

Outcomes of the experiments with the models: *precision* (P), *recall* (R), *F 1-measure* (F 1) and *Geometric mean score* (G m)  $\pm$  standard deviation averaged over the 10 classification problems per KG

| TARGET CLASS #1   |                   |                   |                   |                   |
|---|-------------------|-------------------|-------------------|-------------------|
| <i>financial-abbrev-t.nt.Class_18_69</i> $\equiv$ [ <i>financial-abbrev.From25To35</i>   <i>financial-abbrev.Some_hasPermanentOrder_range</i> ] |                   |                   |                   |                   |
|   |                   | # Individuals     |                   |                   |
|   |                   | Positive          | Negative          | Unlabeled         |
|   |                   | 158               | 773               | 69                |
| Models  |                   |                   |                   |                   |
| Measures  | MBNB              | MBNB-EM           | HBM               | LogReg            |
| <i>Precision</i>  | 1.000 $\pm$ 0.001 | 1.000 $\pm$ 1.001 | 0,860 $\pm$ 0.000 | 0,860 $\pm$ 0.000 |
| <i>Recall</i>   | 1.000 $\pm$ 0.001 | 1.000 $\pm$ 0.001 | 0.832 $\pm$ 0.000 | 0.832 $\pm$ 0.000 |
| <i>F<sub>1</sub></i>  | 1.000 $\pm$ 0.001 | 1.000 $\pm$ 0.001 | 0.755 $\pm$ 0.000 | 0.755 $\pm$ 0.000 |
| <i>G m</i>  | 0.999 $\pm$ 0.003 | 0.999 $\pm$ 0.003 | 0.374 $\pm$ 0.000 | 0.374 $\pm$ 0.000 |

| TARGET CLASS #2   |                   |                   |                   |                   |
|---|-------------------|-------------------|-------------------|-------------------|
| <i>financial-abbrev-t.nt.Class_26_68</i> $\equiv$ [ <i>financial-abbrev.CreditCardWithdrawal</i>   <i>financial-abbrev.Some_isOwnerOf_range</i> ] |                   |                   |                   |                   |
|   |                   | # Individuals     |                   |                   |
|   |                   | Positive          | Negative          | Unlabeled         |
|   |                   | 217               | 742               | 41                |
| Models  |                   |                   |                   |                   |
| Measures  | MBNB              | MBNB-EM           | HBM               | LogReg            |
| <i>Precision</i>  | 1.000 $\pm$ 0.000 | 1.000 $\pm$ 0.000 | 0.983 $\pm$ 0.052 | 0.825 $\pm$ 0.000 |
| <i>Recall</i>   | 1.000 $\pm$ 0.000 | 1.000 $\pm$ 0.000 | 0.977 $\pm$ 0.068 | 0.774 $\pm$ 0.000 |
| <i>F<sub>1</sub></i>  | 1.000 $\pm$ 0.000 | 1.000 $\pm$ 0.000 | 0.968 $\pm$ 0.097 | 0.676 $\pm$ 0.000 |
| <i>G m</i>  | 1.000 $\pm$ 0.000 | 1.000 $\pm$ 0.000 | 0.942 $\pm$ 0.175 | 0.418 $\pm$ 0.000 |

| TARGET CLASS #3  |               |               |               |               |
|--|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_2_30</i> ≡ [ <i>financial-abbrev.Account</i>   <i>financial-abbrev.NorthBohemia</i> ] |               |               |               |               |
|  |               | # Individuals |               |               |
|  |               | Positive      | Negative      | Unlabeled     |
|  |               | 223           | 773           | 4             |
| Models   |               |               |               |               |
| Measures   | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>   | 0.999 ± 0.002 | 0.999 ± 0.002 | 0.848 ± 0.040 | 0.826 ± 0.000 |
| <i>Recall</i>  | 0.999 ± 0.002 | 0.999 ± 0.002 | 0.773 ± 0.079 | 0.776 ± 0.000 |
| <i>F<sub>1</sub></i>   | 0.999 ± 0.002 | 0.999 ± 0.002 | 0.709 ± 0.088 | 0.678 ± 0.000 |
| <i>G<sub>m</sub></i>   | 0.998 ± 0.003 | 0.998 ± 0.003 | 0.544 ± 0.202 | 0.417 ± 0.000 |

| TARGET CLASS #4   |               |               |               |               |
|---|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_44_16</i> ≡ [ <i>financial-abbrev.Finished</i>   <i>financial-abbrev.Below18</i> ] |               |               |               |               |
|   |               | # Individuals |               |               |
|   |               | Positive      | Negative      | Unlabeled     |
|   |               | 24            | 972           | 4             |
| Models  |               |               |               |               |
| Measures  | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>  | 0.980 ± 0.001 | 0.979 ± 0.002 | 0.977 ± 0.000 | 0.977 ± 0.000 |
| <i>Recall</i>   | 0.902 ± 0.040 | 0.926 ± 0.052 | 0.977 ± 0.000 | 0.977 ± 0.000 |
| <i>F<sub>1</sub></i>  | 0.930 ± 0.020 | 0.941 ± 0.025 | 0.965 ± 0.000 | 0.965 ± 0.000 |
| <i>G<sub>m</sub></i>  | 0.781 ± 0.315 | 0.543 ± 0.391 | 0.151 ± 0.000 | 0.151 ± 0.000 |

| TARGET CLASS #5   |               |               |               |               |
|---|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_48_53</i> ≡ [ <i>financial-abbrev.Leasing</i>   <i>financial-abbrev.NoProblemsFinishedLoan</i> ] |               |               |               |               |
|   |               | # Individuals |               |               |
|   |               | Positive      | Negative      | Unlabeled     |
|   |               | 22            | 974           | 4             |
| Models  |               |               |               |               |
| Measures  | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>  | 0.977 ± 0.001 | 0.977 ± 0.000 | 0.977 ± 0.000 | 0.977 ± 0.000 |
| <i>Recall</i>   | 0.965 ± 0.036 | 0.977 ± 0.000 | 0.977 ± 0.000 | 0.977 ± 0.000 |
| <i>F<sub>1</sub></i>  | 0.959 ± 0.018 | 0.965 ± 0.000 | 0.965 ± 0.000 | 0.965 ± 0.000 |
| <i>G<sub>m</sub></i>  | 0.228 ± 0.232 | 0.151 ± 0.000 | 0.151 ± 0.000 | 0.151 ± 0.000 |

| TARGET CLASS #6   |               |               |               |               |
|---|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_53_38</i> ≡ [ <i>financial-abbrev.NoProblemsFinishedLoan</i>   <i>financial-abbrev.DebtRunningLoan</i> ] |               |               |               |               |
|   |               | # Individuals |               |               |
|   |               | Positive      | Negative      | Unlabeled     |
|   |               | 25            | 972           | 3             |
| Models  |               |               |               |               |
| Measures  | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>  | 0.981 ± 0.001 | 0.979 ± 0.002 | 0.977 ± 0.000 | 0.977 ± 0.000 |
| <i>Recall</i>   | 0.891 ± 0.021 | 0.909 ± 0.046 | 0.977 ± 0.000 | 0.977 ± 0.000 |
| <i>F<sub>1</sub></i>  | 0.926 ± 0.013 | 0.933 ± 0.022 | 0.965 ± 0.000 | 0.965 ± 0.000 |
| <i>G<sub>m</sub></i>  | 0.942 ± 0.011 | 0.701 ± 0.360 | 0.151 ± 0.000 | 0.151 ± 0.000 |

| TARGET CLASS #7   |               |               |               |               |
|---|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_58_63</i> ≡ [ <i>financial-abbrev.WestBohemia</i>   <i>financial-abbrev.Some_hasLoan_range</i> ] |               |               |               |               |
|   |               | # Individuals |               |               |
|   |               | Positive      | Negative      | Unlabeled     |
|   |               | 46            | 767           | 187           |
| Models  |               |               |               |               |
| Measures  | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>  | 0.998 ± 0.002 | 0.998 ± 0.002 | 0.930 ± 0.046 | 0.946 ± 0.000 |
| <i>Recall</i>   | 0.998 ± 0.002 | 0.998 ± 0.002 | 0.861 ± 0.147 | 0.943 ± 0.000 |
| <i>F<sub>1</sub></i>  | 0.998 ± 0.002 | 0.998 ± 0.002 | 0.876 ± 0.097 | 0.915 ± 0.000 |
| <i>G<sub>m</sub></i>  | 0.986 ± 0.018 | 0.986 ± 0.018 | 0.344 ± 0.285 | 0.233 ± 0.000 |

| TARGET CLASS #8  |               |               |               |               |
|--|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_63_17</i> ≡ [ <i>financial-abbrev.Some_hasLoan_range</i>   <i>financial-abbrev.From18To25</i> ] |               |               |               |               |
|  |               | # Individuals |               |               |
|  |               | Positive      | Negative      | Unlabeled     |
|  |               | 46            | 773           | 181           |
| Models   |               |               |               |               |
| Measures   | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>   | 0.998 ± 0.002 | 0.998 ± 0.002 | 0.946 ± 0.000 | 0.946 ± 0.000 |
| <i>Recall</i>  | 0.998 ± 0.002 | 0.998 ± 0.002 | 0.943 ± 0.000 | 0.943 ± 0.000 |
| <i>F<sub>1</sub></i>   | 0.998 ± 0.002 | 0.998 ± 0.002 | 0.915 ± 0.000 | 0.915 ± 0.000 |
| <i>G<sub>m</sub></i>   | 0.986 ± 0.018 | 0.986 ± 0.018 | 0.232 ± 0.000 | 0.233 ± 0.000 |

| TARGET CLASS #9  |               |               |               |               |
|--|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_69_64</i> ≡ [ <i>financial-abbrev.Some_hasPermanentOrder_range</i>   <i>financial-abbrev.Some_hasAgeValue_range</i> ] |               |               |               |               |
|  |               | # Individuals |               |               |
|  |               | Positive      | Negative      | Unlabeled     |
|  |               | 412           | 520           | 68            |
| Models   |               |               |               |               |
| Measures   | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>   | 1.000 ± 0.000 | 1.000 ± 0.000 | 0.869 ± 0.005 | 0.858 ± 0.053 |
| <i>Recall</i>  | 1.000 ± 0.000 | 1.000 ± 0.000 | 0.828 ± 0.009 | 0.787 ± 0.115 |
| <i>F<sub>1</sub></i>   | 1.000 ± 0.000 | 1.000 ± 0.000 | 0.819 ± 0.010 | 0.754 ± 0.178 |
| <i>G<sub>m</sub></i>   | 1.000 ± 0.000 | 1.000 ± 0.000 | 0.805 ± 0.010 | 0.787 ± 0.145 |

| TARGET CLASS #10   |               |               |               |               |
|--|---------------|---------------|---------------|---------------|
| <i>financial-abbrev-t.nt.Class_74_0</i> ≡ [ <i>financial-abbrev.Some_livesIn_range</i>   <i>financial-abbrev.Above65</i> ] |               |               |               |               |
|  |               | # Individuals |               |               |
|  |               | Positive      | Negative      | Unlabeled     |
|  |               | 256           | 736           | 8             |
| Models   |               |               |               |               |
| Measures   | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>   | 0.999 ± 0.002 | 0.999 ± 0.002 | 0.980 ± 0.057 | 0.808 ± 0.000 |
| <i>Recall</i>  | 0.999 ± 0.002 | 0.999 ± 0.002 | 0.973 ± 0.077 | 0.742 ± 0.000 |
| <i>F<sub>1</sub></i>   | 0.999 ± 0.002 | 0.999 ± 0.002 | 0.962 ± 0.110 | 0.632 ± 0.000 |
| <i>G<sub>m</sub></i>   | 0.997 ± 0.003 | 0.997 ± 0.003 | 0.942 ± 0.168 | 0.438 ± 0.000 |

| MEANS                |               |               |               |               |
|----------------------|---------------|---------------|---------------|---------------|
| Models               |               |               |               |               |
| Measures             | MBNB          | MBNB-EM       | HBM           | LogReg        |
| <i>Precision</i>     | 0.993 ± 0.009 | 0.993 ± 0.009 | 0.935 ± 0.052 | 0.900 ± 0.067 |
| <i>Recall</i>        | 0.975 ± 0.041 | 0.981 ± 0.032 | 0.912 ± 0.076 | 0.873 ± 0.094 |
| <i>F<sub>1</sub></i> | 0.981 ± 0.029 | 0.983 ± 0.025 | 0.890 ± 0.092 | 0.822 ± 0.129 |
| <i>G<sub>m</sub></i> | 0.891 ± 0.230 | 0.836 ± 0.274 | 0.464 ± 0.308 | 0.335 ± 0.188 |

| Nemenyi-Friedman results calculated over the means |          |          |          |          |
|--|----------|----------|----------|----------|
| Models   | MBNB     | MBNB-EM  | HBM      | LogReg   |
| <b>MBNB</b>  | 1.000000 | 0.900000 | 0.354855 | 0.031375 |
| <b>MBNB_EM</b>                                     | 0.900000 | 1.000000 | 0.354855 | 0.031375 |
| <b>HBM</b>   | 0.354855 | 0.354855 | 1.000000 | 0.670273 |
| <b>LogReg</b>                                      | 0.031375 | 0.031375 | 0.670273 | 1.000000 |