Assignment 1

Decision Tree and AdaBoost for Classification Introduction

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# Telco-Customer-Churn

## Decision Tree

|  |  |  |
| --- | --- | --- |
| Performance Measure | Training | Testing |
| Accuracy | 93.6812211572595 | 71.82398864442867 |
| True positive rate | 0.8830645161290323 | 0.4645669291338583 |
| True negative rate | 0.9561022672455378 | 0.4645669291338583 |
| Positive predict value | 0.8783422459893048 | 0.4783783783783784 |
| False discovery rate | 0.12165775401069519 | 0.5216216216216216 |
| F1 score | 0.8806970509383377 | 0.47137150466045274 |

## Adaboost

|  |  |  |
| --- | --- | --- |
| Number of Boosting Round | Training | Testing |
| 5 | 77.36954206602769 | 78.28246983676367 |
| 10 | 78.64749733759318 | 79.4180269694819 |
| 15 | 79.67696130635427 | 79.27608232789213 |
| 20 | 79.28647497337593 | 78.49538679914833 |

# Adult Dataset

## Decision Tree

|  |  |  |
| --- | --- | --- |
| Performance Measure | Training | Testing |
| Accuracy | 90.86330272411782 | 80.81813156440022 |
| True positive rate | 0.7682693533988012 | 0.5423816952678107 |
| True negative rate | 0.9531553398058252 | 0.890390028146361 |
| Positive predict value | 0.8387635756056808 | 0.6048129892722528 |
| False discovery rate | 0.16123642439431912 | 0.39518701072774715 |
| F1 score | 0.16123642439431912 | 0.571898560657985 |

## Adaboost

|  |  |  |
| --- | --- | --- |
| Number of Boosting Round | Training | Testing |
| 5 | 82.00608089432143 | 82.17554204287205 |
| 10 | 83.29596756856363 | 83.50838400589645 |
| 15 | 83.79656644451951 | 83.84620109329894 |
| 20 | 84.10368231933909 | 84.12873902094466 |

# Credit Card Dataset

## Decision Tree

|  |  |  |
| --- | --- | --- |
| Performance Measure | Training | Testing |
| Accuracy | 99.97278851851038 | 99.92977774656788 |
| True positive rate | 0.8609112709832134 | 0.68 |
| True negative rate | 0.9999824120161106 | 0.9997187406613111 |
| Positive predict value | 0.9999824120161106 | 0.7611940298507462 |
| False discovery rate | 0.011019283746556474 | 0.23880597014925373 |
| F1 score | 0.9205128205128205 | 0.7183098591549296 |

## Adaboost

|  |  |  |
| --- | --- | --- |
| Number of Boosting Round | Training | Testing |
| 5 | 99.90432091992363 | 99.89993328885924 |
| 10 | 99.90432091992363 | 99.89993328885924 |
| 15 | 99.90432091992363 | 99.89993328885924 |
| 20 | 99.90432091992363 | 99.90344440153085 |