

Results for MLIC for different parameter configurations

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Table 1: Table for DNF rules with $k=1$ and $\lambda = 1$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | DNF | 1 | 1.0 | 2000 | 0.965 | 0.964 | 3.0 |
| Twitter | DNF | 1 | 1.0 | 2000 | 0.939 | 0.939 | 8.0 |
| adult | DNF | 1 | 1.0 | 2000 | 0.778 | 0.732 | 43.0 |
| credit-card | DNF | 1 | 1.0 | 2000 | 0.779 | 0.778 | 15.0 |
| ionosphere | DNF | 1 | 1.0 | 16.05 | 0.935 | 0.886 | 5.5 |
| parkinsons | DNF | 1 | 1.0 | 9.98 | 0.881 | 0.83 | 1.0 |
| pima | DNF | 1 | 1.0 | 2000 | 0.702 | 0.68 | 4.0 |
| transfusion | DNF | 1 | 1.0 | 3.29 | 0.792 | 0.788 | 3.0 |
| wdbc | DNF | 1 | 1.0 | 876.96 | 0.946 | 0.921 | 5.0 |

Table 2: Table for DNF rules with $k=1$ and $\lambda = 10$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | DNF | 1 | 10.0 | 2000 | 0.964 | 0.965 | 3.5 |
| Twitter | DNF | 1 | 10.0 | 2000 | 0.937 | 0.938 | 8.0 |
| adult | DNF | 1 | 10.0 | 2000 | 0.778 | 0.732 | 43.0 |
| credit-card | DNF | 1 | 10.0 | 2000 | 0.779 | 0.778 | 15.0 |
| ionosphere | DNF | 1 | 10.0 | 14.79 | 0.935 | 0.889 | 5.5 |
| parkinsons | DNF | 1 | 10.0 | 65.63 | 0.884 | 0.811 | 1.5 |
| pima | DNF | 1 | 10.0 | 2000 | 0.691 | 0.679 | 8.0 |
| transfusion | DNF | 1 | 10.0 | 12.29 | 0.792 | 0.785 | 3.0 |
| wdbc | DNF | 1 | 10.0 | 777.71 | 0.947 | 0.918 | 5.5 |

Table 3: Table for DNF rules with $k=2$ and $\lambda = 1$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | DNF | 2 | 1.0 | 2000 | 0.956 | 0.952 | 13.0 |
| Twitter | DNF | 2 | 1.0 | 2000 | 0.948 | 0.948 | 19.0 |
| adult | DNF | 2 | 1.0 | 2000 | 0.796 | 0.755 | 51.5 |
| credit-card | DNF | 2 | 1.0 | 2000 | 0.78 | 0.779 | 27.0 |
| ionosphere | DNF | 2 | 1.0 | 2000 | 0.971 | 0.886 | 12.5 |
| parkinsons | DNF | 2 | 1.0 | 140.75 | 0.962 | 0.895 | 6.0 |
| pima | DNF | 2 | 1.0 | 2000 | 0.747 | 0.728 | 9.5 |
| transfusion | DNF | 2 | 1.0 | 35.05 | 0.8 | 0.786 | 5.0 |
| wdbc | DNF | 2 | 1.0 | 2000 | 0.974 | 0.938 | 10.5 |

Table 4: Table for DNF rules with $k=2$ and $\lambda = 10$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | DNF | 2 | 10.0 | 2000 | 0.956 | 0.956 | 12.0 |
| Twitter | DNF | 2 | 10.0 | 2000 | 0.947 | 0.946 | 21.0 |
| adult | DNF | 2 | 10.0 | 2000 | 0.796 | 0.754 | 53.0 |
| credit-card | DNF | 2 | 10.0 | 2000 | 0.78 | 0.779 | 25.0 |
| ionosphere | DNF | 2 | 10.0 | 960.3 | 0.983 | 0.909 | 15.0 |
| parkinsons | DNF | 2 | 10.0 | 102.18 | 0.968 | 0.889 | 8.0 |
| pima | DNF | 2 | 10.0 | 2000 | 0.741 | 0.72 | 11.0 |
| transfusion | DNF | 2 | 10.0 | 2000 | 0.801 | 0.764 | 7.0 |
| wdbc | DNF | 2 | 10.0 | 2000 | 0.978 | 0.943 | 12.0 |

Table 5: Table for DNF rules with $k=3$ and $\lambda = 1$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | DNF | 3 | 1.0 | 2000 | 0.954 | 0.953 | 17.0 |
| Twitter | DNF | 3 | 1.0 | 2000 | 0.951 | 0.95 | 26.0 |
| adult | DNF | 3 | 1.0 | 2000 | 0.801 | 0.734 | 100.5 |
| credit-card | DNF | 3 | 1.0 | 2000 | 0.693 | 0.691 | 57.5 |
| ionosphere | DNF | 3 | 1.0 | 2000 | 0.972 | 0.883 | 20.0 |
| parkinsons | DNF | 3 | 1.0 | 2000 | 0.982 | 0.892 | 9.0 |
| pima | DNF | 3 | 1.0 | 2000 | 0.769 | 0.711 | 17.0 |
| transfusion | DNF | 3 | 1.0 | 155.75 | 0.807 | 0.784 | 8.0 |
| wdbc | DNF | 3 | 1.0 | 2000 | 0.956 | 0.925 | 17.0 |

Table 6: Table for DNF rules with $k=3$ and $\lambda = 10$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | DNF | 3 | 10.0 | 2000 | 0.954 | 0.953 | 17.0 |
| Twitter | DNF | 3 | 10.0 | 2000 | 0.949 | 0.947 | 27.0 |
| adult | DNF | 3 | 10.0 | 2000 | 0.803 | 0.739 | 88.5 |
| credit-card | DNF | 3 | 10.0 | 2000 | 0.693 | 0.691 | 57.5 |
| ionosphere | DNF | 3 | 10.0 | 2000 | 0.934 | 0.88 | 20.0 |
| parkinsons | DNF | 3 | 10.0 | 2000 | 0.995 | 0.832 | 11.5 |
| pima | DNF | 3 | 10.0 | 2000 | 0.768 | 0.712 | 17.0 |
| transfusion | DNF | 3 | 10.0 | 2000 | 0.805 | 0.774 | 10.0 |
| wdbc | DNF | 3 | 10.0 | 2000 | 0.953 | 0.932 | 16.5 |

Table 7: Table for CNF rules with $k=1$ and $\lambda = 1$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | CNF | 1 | 1.0 | 2000 | 0.97 | 0.969 | 4.0 |
| Twitter | CNF | 1 | 1.0 | 2000 | 0.95 | 0.951 | 8.0 |
| adult | CNF | 1 | 1.0 | 2000 | 0.778 | 0.727 | 16.0 |
| credit-card | CNF | 1 | 1.0 | 2000 | 0.82 | 0.82 | 4.0 |
| ionosphere | CNF | 1 | 1.0 | 1670.68 | 0.821 | 0.789 | 1.0 |
| parkinsons | CNF | 1 | 1.0 | 17.14 | 0.906 | 0.855 | 4.0 |
| pima | CNF | 1 | 1.0 | 2000 | 0.67 | 0.67 | 5.0 |
| transfusion | CNF | 1 | 1.0 | 0.37 | 0.759 | 0.759 | 0.0 |
| wdbc | CNF | 1 | 1.0 | 928.16 | 0.95 | 0.943 | 3.0 |

Table 8: Table for CNF rules with $k=1$ and $\lambda = 10$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | CNF | 1 | 10.0 | 2000 | 0.969 | 0.969 | 4.5 |
| Twitter | CNF | 1 | 10.0 | 2000 | 0.951 | 0.951 | 8.0 |
| adult | CNF | 1 | 10.0 | 2000 | 0.777 | 0.723 | 17.0 |
| credit-card | CNF | 1 | 10.0 | 2000 | 0.82 | 0.82 | 4.0 |
| ionosphere | CNF | 1 | 10.0 | 2000 | 0.793 | 0.774 | 3.0 |
| parkinsons | CNF | 1 | 10.0 | 45.84 | 0.914 | 0.842 | 6.0 |
| pima | CNF | 1 | 10.0 | 2000 | 0.682 | 0.65 | 5.0 |
| transfusion | CNF | 1 | 10.0 | 0.36 | 0.759 | 0.759 | 0.0 |
| wdbc | CNF | 1 | 10.0 | 848.68 | 0.949 | 0.941 | 3.5 |

Table 9: Table for CNF rules with $k=2$ and $\lambda = 1$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | CNF | 2 | 1.0 | 2000 | 0.933 | 0.933 | 3.0 |
| Twitter | CNF | 2 | 1.0 | 2000 | 0.959 | 0.958 | 15.0 |
| adult | CNF | 2 | 1.0 | 2000 | 0.742 | 0.712 | 28.5 |
| credit-card | CNF | 2 | 1.0 | 2000 | 0.61 | 0.61 | 15.0 |
| ionosphere | CNF | 2 | 1.0 | 2000 | 0.867 | 0.829 | 4.0 |
| parkinsons | CNF | 2 | 1.0 | 559.02 | 0.973 | 0.9 | 9.0 |
| pima | CNF | 2 | 1.0 | 2000 | 0.752 | 0.737 | 9.0 |
| transfusion | CNF | 2 | 1.0 | 2000 | 0.774 | 0.754 | 2.0 |
| wdbc | CNF | 2 | 1.0 | 2000 | 0.971 | 0.938 | 8.0 |

Table 10: Table for CNF rules with $k=2$ and $\lambda = 10$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | CNF | 2 | 10.0 | 2000 | 0.938 | 0.869 | 6.5 |
| Twitter | CNF | 2 | 10.0 | 2000 | 0.957 | 0.957 | 15.0 |
| adult | CNF | 2 | 10.0 | 2000 | 0.742 | 0.712 | 28.5 |
| credit-card | CNF | 2 | 10.0 | 2000 | 0.61 | 0.61 | 15.0 |
| ionosphere | CNF | 2 | 10.0 | 2000 | 0.866 | 0.834 | 6.0 |
| parkinsons | CNF | 2 | 10.0 | 21.87 | 0.988 | 0.889 | 12.5 |
| pima | CNF | 2 | 10.0 | 2000 | 0.748 | 0.726 | 9.5 |
| transfusion | CNF | 2 | 10.0 | 2000 | 0.773 | 0.747 | 2.5 |
| wdbc | CNF | 2 | 10.0 | 2000 | 0.974 | 0.941 | 10.5 |

Table 11: Table for CNF rules with $k=3$ and $\lambda = 1$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | CNF | 3 | 1.0 | 2000 | 0.944 | 0.943 | 8.0 |
| Twitter | CNF | 3 | 1.0 | 2000 | 0.956 | 0.955 | 25.0 |
| adult | CNF | 3 | 1.0 | 2000 | 0.755 | 0.721 | 42.0 |
| credit-card | CNF | 3 | 1.0 | 2000 | 0.703 | 0.704 | 19.0 |
| ionosphere | CNF | 3 | 1.0 | 2000 | 0.744 | 0.68 | 14.5 |
| parkinsons | CNF | 3 | 1.0 | 1600.56 | 0.994 | 0.874 | 12.5 |
| pima | CNF | 3 | 1.0 | 2000 | 0.765 | 0.722 | 13.5 |
| transfusion | CNF | 3 | 1.0 | 913.86 | 0.798 | 0.797 | 4.0 |
| wdbc | CNF | 3 | 1.0 | 2000 | 0.955 | 0.93 | 12.5 |

Table 12: Table for CNF rules with $k=3$ and $\lambda = 10$

| Benchmark | Rule Type | k | λ | Time Taken | Train Accuracy | Test Accuracy | Rule Size |
|--------------|-----------|-----|-----------|------------|----------------|---------------|-----------|
| TomsHardware | CNF | 3 | 10.0 | 2000 | 0.943 | 0.941 | 8.5 |
| Twitter | CNF | 3 | 10.0 | 2000 | 0.956 | 0.954 | 24.0 |
| adult | CNF | 3 | 10.0 | 2000 | 0.755 | 0.721 | 42.0 |
| credit-card | CNF | 3 | 10.0 | 2000 | 0.703 | 0.704 | 19.0 |
| ionosphere | CNF | 3 | 10.0 | 2000 | 0.788 | 0.703 | 13.5 |
| parkinsons | CNF | 3 | 10.0 | 2000 | 1.0 | 0.905 | 13.0 |
| pima | CNF | 3 | 10.0 | 2000 | 0.765 | 0.743 | 15.5 |
| transfusion | CNF | 3 | 10.0 | 2000 | 0.794 | 0.785 | 4.0 |
| wdbc | CNF | 3 | 10.0 | 2000 | 0.953 | 0.929 | 11.5 |