 ± 0.099 | 0.910 ± 0.099 | 0.911 ± 0.104 | 0.914 ± 0.103 | 0.916 ± 0.103 | 0.911 ± 0.102 |
| | <u> </u> | _ | <u> </u> | 7 | 7 | 3,7 | <u> </u> |

Table 1: Results for BAC metric

| | kNN (1) OSB (2) OKNORAU (3) TBAC (4) OTBAC (5) TBAW (6) OTBAW (7) | | | | | | | | | |
|--------------|---|-------|-------|-------|-------|-------|-------|--|--|--|
| $Mean\ rank$ | 1.561 | 4.841 | 4.573 | 2.768 | 4.744 | 4.354 | 5.159 | | | |
| | _ | 1,4 | 1,4 | 1 | 1,4 | 1,4 | 1,4,6 | | | |

Table 2: Results for mean ranks according to BAC metric

| Dataset | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|--|--|--------------------------------|-------------------------------|---------------------------------------|---|---------------------------------|---------------------------------|
| glass4 | 0.572 ± 0.309 | 0.660 ± 0.240 | 0.671 ± 0.240 | 0.535 ± 0.244 | 0.580 ± 0.251 | 0.518 ± 0.210 | 0.580 ± 0.232 |
| ecoli - 0 - 2 - 3 - 4 - vs - 5 | 0.852 ± 0.121 | 0.806 ± 0.127 | 0.793 ± 0.130 | 0.835 ± 0.132 | 0.815 ± 0.124 | 0.824 ± 0.136 | 0.793 ± 0.126 |
| glass-0-1-6-vs-2 | 0.088 ± 0.169 | 0.321 ± 0.161 | 0.277 ± 0.144 | 0.336 ± 0.135 | 0.326 ± 0.093 | 0.311 ± 0.084 | 0.310 ± 0.082 |
| $ecoli \hbox{-} 0 \hbox{-} 1 \hbox{-} vs \hbox{-} 5$ | 0.855 ± 0.117 | 0.847 ± 0.105 | 0.827 ± 0.105 | 0.875 ± 0.105 | 0.868 ± 0.110 | $0.862 \stackrel{1}{\pm} 0.108$ | $0.849 \stackrel{1}{\pm} 0.104$ |
| yeast-1-4-5-8- vs -7 | 0.004 ± 0.031 | 0.113 ± 0.102 | 0.121 ± 0.100 | 0.121 ± 0.100 | 0.143 ± 0.064 | $0.137 \stackrel{3}{\pm} 0.069$ | 0.139 ± 0.056 |
| ecoli4 | 0.853 ± 0.143 | 0.773 ± 0.144 | 0.759 ± 0.144 | 0.874 ± 0.129 | 0.838 ± 0.131 | $0.775 \stackrel{1}{\pm} 0.123$ | 0.753 ± 0.130 |
| $led 7 digit \hbox{-} 0 \hbox{-} 2 \hbox{-} 4 \hbox{-} 5 \hbox{-} 6 \hbox{-} 7 \hbox{-} 8 \hbox{-} 9 \hbox{-} vs \hbox{-} 1$ | 0.388 ± 0.185 | 0.675 ± 0.087 | 0.619 ± 0.170 | 0.249 ± 0.219 | 0.397 ± 0.178 | 0.698 ± 0.103 | 0.540 ± 0.078 |
| glass5 | 0.325 ± 0.332 | 0.524 ± 0.308 | 0.527 ± 0.325 | 0.519 ± 0.294 | 0.500 ± 0.229 | 0.463 ± 0.291 | 0.505 ± 0.233 |
| ecoli-0-3-4-6- vs -5 | 0.853 ± 0.140 | 0.798 ± 0.136 | 0.786 ± 0.132 | 0.784 ± 0.151 | 0.781 ± 0.157 | 0.801 ± 0.151 | 0.758 ± 0.149 |
| yeast - 0 - 5 - 6 - 7 - 9 - vs - 4 | 0.405 ± 0.157 | 0.552 ± 0.090 $1,6,7$ | 0.545 ± 0.081 | 0.561 ± 0.098 $1,6,7$ | 0.559 ± 0.080 $1,6,7$ | 0.466 ± 0.066 | 0.440 ± 0.056 |
| yeast6 | 0.553 ± 0.158 | 0.486 ± 0.116 | 0.474 ± 0.115 | 0.545 ± 0.126 | 0.512 ± 0.118 | 0.398 ± 0.076 | 0.369 ± 0.070 |
| ecoli-0-6-7- vs -5 | 0.774 ± 0.170 | 0.717 ± 0.163 | 0.677 ± 0.159 | 0.782 ± 0.161 | 0.755 ± 0.172 | 0.732 ± 0.161 | 0.672 ± 0.158 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.332 ± 0.282 | 0.585 ± 0.253 | 0.564 ± 0.263 | 0.496 ± 0.285 | 0.589 ± 0.237 | 0.509 ± 0.271 | 0.584 ± 0.236 |
| ecoli-0-1-3-7-vs-2-6 | 0.727 ± 0.386 $2,3,5,6,7$ | 0.549 ± 0.336 6.7 | $0.580 \pm 0.348 \\ 6,7$ | 0.713 ± 0.383 | $0.617 \pm 0.368 \\ 6,7$ | 0.418 ± 0.359 | 0.412 ± 0.273 |
| yeast - 0 - 2 - 5 - 6 - vs - 3 - 7 - 8 - 9 | $0.626 \pm 0.075 \\ 2,3,6,7$ | 0.557 ± 0.058 $3,6,7$ | 0.540 ± 0.057 $6,7$ | $0.618 \pm 0.091 \\ 2,3,6,7$ | 0.623 ± 0.079 $2,3,6,7$ | 0.481 ± 0.078 | 0.429 ± 0.053 |
| ecoli - 0 - 1 - 4 - 7 - vs - 5 - 6 | 0.812 ± 0.160 $2.3.6.7$ | 0.758 ± 0.136 6.7 | 0.746 ± 0.121 | 0.827 ± 0.108 $2.3,6,7$ $2.3,6,7$ | 0.832 ± 0.117 $2.3.6.7$ | 0.730 ± 0.120 | 0.719 ± 0.123 |
| yeast5 | 0.706 ± 0.114 6.7 | 0.701 ± 0.083 6.7 | 0.695 ± 0.085 $6,7$ | 0.708 ± 0.090 6.7 | 0.700 ± 0.084 $6,7$ | 0.616 ± 0.070 | 0.634 ± 0.069 |
| shuttle- $c2$ - vs - $c4$ | 0.180 ± 0.366 | 0.993 ± 0.046 | 0.993 ± 0.046 | 0.440 ± 0.468 | 0.867 ± 0.326 | 0.180 ± 0.347 | 0.867 ± 0.326 |
| ecoli - 0 - 1 - 4 - 7 - vs - 2 - 3 - 5 - 6 | 0.773 ± 0.159 $2.3,6.7$ | 0.690 ± 0.110 6.7 | 0.681 ± 0.109 | 0.800 ± 0.117 $2.3,5,6,7$ | 0.769 ± 0.118 $2.3,6,7$ | 0.658 ± 0.116 | 0.598 ± 0.114 |
| yeast - 0 - 3 - 5 - 9 - vs - 7 - 8 | 0.397 ± 0.126 | 0.411 ± 0.091 $3,4,6,7$ | 0.389 ± 0.095 | 0.370 ± 0.121 | 0.396 ± 0.114 4.7 | 0.372 ± 0.080 | 0.355 ± 0.051 |
| yeast-1- vs -7 | 0.101 ± 0.143 | 0.277 ± 0.146 $1,3,5,6,7$ | 0.271 ± 0.139 $1,5,6,7$ | 0.254 ± 0.126 $1,6$ | 0.243 ± 0.115 $1,6$ | 0.214 ± 0.080 | 0.225 ± 0.078 |
| yeast-1-2-8-9- vs -7 | 0.026 ± 0.079 | 0.225 ± 0.133 $1,4,5,6,7$ | 0.235 ± 0.129 $1,4,5,6,7$ | 0.153 ± 0.124 | 0.186 ± 0.109 | 0.144 ± 0.069 | 0.174 ± 0.057 1.6 |
| ecoli- 0 - 1 - 4 - 6 - vs - 5 | 0.845 ± 0.127 3.6 | 0.820 ± 0.102 | 0.806 ± 0.108 | 0.846 ± 0.122 $3,6,7$ | 0.838 ± 0.101 | 0.813 ± 0.130 | 0.816 ± 0.104 |
| $glass\hbox{-}0\hbox{-}1\hbox{-}5\hbox{-}vs\hbox{-}2$ | 0.113 ± 0.179 | 0.326 ± 0.160 $1,3$ | 0.309 ± 0.156 | 0.343 ± 0.138 $1,6,7$ | 0.339 ± 0.096 $1,6,7$ | 0.306 ± 0.088 | 0.308 ± 0.088 |
| yeast-2- vs -4 | 0.752 ± 0.104 6.7 | 0.763 ± 0.089 6.7 | 0.754 ± 0.094 6.7 | 0.760 ± 0.094 6.7 | 0.769 ± 0.096 6.7 | 0.710 ± 0.091 | 0.679 ± 0.084 |
| glass-0-6-vs-5 | 0.490 ± 0.393 | 0.837 ± 0.179 $1,4,5,6$ | 0.823 ± 0.213 $1,4,6$ | 0.610 ± 0.345 | 0.777 ± 0.234 $1,4,6$ | 0.575 ± 0.339 | 0.783 ± 0.230 $1,4,6$ |
| glass2 | 0.152 ± 0.209 | 0.364 ± 0.161 $1,6,7$ | 0.365 ± 0.147 $1,5,6,7$ | 0.352 ± 0.134 $1,6,7$ | 0.341 ± 0.114 $1,6,7$ | 0.302 ± 0.102 | 0.313 ± 0.095 |
| yeast-2- vs -8 | 0.661 ± 0.209 $2,3,5,6,7$ | 0.493 ± 0.144 | 0.486 ± 0.137 | 0.661 ± 0.209 $2,3,5,6,7$ | 0.632 ± 0.199 $2,3,6,7$ | 0.461 ± 0.163 | 0.373 ± 0.120 |
| vowel0 | $\begin{array}{c} 2.3.5.6.7 \\ 0.963 \pm 0.046 \\ 4.5.6.7 \end{array}$ | 0.974 ± 0.040 $1,4,5,6,7$ | 0.981 ± 0.032 $1,4,5,6,7$ | 0.764 ± 0.093 | 0.901 ± 0.076 | 0.889 ± 0.058 | 0.906 ± 0.063 $4,6$ |
| $glass\hbox{-}0\hbox{-}4\hbox{-}vs\hbox{-}5$ | 0.547 ± 0.415 | 0.861 ± 0.193 $1,4,6$ | 0.857 ± 0.198 $1,4,6$ | 0.693 ± 0.287 | 0.841 ± 0.193 $1,4,6$ | 0.709 ± 0.290 | 0.841 ± 0.193 $1,4,6$ |
| $glass\hbox{-}0\hbox{-}1\hbox{-}4\hbox{-}6\hbox{-}vs\hbox{-}2$ | 0.074 ± 0.165 | 0.347 ± 0.161 $1,4,6,7$ | 0.333 ± 0.175 | 0.318 ± 0.141 | 0.324 ± 0.111 $1,6,7$ | 0.307 ± 0.098 | 0.310 ± 0.090 |
| yeast4 | 0.170 ± 0.122 | 0.387 ± 0.114 $1,3,6,7$ | 0.373 ± 0.111 $1,6,7$ | 0.420 ± 0.106 | 0.411 ± 0.101 $1,3,6,7$ | 0.327 ± 0.063 | 0.326 ± 0.053 |
| ecoli-0-4-6-vs-5 | 0.860 ± 0.134 | 0.846 ± 0.135 3,4,5,6,7 | 0.816 ± 0.140 | 0.808 ± 0.127 | 0.800 ± 0.140 | 0.816 ± 0.136 | 0.788 ± 0.140 |
| page-blocks-1-3-vs-4 | 0.648 ± 0.152 | 0.676 ± 0.134 $4.6.7$ | 0.681 ± 0.132 $4,6,7$ | 0.584 ± 0.177 | 0.650 ± 0.136 4.6 | 0.608 ± 0.116 | 0.630 ± 0.121 |
| yeast - 0 - 2 - 5 - 7 - 9 - vs - 3 - 6 - 8 | 0.829 ± 0.059 | 0.742 ± 0.053 $3,6,7$ | 0.733 ± 0.056 $6,7$ | 0.822 ± 0.058 $2,3,5,6,7$ | 0.798 ± 0.064 $2,3,6,7$ | 0.711 ± 0.061 | 0.636 ± 0.043 |
| ecoli-0-1- vs -2-3-5 | 0.773 ± 0.150 $2,3,7$ | 0.733 ± 0.121 | 0.725 ± 0.125 | 0.800 ± 0.138 $1,2,3,7$ | 0.786 ± 0.131 $2,3,7$ | 0.783 ± 0.136 $2,3,7$ | 0.703 ± 0.139 |
| ecoli-0-6-7-vs-3-5 | 0.689 ± 0.199 | 0.739 ± 0.165 $6,7$ | 0.729 ± 0.154 6.7 | 0.725 ± 0.182 $6,7$ | 0.714 ± 0.186 $6,7$ | 0.673 ± 0.179 | 0.635 ± 0.168 |
| ecoli - 0 - 3 - 4 - 7 - vs - 5 - 6 | 0.813 ± 0.131 $2.3.6.7$ | 0.757 ± 0.107 | 0.750 ± 0.113 | $0.797 \pm 0.120 \\ 2,3,6,7$ | 0.814 ± 0.111 $2,3,6,7$ | 0.738 ± 0.148 | 0.729 ± 0.118 |
| ecoli - 0 - 2 - 6 - 7 - vs - 3 - 5 | 0.699 ± 0.217 7 | 0.727 ± 0.140 | 0.724 ± 0.115 | 0.731 ± 0.174 $5,6,7$ | 0.701 ± 0.162 | 0.684 ± 0.145 | 0.633 ± 0.139 |
| shuttle-c0-vs-c4 | 0.996 ± 0.008 | 0.996 ± 0.008 | 0.996 ± 0.008 | 0.995 ± 0.008 | 0.996 ± 0.008 | 0.995 ± 0.008 | 0.996 ± 0.008 |
| ecoli-0-3-4-vs-5 | $0.861 \pm 0.162 2,3,4,5,7$ | 0.812 ± 0.159 | 0.801 ± 0.157 | 0.834 ± 0.165 | $\begin{array}{c c} 0.827 \pm 0.171 \\ 7 \end{array}$ | 0.838 ± 0.169 3,7 | 0.804 ± 0.166 |

Table 3: Results for F1 metric

| | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|-----------|---------|---------|-------------|----------|-----------|-----------------|-----------|
| Mean rank | 3.902 | 4.963 | 4.134 | 4.780 | 4.878 | 2.878 | 2.463 |
| | 6,7 | 1,3,6,7 | 6,7 | 6,7 | 6,7 | _ | _ |

Table 4: Results for mean ranks according to F1 metric

| Dataset | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|---|---|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| glass4 | 0.728 ± 0.384 | 0.571 ± 0.260 | 0.587 ± 0.263 | 0.533 ± 0.290 | 0.517 ± 0.264 | 0.480 ± 0.254 | 0.500 ± 0.253 |
| ecoli - 0 - 2 - 3 - 4 - vs - 5 | 0.960 ± 0.092 | 0.805 ± 0.188 | 0.782 ± 0.192 | 0.867 ± 0.178 | 0.825 ± 0.176 | 0.838 ± 0.187 | 0.781 ± 0.180 |
| glass-0-1-6-vs-2 | 0.161 ± 0.334 | 0.243 ± 0.141 | 0.208 ± 0.121 | 0.240 ± 0.113 | 0.211 ± 0.068 | 0.195 ± 0.060 | 0.194 ± 0.059 |
| ecoli-0-1- vs -5 | 0.972 ± 0.076 | 0.868 ± 0.135 | 0.831 ± 0.144 | 0.966 ± 0.085 | 0.926 ± 0.116 | $0.919 \stackrel{1}{\pm} 0.125$ | 0.883 ± 0.133 |
| yeast-1-4-5-8-vs-7 | 0.007 ± 0.046 | $0.090 \stackrel{3}{\pm} 0.082$ | 0.092 ± 0.076 | 0.089 ± 0.075 | 0.094 ± 0.043 | 0.083 ± 0.042 | 0.082 ± 0.033 |
| ecoli4 | 0.973 ± 0.073 | 0.754 ± 0.193 | 0.729 ± 0.190 | 0.922 ± 0.118 | 0.832 ± 0.162 | $0.733 \stackrel{1}{\pm} 0.185$ | 0.702 ± 0.198 |
| led7digit - 0 - 2 - 4 - 5 - 6 - 7 - 8 - 9 - vs - 1 | 0.782 ± 0.304 | 0.564 ± 0.090 | 0.533 ± 0.131 | 0.511 ± 0.406 | 0.498 ± 0.239 | 0.661 ± 0.120 | 0.406 ± 0.096 |
| glass5 | 0.377 ± 0.406 | 0.464 ± 0.311 | 0.465 ± 0.322 | 0.466 ± 0.318 | $0.386 \stackrel{7}{\pm} 0.208$ | 0.409 ± 0.313 | 0.389 ± 0.211 |
| ecoli-0-3-4-6-vs-5 | 0.946 ± 0.119 | 0.787 ± 0.171 | 0.766 ± 0.163 | 0.773 ± 0.177 | 0.753 ± 0.180 | 0.780 ± 0.173 | 0.716 ± 0.176 |
| yeast - 0 - 5 - 6 - 7 - 9 - vs - 4 | 0.647 ± 0.237 | $0.480 \stackrel{7}{\pm} 0.096$ | 0.463 ± 0.085 | 0.564 ± 0.123 | 0.493 ± 0.102 | 0.341 ± 0.063 | 0.304 ± 0.046 |
| yeast6 | 0.626 ± 0.178 | 0.392 ± 0.105 | 0.379 ± 0.104 | 0.475 ± 0.123 | 0.416 ± 0.110 | $0.268 \stackrel{7}{\pm} 0.063$ | 0.241 ± 0.058 |
| ecoli-0-6-7-vs-5 | 0.953 ± 0.114 | 0.693 ± 0.204 | 0.637 ± 0.196 | 0.852 ± 0.181 | 0.774 ± 0.201 | $0.729 \stackrel{7}{\pm} 0.221$ | 0.613 ± 0.183 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.373 ± 0.371 | 0.514 ± 0.277 | 0.494 ± 0.275 | 0.449 ± 0.290 | 0.477 ± 0.232 | 0.480 ± 0.302 | 0.471 ± 0.233 |
| ecoli- 0 - 1 - 3 - 7 - vs - 2 - 6 | 0.790 ± 0.401 | 0.534 ± 0.383 | 0.573 ± 0.392 | 0.770 ± 0.402 | 0.614 ± 0.401 | 0.454 ± 0.426 | 0.368 ± 0.326 |
| yeast - 0 - 2 - 5 - 6 - vs - 3 - 7 - 8 - 9 | 0.779 ± 0.092 | 0.488 ± 0.061 | 0.459 ± 0.056 | 0.737 ± 0.102 | 0.640 ± 0.091 | 0.378 ± 0.087 | 0.302 ± 0.045 |
| ecoli - 0 - 1 - 4 - 7 - vs - 5 - 6 | 0.967 ± 0.091 | 0.749 ± 0.175 | 0.713 ± 0.162 | 0.906 ± 0.122 | 0.876 ± 0.143 | 0.671 ± 0.172 | 0.651 ± 0.188 |
| yeast5 | 0.794 ± 0.140 | 0.591 ± 0.094 | 0.581 ± 0.093 | 0.628 ± 0.096 | 0.580 ± 0.090 | 0.470 ± 0.071 | 0.476 ± 0.074 |
| shuttle-c2-vs-c4 | $0.200 \stackrel{all}{\pm} 0.400$ | 1.000 ± 0.000 | 1.000 ± 0.000 | 0.480 ± 0.499 | 0.880 ± 0.324 | 0.220 ± 0.414 | 0.880 ± 0.324 |
| ecoli - 0 - 1 - 4 - 7 - vs - 2 - 3 - 5 - 6 | 0.979 ± 0.065 | 0.672 ± 0.148 | 0.648 ± 0.149 | 0.947 ± 0.106 | 0.849 ± 0.131 | 0.644 ± 0.185 | 0.528 ± 0.170 |
| $yeast\hbox{-}0\hbox{-}3\hbox{-}5\hbox{-}9\hbox{-}vs\hbox{-}7\hbox{-}8$ | $\begin{array}{c} 2,3,5,6,7 \\ 0.605 \pm 0.176 \end{array}$ | 0.342 ± 0.086 | 0.316 ± 0.084 | 0.592 ± 0.213 | 0.449 ± 0.143 | 0.284 ± 0.074 | 0.242 ± 0.039 |
| yeast-1- vs -7 | 0.330 ± 0.464 | 0.249 ± 0.140 | 0.230 ± 0.120 | 0.228 ± 0.128 | 0.190 ± 0.109 | 0.137 ± 0.052 | 0.140 ± 0.049 |
| yeast-1-2-8-9- vs -7 | 0.070 ± 0.223 | 0.191 ± 0.122 | 0.195 ± 0.112 | 0.138 ± 0.128 | 0.132 ± 0.098 | $0.088 \stackrel{-}{\pm} 0.044$ | 0.105 ± 0.035 |
| ecoli- 0 - 1 - 4 - 6 - vs - 5 | 0.960 ± 0.100 | 0.825 ± 0.148 | 0.797 ± 0.148 | 0.921 ± 0.125 | 0.877 ± 0.134 | $0.846 \stackrel{1}{\pm} 0.153$ | 0.833 ± 0.156 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 5\hbox{-} vs\hbox{-} 2$ | 0.186 ± 0.333 | 0.250 ± 0.122 | 0.235 ± 0.119 | 0.240 ± 0.099 | 0.220 ± 0.070 | 0.194 ± 0.060 | 0.193 ± 0.060 |
| yeast-2- vs -4 | 0.922 ± 0.095 | 0.769 ± 0.113 | 0.746 ± 0.114 | 0.877 ± 0.098 | 0.842 ± 0.106 | 0.675 ± 0.112 | 0.582 ± 0.104 |
| $glass\hbox{-} 0\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.600 ± 0.469 | 0.815 ± 0.237 | 0.795 ± 0.262 | 0.740 ± 0.402 | 0.792 ± 0.275 | 0.687 ± 0.407 | 0.795 ± 0.272 |
| glass2 | 0.260 ± 0.387 | $0.291 \stackrel{1}{\pm} 0.140$ | $0.285 \stackrel{1}{\pm} 0.131$ | 0.251 ± 0.105 | 0.224 ± 0.085 | 0.193 ± 0.072 | $0.198 \stackrel{1}{\pm} 0.066$ |
| yeast-2- vs -8 | 0.908 ± 0.200 | 0.485 ± 0.207 | 0.440 ± 0.173 | 0.908 ± 0.200 | 0.834 ± 0.227 | 0.416 ± 0.202 | 0.270 ± 0.104 |
| vowel0 | 0.989 ± 0.027 | 0.967 ± 0.050 | 0.982 ± 0.032 | 0.888 ± 0.094 | 0.906 ± 0.074 | 0.845 ± 0.073 | 0.876 ± 0.078 |
| glass - 0 - 4 - vs - 5 | 0.660 ± 0.473 | 0.828 ± 0.235 | 0.815 ± 0.243 | $0.768 \stackrel{6}{\pm} 0.335$ | 0.801 ± 0.259 | 0.746 ± 0.332 | $0.801 \stackrel{6}{\pm} 0.259$ |
| $glass\hbox{-}0\hbox{-}1\hbox{-}4\hbox{-}6\hbox{-}vs\hbox{-}2$ | 0.133 ± 0.310 | 0.261 ± 0.124 | 0.250 ± 0.136 | 0.226 ± 0.102 | 0.210 ± 0.074 | 0.194 ± 0.069 | 0.194 ± 0.060 |
| yeast4 | 0.358 ± 0.276 | 0.342 ± 0.115 | 0.315 ± 0.096 | 0.399 ± 0.122 | 0.351 ± 0.097 | 0.225 ± 0.044 | $0.214 \stackrel{1}{\pm} 0.036$ |
| ecoli-0-4-6- vs -5 | 0.935 ± 0.135 | 0.868 ± 0.169 | 0.804 ± 0.172 | 0.803 ± 0.171 | 0.781 ± 0.181 | 0.817 ± 0.182 | 0.763 ± 0.188 |
| page-blocks-1-3-vs-4 | 0.686 ± 0.174 | 0.567 ± 0.139 | 0.589 ± 0.143 | 0.657 ± 0.206 | 0.633 ± 0.175 | 0.474 ± 0.115 | 0.508 ± 0.140 |
| yeast - 0 - 2 - 5 - 7 - 9 - vs - 3 - 6 - 8 | 0.871 ± 0.068 | 0.671 ± 0.069 | 0.656 ± 0.073 | 0.837 ± 0.067 | 0.776 ± 0.083 | 0.619 ± 0.087 | $0.502 \stackrel{6}{\pm} 0.052$ |
| ecoli-0-1- vs -2-3-5 | 0.968 ± 0.081 | 0.726 ± 0.165 | 0.711 ± 0.155 | 2,3,5,6,7 0.970 ± 0.084 | 0.901 ± 0.127 | 0.878 ± 0.149 | 0.714 ± 0.199 |
| ecoli-0-6-7-vs-3-5 | 0.907 ± 0.169 | 0.761 ± 0.212 | 0.733 ± 0.200 | 0.822 ± 0.201 | 0.783 ± 0.213 | 0.669 ± 0.212 | 0.594 ± 0.219 |
| ecoli - 0 - 3 - 4 - 7 - vs - 5 - 6 | 0.944 ± 0.091 | 0.730 ± 0.150 | 0.716 ± 0.160 | 0.859 ± 0.131 | 0.829 ± 0.118 | $0.675 \stackrel{7}{\pm} 0.172$ | 0.657 ± 0.147 |
| ecoli - 0 - 2 - 6 - 7 - vs - 3 - 5 | 0.933 ± 0.175 | 0.760 ± 0.202 | 0.749 ± 0.199 | 0.815 ± 0.183 | 0.753 ± 0.194 | 0.672 ± 0.185 | 0.575 ± 0.182 |
| shuttle-c0-vs-c4 | 1.000 ± 0.000 | 1.000 ± 0.000 | $1.000 \stackrel{7}{\pm} 0.000$ | $3.5,6,7$ 1.000 ± 0.000 | 1.000 ± 0.000 | $1.000 \stackrel{7}{\pm} 0.000$ | 1.000 ± 0.000 |
| ecoli-0-3-4-vs-5 | 0.958 ± 0.111 | 0.826 ± 0.183 | 0.807 ± 0.182 | 0.858 ± 0.168 | 0.833 ± 0.183 | $0.854 \pm 0.176 \\ 3,7$ | 0.792 ± 0.184 |

Table 5: Results for Precision metric

| | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|-----------|---------|---------|-------------|----------|-----------|----------|-----------|
| Mean rank | 5.354 | 4.695 | 3.854 | 5.207 | 4.293 | 2.732 | 1.866 |
| | 5,6,7 | 3,6,7 | 6,7 | 3,5,6,7 | 6,7 | 7 | _ |

Table 6: Results for mean ranks according to Precision metric

| Continue - 2 - 2 - 2 - 2 - 2 - 2 Continue - 2 - 2 - 2 Continue | Dataset | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|---|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------|---------------------------------|-----------------------------------|
| Second D - 1 - 1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 | glass4 | 0.513 ± 0.310 | | | 0.600 ± 0.288 | | 0.643 ± 0.260 | 0.793 ± 0.301 |
| $\begin{array}{c} s_{088}-\rho_{-1}+\rho_{-1}=2\\ conit-\rho_{-1}=2\\ conit-\rho_{-1}=2$ | ecoli-0-2-3-4- vs -5 | 0.785 ± 0.165 | | 0.850 ± 0.158 | 0.835 ± 0.155 | 0.840 ± 0.156 | | 0.845 ± 0.157 |
| colle -1-4-5-8-n-7 0.003 ± 0.023 0.160 ± 0.150 0.850 ± 0.150 | $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.065 ± 0.123 | | 0.457 ± 0.252 | | 0.762 ± 0.211 | 0.805 ± 0.196 | $0.815 \stackrel{1}{\pm} 0.193$ |
| $ \begin{array}{c} contit \\ cont$ | $ecoli \hbox{-} 0 \hbox{-} 1 \hbox{-} vs \hbox{-} 5$ | 0.785 ± 0.180 | 0.850 ± 0.150 | $0.850 \stackrel{1}{\pm} 0.150$ | 0.815 ± 0.156 | 0.835 ± 0.155 | 0.835 ± 0.155 | 0.840 ± 0.147 |
| | yeast-1-4-5-8- vs -7 | 0.003 ± 0.023 | | 1 | 0.203 ± 0.167 | 0.333 ± 0.173 | 0.403 ± 0.205 | 0.463 ± 0.186 |
| $\begin{array}{c} bid r disple display - 0.94 - 0.6 - 0.78 - 0.99 \\ pleas 5 \\ cools - 0.94 - 0.99 \pm 0.155 \\ cools - 0.94 - 0.99 \pm 0.99 \\ cools - 0.94 - 0.99 \pm 0.155 \\ cools - 0.94 - 0.99 \\ cools - 0.99$ | ecoli4 | 0.790 ± 0.202 | | | 0.855 ± 0.180 | | | 0.885 ± 0.174 |
| $\begin{array}{c} glass5 \\ coli-0-3-4-6-w-5 \\ coli-0-6-7-9-w-4 \\ coli-0-6-7-9-w-4 \\ coli-0-6-7-9-w-4 \\ coli-0-6-7-9-w-4 \\ coli-0-6-7-9-w-5 \\ coli-0-6-7-9-w-5 \\ coli-0-6-7-w-5 \\ coli-0-1-3-7-w-2-6 \\ coli-0-6-7-w-5 \\ coli-0-1-3-7-w-2-6 \\ coli-0-1-3-1-3 \\ coli-$ | $led 7 digit \hbox{-} 0 \hbox{-} 2 \hbox{-} 4 \hbox{-} 5 \hbox{-} 6 \hbox{-} 7 \hbox{-} 8 \hbox{-} 9 \hbox{-} vs \hbox{-} 1$ | 0.279 ± 0.155 | 0.861 ± 0.135 | 0.775 ± 0.249 | 0.185 ± 0.182 | | | 0.870 ± 0.139 |
| $cocho-9.4-6-ex-5 \\ cocho-9.4-6-ex-5 \\ cocho-9.4-6$ | glass5 | $0.310 \stackrel{4}{\pm} 0.330$ | 0.680 ± 0.396 | 0.680 ± 0.409 | 0.690 ± 0.372 | 0.800 ± 0.346 | 0.640 ± 0.374 | 0.810 ± 0.344 |
| $y_{onst-0} - 5.6-7.9.w 4 \\ 0.37 \pm 0.158 \\ 0.697 \pm 0.136 \\ 0.698 \pm 0.179 \\ 0.693 \pm 0.184 \\ 0.698 \pm 0.179 \\ 0.693 \pm 0.186 \\ 0.698 \pm 0.115 \\ 0.795 \pm 0.204 \\ 0.785 \pm 0.204 \\ 0.785 \pm 0.206 \\ 0.745 \pm 0.204 \\ 0.785 \pm 0.206 \\ 0.745 \pm 0.199 \\ 0.785 \pm 0.206 \\ 0.745 \pm 0.199 \\ 0.785 \pm 0.206 \\ 0.785 \pm 0.204 \\ 0.785 \pm 0.206 \\ 0.785 \pm 0.196 \\$ | ecoli-0-3-4-6-vs-5 | 0.795 ± 0.185 | 0.845 ± 0.179 | 0.845 ± 0.179 | 0.815 ± 0.164 | | 0.845 ± 0.172 | 0.835 ± 0.177 |
| $y_{asst6} = 0.523 \pm 0.184 = 0.660 \pm 0.177 = 0.663 \pm 0.168 = 0.660 \pm 0.167 = 0.663 \pm 0.168 = 0.660 \pm 0.167 = 0.883 \pm 0.130 = 0.882 \pm 0.180 = 0.685 \pm 0.200 = 0.785 \pm 0.190 = 0.785 \pm 0.180 = 0.887 = 0.683 \pm 0.187 = 0.785 \pm 0.180 = 0.885 \pm 0.187 = 0.785 \pm 0.180 = 0.885 \pm $ | yeast - 0 - 5 - 6 - 7 - 9 - vs - 4 | 0.317 ± 0.153 | 0.667 ± 0.136 | 0.681 ± 0.129 | | | 0.766 ± 0.123 | 0.815 ± 0.103 |
| $coche-0-7-e-s-5 \\ glass-0-1-6-ve-5 \\ glass-0-1-6-ve-5 \\ coche-0-1-6-ve-5 \\ coche-0-1-6-ve-5 \\ coche-0-1-8-ve-2-6 \\ coche-0-1-8-ve-2-6 \\ coche-0-1-8-ve-2-6 \\ coche-0-1-4-7-ve-2-6 \\ coche-0-1-4-7-ve-2-6 \\ coche-0-1-4-7-ve-2-6 \\ coche-0-1-4-7-ve-3-6 \\ coche-0-1-4-6-ve-3-7 \\ c$ | yeast6 | 0.523 ± 0.184 | | | | 0.694 ± 0.173 | 0.803 ± 0.130 | 0.823 ± 0.123 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | ecoli-0-6-7-vs-5 | 0.685 ± 0.216 | $0.795 \stackrel{1}{\pm} 0.204$ | $0.785 \stackrel{1}{\pm} 0.206$ | $0.745 \stackrel{1}{\pm} 0.190$ | | | 0.795 ± 0.216 |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.360 ± 0.316 | 0.780 ± 0.318 | 1 | | 0.850 ± 0.287 | | 0.850 ± 0.287 |
| $\begin{array}{c} p_{oast-0-2-5-6-w_s-3-7-s-9} \\ ecoli-0-1-4-7-v_s-5-6 \\ ecoli-0-1-4-7-v_s-5-6 \\ \\ 0.732 \pm 0.198 \\ \\ 0.647 \pm 0.127 \\ \\ 0.816 \pm 0.173 \\ \\ 0.820 \pm 0.156 \\ \\ 0.816 \pm 0.173 \\ \\ 0.820 \pm 0.156 \\ \\ 0.784 \pm 0.166 \\ \\ 0.820 \pm 0.156 \\ \\ 0.784 \pm 0.164 \\ \\ 0.820 \pm 0.156 \\ \\ 0.828 \pm 0.129 \\ 0.896 \pm 0.130 \\ 0.898 \pm 0.103 \\ 0.898 \pm 0.089 \\ 0.103 \\ 0.998 \pm 0.089 \\ 0.990 \pm 0.069 \\ 0.175 \pm 0.162 \\ 0.715 \pm 0.167 \\ 0.758 \pm 0.159 \\ 0.159 \pm 0.162 \\ 0.896 \pm 0.103 \\ 0.896 \pm 0.103 \\ 0.998 \pm 0.089 \\ 0.160 \pm 0.333 \\ 0.160 \pm 0.333 \\ 0.866 \pm 0.323 \\ 0.160 \pm 0.333 \\ 0.866 \pm 0.292 \\ 0.788 \pm 0.159 \\ 0.758 \pm 0.159 \\ 0.159 \pm 0.162 \\ 0.896 \pm 0.120 \\ $ | ecoli - 0 - 1 - 3 - 7 - vs - 2 - 6 | 0.700 ± 0.400 | 0.700 ± 0.400 | 0.700 ± 0.400 | | 0.700 ± 0.400 | | 0.700 ± 0.400 |
| $ \begin{array}{c} cachie-1-4-rvs-5-6 \\ yeast5 \\ yeast5 \\ bittle-cz-vs-c4 \\ coli-0-1-4-rvs-2-6 \\ coli-0-1-4-rvs-2-3-5-6 \\ coli-0-1-4-rvs-2-3-5 \\ coli-0-1-4$ | $yeast\hbox{-}0\hbox{-}2\hbox{-}5\hbox{-}6\hbox{-}vs\hbox{-}3\hbox{-}7\hbox{-}8\hbox{-}9$ | 0.529 ± 0.083 | 0.657 ± 0.084 | 0.664 ± 0.085 | 0.540 ± 0.103 | 0.616 ± 0.095 | | 0.755 ± 0.104 |
| $\begin{array}{c} y_{ast5} \\ shuttle-c_2-v_{s-c4} \\ shuttle-c_2-v_{s-c4} \\ o_{177} = 0.355 \\ shuttle-c_2-v_{s-c4} \\ o_{177} = 0.355 \\ shuttle-c_2-v_{s-c4} \\ o_{177} = 0.355 \\ o_{190} \pm 0.669 \\ o_{190} \pm 0.069 \\ o_{114} = 0.090 \\ o_{115} = 0.090 \\ o_{114} = 0.090 \\ o_{115} = $ | ecoli - 0 - 1 - 4 - 7 - vs - 5 - 6 | 0.732 ± 0.198 | 0.816 ± 0.173 | 0.820 ± 0.156 | 0.784 ± 0.164 | 0.812 ± 0.151 | 0.840 ± 0.132 | 0.852 ± 0.125 |
| $shutthe-c2-vs-c4 \\ coli-0-1-4-7-vs-2-3-5-6 \\ 0.668\pm0.202 \\ 0.744\pm0.158 \\ 0.788\pm0.159 \\ 0.788\pm0.158 \\ 0.788\pm0.159 \\ 0.788\pm0.159 \\ 0.788\pm0.159 \\ 0.788\pm0.169 \\ 0.789\pm0.169 \\ 0.789\pm0.169$ | yeast5 | 0.647 ± 0.127 | 0.878 ± 0.104 | 0.877 ± 0.095 | 0.828 ± 0.129 | 0.896 ± 0.103 | 0.908 ± 0.089 | 0.964 ± 0.064 |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | shuttle-c2-vs-c4 | 0.170 ± 0.355 | 0.990 ± 0.069 | 0.990 ± 0.069 | | 0.860 ± 0.332 | 0.160 ± 0.323 | 0.860 ± 0.332 |
| $\begin{array}{c} y_{aast} - 0 - 3 - 5 - v_{b} - 7 - 8 \\ y_{aast} - 1 - v_{b} - 7 \\ y_$ | $ecoli \hbox{-} 0 \hbox{-} 1 \hbox{-} 4 \hbox{-} 7 \hbox{-} vs \hbox{-} 2 \hbox{-} 3 \hbox{-} 5 \hbox{-} 6$ | 0.668 ± 0.202 | | 0.758 ± 0.159 | | 0.730 ± 0.167 | 0.726 ± 0.159 | 0.755 ± 0.150 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | yeast - 0 - 3 - 5 - 9 - vs - 7 - 8 | 0.306 ± 0.115 | | 0.522 ± 0.140 | 0.284 ± 0.108 | 0.372 ± 0.124 | | 0.682 ± 0.127 |
| $\begin{array}{c} yeast-1-2-8-9-us-7 \\ ccoli-0-1-4-6-vs-5 \\ ccoli-0-1-4-6-vs-5 \\ dcoli-0-1-4-6-vs-5 \\ dc$ | yeast-1- vs -7 | 0.060 ± 0.086 | | 0.353 ± 0.196 | 0.323 ± 0.180 | 0.387 ± 0.217 | 0.520 ± 0.217 | 0.600 ± 0.230 |
| $\begin{array}{c} coli-0-1-4-6-vs-5\\ glass-0-1-5-vs-2\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $ | $yeast\hbox{-} 1\hbox{-} 2\hbox{-} 8\hbox{-} 9\hbox{-} vs\hbox{-} 7$ | 0.017 ± 0.049 | | 0.313 ± 0.175 | 0.190 ± 0.149 | 0.373 ± 0.195 | 0.397 ± 0.191 | 0.523 ± 0.173 |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | ecoli- 0 - 1 - 4 - 6 - vs - 5 | 0.775 ± 0.182 | | | 0.805 ± 0.175 | 0.830 ± 0.153 | 0.810 ± 0.177 | 0.835 ± 0.155 |
| $\begin{array}{c} yeast-2-vs-4\\ yeast-2-vs-4\\ yeast-2-vs-4\\ yeast-2-vs-5\\ yeast-2-vs-8\\ yeast-2-vs-3-8\\ yeast$ | $glass\hbox{-} 0\hbox{-} 1\hbox{-} 5\hbox{-} vs\hbox{-} 2$ | 0.090 ± 0.139 | $0.497 \stackrel{1}{\pm} 0.267$ | | | | | 0.800 ± 0.226 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | yeast-2- vs -4 | 0.647 ± 0.132 | | 0.778 ± 0.125 | 0.682 ± 0.126 | 0.719 ± 0.127 | 0.768 ± 0.126 | 0.838 ± 0.124 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | $glass\hbox{-} 0\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.440 ± 0.382 | 0.930 ± 0.173 | 0.920 ± 0.208 | | 0.830 ± 0.257 | | 0.840 ± 0.253 |
| $\begin{array}{c} yeast-2-vs-8 \\ vowell0 \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $ | glass2 | 0.117 ± 0.164 | 0.533 ± 0.260 | 0.547 ± 0.236 | | 0.755 ± 0.231 | | 0.778 ± 0.208 |
| $\begin{array}{c} vowel0 \\ glass-0-4-vs-5 \\ glass-0-1-4-6-vs-2 \\ vest4 \\ ecoli-0-4-cs-5 \\ vest-0-2-5-7-9-vs-3-5 \\ ecoli-0-3-4-7-vs-5-6 \\ ecoli-0-2-6-7-vs-3-5 \\ shuttle-c0-vs-c4 \\ \end{array} \begin{array}{c} 0.941 \pm 0.077 \\ 0.983 \pm 0.053 \\ 1.4,5,6,7 \\ 0.490 \pm 0.190 \\ 0.940 \pm 0.190 \\ 0.943 \pm 0.053 \\ 0.983 \pm 0.053 \\ 1.4,5,6,7 \\ 0.090 \pm 0.331 \\ 0.960 \pm 0.180 \\ 0.090 \pm 0.331 \\ 0.960 \pm 0.180 \\ 0.050 \pm$ | yeast-2-vs-8 | 0.550 ± 0.229 | 0.580 ± 0.220 | | 0.550 ± 0.229 | 0.550 ± 0.229 | 0.610 ± 0.235 | 0.660 ± 0.222 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | vowel0 | 0.941 ± 0.077 | | 0.983 ± 0.053 | 0.681 ± 0.119 | 0.907 ± 0.118 | | 0.946 ± 0.084 |
| $\begin{array}{c} glass-0-1-4-6-vs-2\\ yeast4\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $ | $glass\hbox{-} 0\hbox{-} 4\hbox{-} vs\hbox{-} 5$ | $0.490 \stackrel{4}{\pm} 0.406$ | 0.940 ± 0.190 | 0.950 ± 0.180 | 0.700 ± 0.331 | | $0.750 \stackrel{4}{\pm} 0.335$ | 0.960 ± 0.135 |
| $\begin{array}{c} - \\ ccoli-0-4-6-vs-5 \\ page-blocks-1-3-vs-4 \\ yeast-0-2-5-7-9-vs-3-6-8 \\ ccoli-0-4-6-vs-5 \\ \end{array} \begin{array}{c} - \\ 0.810\pm0.162 \\ \hline \\ 0.850\pm0.158 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.845\pm0.157 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.845\pm0.157 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.156 \\ \hline \\ 0.840\pm0.190 \\ \hline \\ 0.840\pm0.190 \\ \hline \\ 0.840\pm0.190 \\ \hline \\ 0.840\pm0.190 \\ \hline \\ 0.813\pm0.083 \\ \hline \\ 0.813\pm0.083 \\ \hline \\ 0.813\pm0.083 \\ \hline \\ 0.830\pm0.083 \\ \hline \\ 0.830\pm0.083 \\ \hline \\ 0.830\pm0.070 \\ \hline \\ 0.848\pm0.070 \\ \hline \\ 0.848\pm0.07$ | $glass\hbox{-} 0\hbox{-} 1\hbox{-} 4\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.055 ± 0.122 | 0.538 ± 0.259 | 0.520 ± 0.281 | 0.573 ± 0.276 | 0.732 ± 0.242 | | 0.790 ± 0.198 |
| $\begin{array}{c} ecoli-0\text{-}4\text{-}6\text{-}vs\text{-}5 \\ page-blocks\text{-}1\text{-}3\text{-}vs\text{-}4 \\ yeast\text{-}0\text{-}2\text{-}5\text{-}7\text{-}9\text{-}vs\text{-}3\text{-}6\text{-}8 \\ ecoli-0\text{-}1\text{-}vs\text{-}2\text{-}3\text{-}5 \\ ecoli-0\text{-}3\text{-}4\text{-}7\text{-}vs\text{-}5\text{-}6 \\ ecoli-0\text{-}2\text{-}6\text{-}7\text{-}vs\text{-}3\text{-}5 \\ ecoli-0\text{-}6\text{-}6\text{-}7\text{-}vs\text{-}3\text{-}5 \\ ecoli-0\text{-}6\text{-}6\text{-}6\text{-}7\text{-}vs\text{-}3$ | yeast4 | 0.117 ± 0.088 | 0.468 ± 0.154 | 0.474 ± 0.162 | 0.459 ± 0.119 | | | 0.699 ± 0.135 |
| $\begin{array}{c} 4 \\ yeast-0-2-5-7-9-vs-3-6-8 \\ \hline \\ ecoli-0-1-vs-2-3-5 \\ \hline \\ ecoli-0-6-7-vs-3-5 \\ \hline \\ ecoli-0-3-4-7-vs-5-6 \\ \hline \\ ecoli-0-2-6-7-vs-3-5 \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $ | ecoli-0-4-6- vs -5 | 0.810 ± 0.162 | 0.850 ± 0.158 | 0.850 ± 0.158 | 0.840 ± 0.156 | 0.845 ± 0.157 | 0.840 ± 0.156 | 0.845 ± 0.157 |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | page-blocks-1-3-vs-4 | 0.657 ± 0.217 | | | 0.562 ± 0.211 | | | 0.876 ± 0.170 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | yeast - 0 - 2 - 5 - 7 - 9 - vs - 3 - 6 - 8 | 0.797 ± 0.084 | | | 0.813 ± 0.083 | 0.830 ± 0.083 | | 0.880 ± 0.081 |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | ecoli- 0 - 1 - vs - 2 - 3 - 5 | 0.670 ± 0.187 | 0.792 ± 0.184 | 0.787 ± 0.186 | 0.703 ± 0.184 | 0.724 ± 0.180 | 0.736 ± 0.178 | $0.745 \stackrel{all}{\pm} 0.190$ |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | ecoli-0-6-7- vs -3-5 | 0.593 ± 0.237 | 0.760 ± 0.196 | | 0.672 ± 0.201 | 0.685 ± 0.206 | 0.712 ± 0.193 | 0.736 ± 0.175 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | ecoli - 0 - 3 - 4 - 7 - vs - 5 - 6 | 0.744 ± 0.196 | | i . | 0.764 ± 0.163 | 0.816 ± 0.154 | 0.844 ± 0.166 | 0.856 ± 0.149 |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | ecoli - 0 - 2 - 6 - 7 - vs - 3 - 5 | 0.597 ± 0.251 | 0.754 ± 0.193 | 0.764 ± 0.177 | 0.681 ± 0.198 | 0.686 ± 0.201 | 0.727 ± 0.179 | 0.755 ± 0.161 |
| | shuttle-c0-vs-c4 | 0.992 ± 0.016 | 0.992 ± 0.016 | 0.992 ± 0.016 | 0.991 ± 0.016 | 0.992 ± 0.016 | 0.991 ± 0.016 | 0.992 ± 0.016 |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | ecoli-0-3-4-vs-5 | 0.810 ± 0.209 | 0.850 ± 0.200 | $0.850 \stackrel{-}{\pm} 0.200$ | 0.840 ± 0.204 | 0.850 ± 0.200 | 0.850 ± 0.200 | 0.850 ± 0.200 |

Table 7: Results for Recall metric

| | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|-----------|---------|---------|-------------|----------|-----------|----------|-----------|
| Mean rank | 1.354 | 4.695 | 4.841 | 2.341 | 4.146 | 4.500 | 6.122 |
| | _ | 1,4 | 1,4 | 1 | 1,4 | 1,4 | all |

Table 8: Results for mean ranks according to Recall metric

| Dataset | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|--|-------------------|-------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| glass4 | 0.750 ± 0.158 | 0.904 ± 0.142 | 0.905 ± 0.142 | 0.779 ± 0.148 | 0.843 ± 0.163 | 0.794 ± 0.131 | 0.866 ± 0.152 |
| ecoli-0-2-3-4-vs-5 | 0.890 ± 0.083 | 0.910 ± 0.078 | 0.908 ± 0.078 | 0.908 ± 0.079 | 0.907 ± 0.078 | 0.910 ± 0.081 | 0.906 ± 0.078 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.522 ± 0.062 | 0.676 ± 0.132 | 0.643 ± 0.124 | 0.712 ± 0.136 | 0.739 ± 0.101 | 0.737 ± 0.099 | 0.738 ± 0.096 |
| ecoli-0-1-vs-5 | 0.891 ± 0.089 | 0.918 ± 0.074 | $0.916 \stackrel{1}{\pm} 0.073$ | 0.906 ± 0.078 | 0.914 ± 0.077 | 0.913 ± 0.077 | 0.914 ± 0.073 |
| yeast-1-4-5- 8 - vs - 7 | 0.501 ± 0.010 | 0.547 ± 0.075 | 0.553 ± 0.077 | 0.556 ± 0.081 | 0.593 ± 0.081 | 0.600 ± 0.102 | 0.613 ± 0.096 |
| ecoli4 | 0.894 ± 0.100 | 0.918 ± 0.094 | $0.917 \stackrel{1}{\pm} 0.094$ | 0.925 ± 0.090 | 0.933 ± 0.086 | 0.927 ± 0.080 | 0.927 ± 0.083 |
| $led 7 digit \hbox{-} 0 \hbox{-} 2 \hbox{-} 4 \hbox{-} 5 \hbox{-} 6 \hbox{-} 7 \hbox{-} 8 \hbox{-} 9 \hbox{-} vs \hbox{-} 1$ | 0.635 ± 0.077 | 0.899 ± 0.066 | 0.857 ± 0.121 | 0.585 ± 0.091 | 0.657 ± 0.088 | 0.867 ± 0.080 | $0.871 \stackrel{4}{\pm} 0.058$ |
| glass5 | 0.648 ± 0.165 | 0.823 ± 0.196 | 0.823 ± 0.203 | 0.824 ± 0.187 | 0.870 ± 0.172 | 0.795 ± 0.187 | 0.875 ± 0.171 |
| ecoli-0-3-4-6- vs -5 | 0.895 ± 0.094 | 0.908 ± 0.089 | 0.906 ± 0.089 | 0.893 ± 0.087 | 0.901 ± 0.093 | 0.908 ± 0.090 | 0.897 ± 0.092 |
| yeast - 0 - 5 - 6 - 7 - 9 - vs - 4 | 0.649 ± 0.074 | 0.793 ± 0.065 | 0.797 ± 0.061 | 0.764 ± 0.062 | 0.795 ± 0.053 | $0.800 \stackrel{7}{\pm} 0.057$ | 0.805 ± 0.051 |
| yeast6 | 0.757 ± 0.091 | 0.821 ± 0.087 | 0.818 ± 0.083 | $0.821 \stackrel{1}{\pm} 0.083$ | 0.835 ± 0.086 | 0.874 ± 0.063 | 0.879 ± 0.059 |
| ecoli-0- 6 - 7 - vs - 5 | 0.840 ± 0.108 | 0.875 ± 0.101 | $0.865 \stackrel{1}{\pm} 0.100$ | 0.865 ± 0.098 | 0.869 ± 0.105 | 0.873 ± 0.096 | 0.868 ± 0.108 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.668 ± 0.151 | 0.868 ± 0.157 | 0.853 ± 0.165 | 0.794 ± 0.175 | 0.898 ± 0.145 | 0.795 ± 0.169 | 0.897 ± 0.145 |
| ecoli - 0 - 1 - 3 - 7 - vs - 2 - 6 | 0.850 ± 0.200 | 0.841 ± 0.197 | 0.843 ± 0.198 | 0.849 ± 0.200 | 0.840 ± 0.205 | 0.718 ± 0.203 | 0.825 ± 0.195 |
| yeast - 0 - 2 - 5 - 6 - vs - 3 - 7 - 8 - 9 | 0.756 ± 0.042 | 0.790 ± 0.041 | 0.788 ± 0.042 | 0.759 ± 0.052 | 0.789 ± 0.047 | 0.778 ± 0.052 | 0.780 ± 0.048 |
| ecoli - 0 - 1 - 4 - 7 - vs - 5 - 6 | 0.865 ± 0.098 | 0.894 ± 0.085 | 0.894 ± 0.076 | 0.888 ± 0.081 | 0.900 ± 0.076 | 0.900 ± 0.065 | 0.903 ± 0.060 |
| yeast5 | 0.821 ± 0.064 | 0.929 ± 0.052 | 0.929 ± 0.048 | 0.906 ± 0.064 | 0.938 ± 0.052 | 0.938 ± 0.044 | 0.965 ± 0.032 |
| shuttle- $c2$ - vs - $c4$ | 0.585 ± 0.177 | 0.995 ± 0.034 | 0.995 ± 0.034 | 0.710 ± 0.231 | 0.930 ± 0.166 | 0.580 ± 0.161 | 0.930 ± 0.166 |
| ecoli - 0 - 1 - 4 - 7 - vs - 2 - 3 - 5 - 6 | 0.833 ± 0.100 | 0.852 ± 0.077 | 0.857 ± 0.076 | 0.855 ± 0.082 | 0.858 ± 0.082 | 0.839 ± 0.077 | 0.839 ± 0.071 |
| $yeast\hbox{-}0\hbox{-}3\hbox{-}5\hbox{-}9\hbox{-}vs\hbox{-}7\hbox{-}8$ | 0.641 ± 0.058 | 0.707 ± 0.064 | 0.697 ± 0.070 | 0.629 ± 0.053 | 0.659 ± 0.062 | 0.702 ± 0.067 | 0.722 ± 0.055 |
| yeast-1- vs -7 | 0.529 ± 0.043 | 0.631 ± 0.098 | 0.634 ± 0.099 | 0.620 ± 0.087 | 0.632 ± 0.101 | 0.644 ± 0.105 | 0.671 ± 0.111 |
| $yeast\hbox{-} 1\hbox{-} 2\hbox{-} 8\hbox{-} 9\hbox{-} vs\hbox{-} 7$ | 0.508 ± 0.024 | 0.623 ± 0.085 | 0.634 ± 0.088 | 0.574 ± 0.075 | 0.643 ± 0.092 | 0.630 ± 0.096 | 0.688 ± 0.086 |
| ecoli-0-1-4-6- vs -5 | 0.886 ± 0.091 | 0.914 ± 0.073 | 0.913 ± 0.077 | 0.899 ± 0.087 | 0.909 ± 0.075 | 0.898 ± 0.088 | $0.909 \stackrel{all}{\pm} 0.074$ |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 5\hbox{-} vs\hbox{-} 2$ | 0.533 ± 0.066 | 0.670 ± 0.135 | 0.658 ± 0.131 | 0.708 ± 0.138 | 0.739 ± 0.108 | 0.711 ± 0.107 | 0.717 ± 0.107 |
| yeast-2- vs -4 | 0.820 ± 0.066 | 0.873 ± 0.061 | 0.873 ± 0.062 | 0.835 ± 0.063 | 0.852 ± 0.064 | 0.862 ± 0.062 | 0.884 ± 0.059 |
| $glass\hbox{-} 0\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.714 ± 0.194 | 0.950 ± 0.086 | 0.945 ± 0.103 | 0.767 ± 0.183 | 0.900 ± 0.133 | 0.761 ± 0.182 | 0.905 ± 0.131 |
| glass2 | 0.547 ± 0.083 | 0.707 ± 0.129 | 0.712 ± 0.116 | 0.735 ± 0.129 | 0.760 ± 0.118 | 0.729 ± 0.122 | 0.749 ± 0.109 |
| yeast-2-vs-8 | 0.774 ± 0.114 | 0.774 ± 0.106 | 0.786 ± 0.105 | 0.773 ± 0.115 | 0.771 ± 0.116 | 0.781 ± 0.115 | 0.788 ± 0.108 |
| vowel0 | 0.970 ± 0.038 | 0.990 ± 0.026 | 0.991 ± 0.026 | 0.836 ± 0.060 | 0.948 ± 0.058 | 0.963 ± 0.037 | 0.966 ± 0.042 |
| $glass\hbox{-} 0\hbox{-} 4\hbox{-} vs\hbox{-} 5$ | 0.744 ± 0.204 | 0.956 ± 0.096 | 0.959 ± 0.091 | 0.835 ± 0.164 | 0.957 ± 0.075 | 0.857 ± 0.165 | 0.957 ± 0.075 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 4\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.518 ± 0.062 | 0.700 ± 0.131 | 0.691 ± 0.140 | 0.697 ± 0.133 | 0.739 ± 0.125 | 0.729 ± 0.107 | 0.741 ± 0.108 |
| yeast4 | 0.555 ± 0.043 | 0.717 ± 0.076 | 0.718 ± 0.080 | 0.716 ± 0.060 | 0.740 ± 0.069 | 0.768 ± 0.068 | 0.803 ± 0.064 |
| ecoli-0-4-6- vs -5 | 0.901 ± 0.084 | 0.916 ± 0.081 | 0.912 ± 0.082 | 0.907 ± 0.079 | 0.907 ± 0.082 | 0.907 ± 0.081 | 0.905 ± 0.082 |
| page-blocks-1-3-vs-4 | 0.818 ± 0.106 | 0.912 ± 0.091 | $0.903 \stackrel{7}{\pm} 0.094$ | 0.770 ± 0.106 | 0.837 ± 0.086 | 0.908 ± 0.082 | 0.909 ± 0.082 |
| yeast - 0 - 2 - 5 - 7 - 9 - vs - 3 - 6 - 8 | 0.892 ± 0.042 | 0.896 ± 0.038 | 0.895 ± 0.039 | 0.898 ± 0.041 | 0.902 ± 0.041 | 0.894 ± 0.034 | 0.891 ± 0.036 |
| ecoli- 0 - 1 - vs - 2 - 3 - 5 | 0.833 ± 0.093 | 0.877 ± 0.089 | 0.873 ± 0.090 | 0.850 ± 0.092 | 0.857 ± 0.089 | 0.861 ± 0.089 | 0.852 ± 0.093 |
| ecoli-0-6-7- vs -3-5 | 0.792 ± 0.119 | 0.863 ± 0.099 | 0.866 ± 0.095 | 0.827 ± 0.104 | $0.830 \stackrel{7}{\pm} 0.108$ | 0.833 ± 0.100 | 0.833 ± 0.091 |
| ecoli - 0 - 3 - 4 - 7 - vs - 5 - 6 | 0.869 ± 0.097 | 0.893 ± 0.075 | 0.893 ± 0.076 | 0.874 ± 0.082 | 0.898 ± 0.078 | 0.897 ± 0.086 | $0.900 \stackrel{1.6}{\pm} 0.074$ |
| $ecoli\mbox{-}0\mbox{-}2\mbox{-}6\mbox{-}7\mbox{-}vs\mbox{-}3\mbox{-}5$ | 0.797 ± 0.125 | 0.859 ± 0.091 | 0.862 ± 0.081 | 0.832 ± 0.102 | 0.829 ± 0.101 | 0.841 ± 0.090 | 0.840 ± 0.082 |
| shuttle-c0-vs-c4 | 0.996 ± 0.008 | 0.996 ± 0.008 | 0.996 ± 0.008 | $0.996 \stackrel{5}{\pm} 0.008$ | 0.996 ± 0.008 | 0.996 ± 0.008 | $0.996 \stackrel{1}{\pm} 0.008$ |
| ecoli-0-3-4-vs-5 | 0.903 ± 0.105 | 0.912 ± 0.099 | 0.910 ± 0.099 | 0.911 ± 0.104 | 0.914 ± 0.103 | 0.916 ± 0.103 | 0.911 ± 0.102 |
| | <u> </u> | <u> </u> | <u> </u> | 7 | 7 | 3,7 | <u> </u> |

Table 9: Results for AUC metric

| | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|-----------|---------|---------|-------------|----------|-----------|-----------------|-----------|
| Mean rank | 1.561 | 4.841 | 4.573 | 2.768 | 4.744 | 4.354 | 5.159 |
| | _ | 1,4 | 1,4 | 1 | 1,4 | 1,4 | 1,4,6 |

Table 10: Results for mean ranks according to AUC metric

| Dataset | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|--|--------------------------------|---|----------------------------------|--------------------------------|-------------------------------|---------------------------------|--------------------------------|
| glass4 | 0.641 ± 0.310 | 0.870 ± 0.242 | 0.871 ± 0.242 | 0.716 ± 0.253 | 0.793 ± 0.272 | 0.752 ± 0.204 | 0.827 ± 0.247 |
| ecoli-0-2-3-4-vs-5 | 0.878 ± 0.100 | 0.903 ± 0.086 | 0.901 ± 0.087 | 0.901 ± 0.088 | 0.901 ± 0.087 | 0.904 ± 0.089 | 0.899 ± 0.087 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 2$ | 0.118 ± 0.222 | $0.618 \stackrel{-}{\pm} 0.224$ | 0.565 ± 0.239 | 0.681 ± 0.178 | 0.728 ± 0.107 | 0.725 ± 0.099 | 0.725 ± 0.096 |
| ecoli-0-1-vs-5 | 0.879 ± 0.104 | $0.911 \stackrel{1,3}{\pm} 0.082$ | $0.909 \stackrel{1}{\pm} 0.082$ | 0.897 ± 0.088 | 0.906 ± 0.087 | 0.906 ± 0.086 | 0.907 ± 0.081 |
| yeast-1-4-5-8-vs-7 | 0.008 ± 0.056 | $0.296 \stackrel{3}{\pm} 0.245$ | 0.330 ± 0.243 | 0.355 ± 0.240 | 0.502 ± 0.169 | 0.535 ± 0.184 | 0.578 ± 0.142 |
| ecoli4 | 0.879 ± 0.124 | $0.908 \stackrel{1}{\pm} 0.112$ | $0.907 \stackrel{1}{\pm} 0.112$ | 0.916 ± 0.103 | 0.926 ± 0.099 | 0.920 ± 0.091 | 0.920 ± 0.095 |
| $led 7 digit \hbox{-} 0 \hbox{-} 2 \hbox{-} 4 \hbox{-} 5 \hbox{-} 6 \hbox{-} 7 \hbox{-} 8 \hbox{-} 9 \hbox{-} vs \hbox{-} 1$ | 0.494 ± 0.179 | $0.895 \stackrel{-}{\pm} 0.071$ | 0.832 ± 0.184 | 0.338 ± 0.260 | 0.556 ± 0.162 | $0.856 \stackrel{4}{\pm} 0.093$ | 0.867 ± 0.065 |
| glass5 | 0.394 ± 0.387 | 0.716 ± 0.376 | 0.709 ± 0.392 | 0.736 ± 0.345 | 0.807 ± 0.314 | 0.696 ± 0.350 | 0.813 ± 0.315 |
| ecoli-0-3-4-6- vs -5 | 0.883 ± 0.108 | $0.900 \stackrel{1}{\pm} 0.101$ | 0.898 ± 0.101 | 0.885 ± 0.097 | 0.893 ± 0.104 | 0.901 ± 0.100 | 0.890 ± 0.103 |
| yeast-0-5-6-7-9-vs-4 | 0.532 ± 0.164 | 0.779 ± 0.078 | 0.784 ± 0.071 | 0.736 ± 0.082 | 0.782 ± 0.064 | 0.796 ± 0.061 | 0.803 ± 0.051 |
| yeast6 | 0.707 ± 0.136 | 0.799 ± 0.112 | 0.795 ± 0.108 | 0.798 ± 0.106 | 0.815 ± 0.112 | 0.867 ± 0.071 | 0.874 ± 0.066 |
| ecoli-0-6-7-vs-5 | 0.814 ± 0.139 | 0.863 ± 0.119 | 0.852 ± 0.121 | 0.849 ± 0.116 | 0.855 ± 0.123 | 0.862 ± 0.108 | 0.856 ± 0.125 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 6\hbox{-} vs\hbox{-} 5$ | 0.459 ± 0.368 | $0.818 \stackrel{3}{\pm} 0.272$ | 0.793 ± 0.293 | 0.701 ± 0.332 | 0.863 ± 0.244 | 0.710 ± 0.315 | 0.862 ± 0.244 |
| ecoli- 0 - 1 - 3 - 7 - vs - 2 - 6 | 0.741 ± 0.387 $2.3.5.6.7$ | 0.734 ± 0.383 6.7 | 0.735 ± 0.384 | $0.741 \pm 0.387 \\ 2.3,5,6,7$ | $0.736 \pm 0.385 \\ 6.7$ | 0.530 ± 0.413 | 0.721 ± 0.375 |
| yeast - 0 - 2 - 5 - 6 - vs - 3 - 7 - 8 - 9 | 0.719 ± 0.058 | 0.777 ± 0.049 | 0.777 ± 0.050 | 0.723 ± 0.072 | 0.767 ± 0.063 | 0.770 ± 0.058 | 0.777 ± 0.050 |
| ecoli-0-1-4-7- vs -5-6 | 0.844 ± 0.132 | 0.884 ± 0.104 | 0.886 ± 0.088 | 0.877 ± 0.091 | $0.892 \pm 0.085 \\ 2,3$ | 0.894 ± 0.071 | 0.898 ± 0.065 |
| yeast5 | 0.798 ± 0.083 | 0.926 ± 0.057 | 0.926 ± 0.052 | 0.900 ± 0.073 | 0.935 ± 0.056 $1,4$ | 0.936 ± 0.047 | 0.965 ± 0.033 |
| shuttle- $c2$ - vs - $c4$ | 0.182 ± 0.369 | 0.994 ± 0.041 $1,4,6$ | 0.994 ± 0.041 $1,4,6$ | 0.445 ± 0.471 | 0.868 ± 0.325 | 0.185 ± 0.354 | 0.868 ± 0.325 $1,4,6$ |
| ecoli - 0 - 1 - 4 - 7 - vs - 2 - 3 - 5 - 6 | 0.805 ± 0.133 | 0.840 ± 0.092 $4,6,7$ | 0.845 ± 0.091 $5,6,7$ | 0.837 ± 0.100 | $0.842 \pm 0.100 \\ 2,4,6,7$ | 0.826 ± 0.091 | 0.829 ± 0.084 |
| $yeast\hbox{-}0\hbox{-}3\hbox{-}5\hbox{-}9\hbox{-}vs\hbox{-}7\hbox{-}8$ | 0.533 ± 0.123 | 0.679 ± 0.084 $1,3,4,5$ | 0.668 ± 0.095 $1,4,5$ | 0.512 ± 0.120 | 0.580 ± 0.124 | 0.683 ± 0.083 $1,4,5$ | 0.716 ± 0.060 |
| yeast-1-vs-7 | 0.142 ± 0.199 | 0.526 ± 0.190 | 0.535 ± 0.192 | 0.512 ± 0.180 | 0.542 ± 0.203 | 0.615 ± 0.132 $1,2,3,4,5$ | $0.647 \pm 0.149 \\ 1,2,3,4,5$ |
| yeast-1-2-8-9- vs -7 | 0.041 ± 0.122 | 0.481 ± 0.210 | 0.507 ± 0.206 | 0.355 ± 0.236 | 0.540 ± 0.214 | 0.559 ± 0.171 $1,2,4$ | 0.658 ± 0.114 all |
| ecoli- 0 - 1 - 4 - 6 - vs - 5 | 0.873 ± 0.105 | 0.908 ± 0.081 | 0.906 ± 0.087 | 0.889 ± 0.100 | 0.902 ± 0.084 | 0.888 ± 0.101 | 0.902 ± 0.084 |
| $glass\hbox{-} 0\hbox{-} 1\hbox{-} 5\hbox{-} vs\hbox{-} 2$ | 0.161 ± 0.246 | 0.606 ± 0.226 1.3 | 0.593 ± 0.222 | 0.673 ± 0.198 $1,2,3$ | 0.720 ± 0.143 $1,2,3,6,7$ | 0.689 ± 0.138 $1,2,3$ | 0.695 ± 0.138 $1,2,3$ |
| yeast-2-vs-4 | 0.797 ± 0.083 | 0.865 ± 0.069 $1,4,5$ | 0.865 ± 0.071 $1,4,5,6$ | 0.817 ± 0.076 | 0.838 ± 0.075 | 0.854 ± 0.071 | 0.879 ± 0.064 $1,4,5,6$ |
| glass-0-6-vs-5 | 0.521 ± 0.407 | 0.944 ± 0.099 $1,4,5,6$ | 0.930 ± 0.162 | 0.651 ± 0.349 | 0.879 ± 0.183 $1,4,6$ | 0.635 ± 0.359 | 0.885 ± 0.181 $1,4,6$ |
| glass2 | 0.201 ± 0.271 | 0.649 ± 0.215 | 0.665 ± 0.188 | 0.701 ± 0.194 | 0.743 ± 0.156 $1,2,3,6,7$ | 0.713 ± 0.153 $1,2,3$ | 0.733 ± 0.144 $1,2,3$ |
| yeast-2-vs-8 | 0.718 ± 0.181 | 0.733 ± 0.148 $1,4,5$ | 0.751 ± 0.142 | 0.718 ± 0.181 | 0.717 ± 0.180 | 0.740 ± 0.177 | 0.759 ± 0.163 |
| vowel0 | 0.969 ± 0.041 $4,5,6$ | 0.989 ± 0.028 $1,4,5,6,7$ | 0.990 ± 0.028 $1,4,5,6,7$ | 0.818 ± 0.074 | 0.945 ± 0.065 | 0.962 ± 0.039 | 0.964 ± 0.045 |
| glass-0-4-vs-5 | 0.560 ± 0.419 | 0.942 ± 0.157 | 0.947 ± 0.153 $1,4,6$ | 0.770 ± 0.289 | 0.953 ± 0.084 $1,4,6$ | 0.796 ± 0.293 | 0.953 ± 0.084 |
| glass-0-1-4-6-vs-2 | 0.098 ± 0.210 | 0.642 ± 0.229 | 0.615 ± 0.261 | 0.639 ± 0.240 | 0.716 ± 0.180 $1,3$ | 0.719 ± 0.110 1,2,3,4,5 | $0.732 \pm 0.109 \\ 1,2,3,4$ |
| yeast4 | 0.288 ± 0.183 | 0.662 ± 0.116 ₁ | 0.664 ± 0.121 $1,2$ | 0.662 ± 0.091 | 0.698 ± 0.097 $1,2,4$ | 0.746 ± 0.087 $1,2,3,4,5$ | 0.792 ± 0.075 |
| ecoli-0-4-6-vs-5 | 0.892 ± 0.095 | 0.909 ± 0.090 3,4,5,6,7 | 0.905 ± 0.090 | 0.900 ± 0.088 1.7 | 0.901 ± 0.090 | 0.901 ± 0.089 | 0.899 ± 0.089 |
| page-blocks-1-3-vs-4 | 0.789 ± 0.138 ₄ | $3,4,5,6,7 \\ 0.905 \pm 0.105 \\ 1,4,5$ | 0.895 ± 0.110 $_{1,4,5}$ | 0.727 ± 0.146 | 0.820 ± 0.103 $1,4$ | 0.902 ± 0.093 $1,4,5$ | 0.902 ± 0.095 $1,4,5$ |
| yeast-0-2-5-7-9-vs-3-6-8 | 0.885 ± 0.047 | 0.893 ± 0.041 3 | 0.892 ± 0.042 | 0.892 ± 0.046 | 0.898 ± 0.045 | 0.892 ± 0.036 | 0.890 ± 0.037 |
| ecoli-0-1-vs-2-3-5 | 0.807 ± 0.125 | 0.865 ± 0.106 $1,7$ | 0.861 ± 0.109 _{1,7} | 0.829 ± 0.114 ₁ | 0.839 ± 0.109 7 | 0.845 ± 0.108 7 | 0.837 ± 0.110 $-$ |
| ecoli-0-6-7-vs-3-5 | 0.750 ± 0.159 $-$ | 0.849 ± 0.118 $1,6,7$ | 0.853 ± 0.113 | 0.803 ± 0.129 | 0.808 ± 0.132 | 0.815 ± 0.122 | 0.820 ± 0.108 $_{1,6}$ |
| ecoli-0-3-4-7-vs-5-6 | 0.852 ± 0.116 $-$ | 0.885 ± 0.085 | 0.886 ± 0.086 | 0.862 ± 0.095 | 0.890 ± 0.086 $2,3$ | 0.891 ± 0.096 - | 0.895 ± 0.080 $1,4$ |
| ecoli-0-2-6-7-vs-3-5 | 0.747 ± 0.192 | 0.844 ± 0.111 $1,5,7$ | 0.850 ± 0.096 $1,5,7$ | 0.809 ± 0.127 ₅ | 0.807 ± 0.125 | 0.826 ± 0.110 ₁ | 0.830 ± 0.095 $_{1,6}$ |
| shuttle-c0-vs-c4 | 0.996 ± 0.008 | 0.996 ± 0.008 - | 0.996 ± 0.008 - | 0.995 ± 0.008 - | 0.996 ± 0.008 | 0.995 ± 0.008 - | 0.996 ± 0.008 - |
| ecoli-0-3-4-vs-5 | 0.888 ± 0.132 | 0.901 ± 0.121 $-$ | 0.899 ± 0.120 - | 0.900 ± 0.126 | 0.904 ± 0.124 $3,7$ | 0.905 ± 0.124 $2,3,7$ | 0.901 ± 0.123 ₄ |

Table 11: Results for GMEAN metric

| | kNN (1) | OSB (2) | OKNORAU (3) | TBAC (4) | OTBAC (5) | TBAW (6) | OTBAW (7) |
|-----------|---------|---------|-------------|----------|-----------|----------|-----------|
| Mean rank | 1.451 | 4.866 | 4.500 | 2.683 | 4.610 | 4.524 | 5.366 |
| | _ | 1,4 | 1,4 | 1 | 1,4 | 1,4 | 1,3,4,5,6 |

Table 12: Results for mean ranks according to GMEAN metric