These tables represent the behavior of Cuttlefish in different iteration numbers and population numbers, in Germany and Pima datasets after we took the accuracy average using the logistic classifier.

Pima Dataset

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pop  Itr | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 10 | 0.77 | 0.78 | 0.77 | 0.77 | 0.79 | 0.78 | 0.77 | 0.799 | 0.787 | 0.79 |
| 20 | 0.746 | 0.75 | 0.754 | 0.76 | 0.764 | 0.77 | 0.76 | 0.785 | 0.790 | 0.80 |
| 30 | 0.75 | 0.76 | 0.77 | 0.775 | 0.79 | 0.793 | 0.80 | 0.789 | 0.80 | 0.795 |
| 40 | 0.735 | 0.75 | 0.753 | 0.76 | 0.77 | 0.77 | 0.79 | 0.79 | 0.80 | 0.79 |
| 50 | 0.74 | 0.75 | 0.77 | 0.765 | 0.76 | 0.78 | 0.79 | 0.80 | 0.798 | 0.80 |
| 60 | 0.754 | 0.76 | 0.773 | 0.77 | 0.768 | 0.78 | 0.79 | 0.79 | 0.804 | 0.80 |
| 70 | 0.76 | 0.768 | 0.771 | 0.775 | 0.77 | 0.78 | 0.78 | 0.80 | 0.80 | 0.80 |

Germany Dataset

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pop  Itr | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 10 | 0.757 | 0.768 | 0.762 | 0.75 | 0.76 | 0.76 | 0.76 | 0.738 | 0.749 | 0.73 |
| 20 | 0.756 | 0.74 | 0.75 | 0.74 | 0.73 | 0.746 | 0.765 | 0.743 | 0.755 | 0.74 |
| 30 | 0.75 | 0.754 | 0.756 | 0.76 | 0.75 | 0.756 | 0.772 | 0.745 | 0.753 | 0.75 |
| 40 | 0.74 | 0.76 | 0.757 | 0.762 | 0.766 | 0.77 | 0.775 | 0.73 | 0.735 | 0.75 |
| 50 | 0.75 | 0.762 | 0.764 | 0.766 | 0.77 | 0.77 | 0.78 | 0.749 | 0.748 | 0.755 |
| 60 | 0.74 | 0.765 | 0.766 | 0.77 | 0.764 | 0.772 | 0.77 | 0.74 | 0.75 | 0.76 |
| 70 | 0.74 | 0.75 | 0.757 | 0.76 | 0.762 | 0.77 | 0.772 | 0.74 | 0.76 | 0.765 |

In this table, we compare the maximum value for accuracy for best features selected by Cuttlefish (our approach ) with a Genetic algorithm after we fixed the number of iterations and number of population (50, 100) and all datasets (without features selection), by used three datasets the P represents Pima Indian, G represent Germany and G\_P represent merge between Pima Indian and Germany.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | KNN | | | SVM | | | DT | | | RF | | | NB | | | Logistic | | |
| Datasets | **P** | **G** | **P\_G** | **Pima** | **G** | **P\_G** | **Pima** | **G** | **P\_G** | **Pima** | **G** | **P\_G** | **Pima** | **G** | **P\_G** | **Pima** | **G** | **P\_G** |
| CFA | 0.73 | 0.82 | **0.84** | 0.81 | 0.78 | **0.77** | 0.70 | 0.97 | **0.99** | 0.77 | 0.97 | 0**.99** | 0.77 | 0.77 | 0.76 | 0.82 | 0.78 | 0.77 |
| GA | 0.75 | 0.78 | 0.81 | 0.77 | 0.74 | 0.76 | 0.75 | 0.96 | 0.98 | 0.76 | 0.97 | 0.98 | 0.76 | 0.73 | 0.75 | 0.77 | 0.73 | 0.76 |
| All features | 0.75 | 0.81 | 0.82 | 0.80 | 0.77 | 0.76 | 0.77 | 0.97 | 0.98 | 0.77 | 0.98 | 0.98 | 0.76 | 0.75 | 0.75 | 0.82 | 0.78 | 0.78 |

This table represents other metrics for cuttlefish and ga. metrics namely (Accuracy ± STD => the average), Accuracy Maximin, Accuracy Minimum, Kappa, and mean absolute error.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Logistic | Dataset | Algorithm | Accuracy ± STD | Accuracy Maximin | Accuracy Minimum | Kappa | MAE |
| PID | CFA | 0.80 ± 0.03 | 0.82 | 0.70 | 0.49 | 0.2 |
| GA | 0.78 ± 0.04 | 0.80 | 0.70 | 0.4 | 0.24 |
| HFD | CFA | 0.79 ± 0.02 | 0.77 | 0.69 | 0.46 | 0.22 |
| GA | 0.73 ± 0.02 | 0.73 | 0.69 | 0.37 | 0.26 |
| PID+HFD | CFA | 0.77 ± 0.02 | 0.77 | 0.76 | 0.45 | 0.23 |
| GA | 0.76 ± 0.03 | 0.76 | 0.75 | 0.42 | 0.25 |
| Random Forest | PID | CFA | 0.77 ± 0.04 | 0.77 | 0.73 | 0.3 | 0.23 |
| GA | 0.78 ± 0.03 | 0.79 | 0.72 | 0.39 | 0.25 |
| HFD | CFA | 0.97 ± 0.01 | 0.97 | 0.90 | 0.91 | 0.03 |
| GA | 0.96 ± 0.03 | 0.97 | 0.89 | 0.92 | 0.03 |
| PID+HFD | CFA | 0.98 ± 0.02 | 0.99 | 0.97 | 0.97 | 0.01 |
| GA | 0.97 ± 0.04 | 0.98 | 0.96 | 0.95 | 0.02 |
| KNN | PID | CFA | 0.72± 0.02 | 0.73 | 0.69 | 0.30 | 0.29 |
| GA | 0.74± 0.02 | 0.75 | 0.71 | 0.38 | 0.25 |
| HFD | CFA | 0.77± 0.04 | 0.82 | 0.72 | 0.53 | 0.19 |
| GA | 0.76 ± 0.03 | 0.78 | 0.74 | 0.52 | 0.21 |
| PID+HFD | CFA | 0.82 ± 0.03 | 0.84 | 0.81 | 0.59 | 0.19 |
| GA | 0.80 ± 0.04 | 0.81 | 0.78 | 0.6 | 0.18 |
| SVM | PID | CFA | 0.80 ± 0.03 | 0.81 | 0.70 | 0.48 | 0.21 |
| GA | 0.76± 0.03 | 0.77 | 0.73 | 0.4 | 0.25 |
| HFD | CFA | 0.75± 0.02 | 0.78 | 0.69 | 0.45 | 0.22 |
| GA | 0.73 ± 0.03 | 0.74 | 0.70 | 0.4 | 0.26 |
| PID+HFD | CFA | 0.76 ± 0.02 | 0.77 | 0.73 | 0.45 | 0.23 |
| GA | 0.75± 0.04 | 0.76 | 0.74 | 0.42 | 0.24 |
| NB | PID | CFA | 0.76± 0.02 | 0.77 | 0.69 | 0.4 | 0.24 |
| GA | 0.75 ± 0.03 | 0.76 | 0.73 | 0.34 | 0.26 |
| HFD | CFA | 0.75 ± 0.02 | 0.77 | 0.69 | 0.46 | 0.22 |
| GA | 0.72 ± 0.04 | 0.73 | 0.69 | 0.36 | 0.28 |
| PID+HFD | CFA | 0.75 ± 0.04 | 0.76 | 0.71 | 0.42 | 0.25 |
| GA | 0.74± 0.03 | 0.75 | 0.70 | 0.42 | 0.25 |
| DT | PID | CFA | 0.69± 0.02 | 0.70 | 0.64 | 0.35 | 0.29 |
| GA | 0.72 ± 0.03 | 0.75 | 0.67 | 0.28 | 0.31 |
| HFD | CFA | 0.95± 0.04 | 0.97 | 0.76 | 0.89 | 0.04 |
| GA | 0.93± 0.01 | 0.96 | 0.94 | 0.86 | 0.06 |
| PID+HFD | CFA | 0.97± 0.02 | 0.99 | 0.95 | 0.97 | 0.01 |
| GA | 0.96± 0.01 | 0.98 | 0.94 | 0.95 | 0.02 |