In this table, we compare the best features selected by Cuttlefish (our approach ) with a Genetic algorithm and all datasets (without features selection), after we fixed the number of iterations and number of population (50, 100), we used three datasets the P represent 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 |

These tables represent the behavior of Cuttlefish in different iteration numbers and population numbers, in Germany and Pima dataset.

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 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Logistic | Dataset | Algorithm | Accuracy ± STD | Maximin | 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 |