|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Player | Mat | Inns | NO | Runs | | HS | Ave | BF | SR | 100 | | 50 | 4’s | 6’s | Overs | Mdns | | Wkts | Econ | Ct | St |  |  1. *Features extracted from ESPN Cricinfo* |
| |  |  |  | | --- | --- | --- | | Team | Won | Lost | | Tied | Pts |  |  1. *Features extracted from IPL T20* |
| |  |  |  |  | | --- | --- | --- | --- | | Season | City | Team\_1 | Team\_2 | | Toss\_Winner | Toss\_Decision | Winner |  |  1. *Features extracted from IPL T20* |

*Table 1: Final Features extracted from gathered data*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Batting** | **Average** | **INN** | **SR** | **50's** | **100's** | **0's** |
| Average | 1 | 2 | 3 | 5 | 6 | 7 |
| INN | 0.5 | 1 | 2 | 4 | 5 | 6 |
| SR | 0.333333 | 0.5 | 1 | 3 | 4 | 5 |
| 50's | 0.2 | 0.25 | 0.333333 | 1 | 2 | 3 |
| 100's | 0.166667 | 0.2 | 0.25 | 0.5 | 1 | 2 |
| 0's | 0.142857 | 0.166667 | 0.2 | 0.333333 | 0.5 | 1 |

*Table 2: Criteria weights for Batting*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bowling** | **Overs** | **Economy** | **Wickets** | **Bowling Avg** | **Bowling strike rate** | **4W Haul** |
| Overs | 1 | 2 | 4 | 6 | 6 | 7 |
| Economy | 0.5 | 1 | 4 | 5 | 5 | 6 |
| Wickets | 0.25 | 0.25 | 1 | 4 | 4 | 6 |
| Bowling Avg | 0.166666 | 0.2 | 0.25 | 1 | 1 | 5 |
| Bowling SR | 0.166666 | 0.2 | 0.25 | 1 | 1 | 4 |
| 4W Haul | 0.142857 | 0.166666 | 0.166666 | 0.2 | 0.25 | 1 |

*Table 3: Criteria weights for Bowling*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | **CSK** | **DD** | **KKR** | **KXIP** | **MI** | **RCB** | **RPS** | **RR** | **SRH** |
| CSK | 1 | 2.5 | 1.857143 | 1.333333 | 0.6875 | 2.142857 | 2 | 2 | 2.142857 |
| DD | 0.4 | 1 | 0.769231 | 0.642857 | 1 | 0.571429 | 1.25 | 0.72727 | 1 |
| KKR | 0.538462 | 1.3 | 1 | 2.125 | 0.315789 | 1.4 | 3.5 | 1 | 1.888889 |
| KXIP | 0.75 | 1.555556 | 0.470588 | 1 | 0.846154 | 1 | 1 | 0.9 | 0.846154 |
| MI | 1.454545 | 1 | 3.166667 | 1.181818 | 1 | 1.777778 | 1.4 | 1 | 1.181818 |
| RCB | 0.466667 | 1.75 | 0.714286 | 1 | 0.5625 | 1 | 3.5 | 0.7 | 0.785714 |
| RPS | 0.5 | 0.8 | 0.285714 | 1 | 0.714286 | 0.285714 | 1 | 0.25 | 0.666667 |
| RR | 0.5 | 1.375 | 1 | 1.111111 | 1 | 1.428571 | 4 | 1 | 1.5 |
| SRH | 0.466667 | 1 | 0.529412 | 1.181818 | 0.846154 | 1.272727 | 1.5 | 0.66666 | 1 |

*Table 4: Criteria weights for Rank*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Teams | RPS | DD | SRH | GL | KTK | RCB | KXIP | RR | KKR | MI | CSK |
| Coefficients | 0.6043 | 0.8090 | 0.9042 | 1 | 1 | 1 | 0.9397 | 1.272 | 1.277 | 1.5188 | 1.6931 |
| Ranks | 9 | 8 | 7 | 5 | 5 | 5 | 6 | 4 | 3 | 2 | 1 |

*Table 5: Ranks of teams derived from AHP*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Team1** | **Team 2** | **Team1\_Strength** | **Team2\_Strength** | **Winner** | **Team1** |
| CSK | MI | X | Y | 1 | CSK |

*Table 6: Example of a row from the dataset*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Team1** | **Team2** | **Team1\_Strength** | **Team2\_Strength** | **Winner** |
| CSK | MI | X | Y | 1 |
| MI | CSK | Y | X | 0 |

*Table 7: Mirroring the row from the dataset*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test Set** | **Team1** | **Team2** | **Winner** | **Prediction** | **Team** |
| 1 | KKR | KXIP | 1 | 1 | KKR |
| 2 | KXIP | KKR | 0 | 1 | KXIP |

*Table 8: Example of a match result and its mirrored data*

|  |  |  |  |
| --- | --- | --- | --- |
| Ambiguity | Real Test Accuracy | Train Accuracy | Cohen Kappa score |
| 3.008 ± 2.5 % | 58.233 ± 5.5 % | 60.757 ± 0.9 % | 0. 1891 |

Table 9: Best results from Naïve Bayes

|  |  |
| --- | --- |
| penalty | l2 |
| solver | liblinear |
| max\_iter | 400 |
| tol | 1 |
| C | 2 |
| Ambiguity | 2.199455± 1.4 % |
| Real Test Accuracy | 57.77618± 5.8 % |
| Train Accuracy | 61.11655± 3.2 % |
| Cohen Kappa score | 0.1351 |

Table 10: Best result with hyperparameters using Logistic Regression

|  |  |
| --- | --- |
| c | 0.1 |
| Gamma | 0.001 |
| Kernal | rbf |
| Ambiguity | 0.24 ± 0.3% |
| Real Test Accuracy | 58.416% ± 5.69% |
| Train Accuracy | 61.13 ± 4.2% |
| Cohen Kappa score | 0.1921 |

Table 11: Best result with hyperparameters using Support Vector Machines

|  |  |
| --- | --- |
| n\_neighbors | 15 |
| weights | uniform |
| metrics | manhattan |
| Leaf-size | 20 |
| Ambiguity | 1.900 ± 1.1% |
| Real Test Accuracy | 53.472% ± 5.2% |
| Train Accuracy | 62.043 ± 4.8 % |
| Cohen Kappa score | 0.1634 |

Table 12: Best result with hyperparameters using Knn

|  |  |
| --- | --- |
| learning\_rate | 0.01 |
| n\_estimators | 150 |
| Ambiguity | 0.402 ± 0.9 % |
| Real Test Accuracy | 60.035 ± 6.2 % |
| Train Accuracy | 62.127 ± 0.9 % |
| Cohen Kappa score | 0.194 |

Table 13: Best result with hyperparameters using ADABOOST

|  |  |
| --- | --- |
| learning\_rate | 0.05 |
| max\_depth | 4 |
| min\_child\_weight | 1 |
| gamma | 0 |
| colsample\_bytree | 0.3 |
| n\_estimators | 100 |
| Ambiguity | 7.098 ± 2.9 % |
| Real Test Accuracy | 55.42 ± 5.9 % |
| Train Accuracy | 78.079 ± 0.9 % |
| Cohen Kappa | 0.228 |

Table 14: Best result with hyperparameters using XGBOOST

|  |  |
| --- | --- |
| n\_estimators | 2100 |
| max\_depth | 12 |
| max\_features | log2 |
| min\_sample\_leaf | 12 |
| Ambiguity | 4.286 ± 2.0 % |
| Real Test Accuracy | 59.506 ± 5.9 % |
| Train Accuracy | 74.71 ± 0.5 % |
| Cohen Kappa | 0.1864 |

Table 15: Best result with hyperparameters Extra TreesClassifier

|  |  |
| --- | --- |
| max\_features | 0.5 |
| bootstrap | True |
| max\_depth | 3 |
| min\_samples\_leaf | 4 |
| min\_samples\_split | 2 |
| colsample\_bytree | 0.3 |
| n\_estimators | 1200 |
| Ambiguity | 1.404 ± 1.4 % |
| Real Test Accuracy | 60.043 ± 6.3 % |
| Train Accuracy | 65.978 ± 0.7 % |
| Cohen Kappa | 0.1785 |

*Table 16: Best result with hyperparameters using Random Forest Classifier*

|  |  |  |  |
| --- | --- | --- | --- |
| Algorithm | Accuracy | Cohen Kappa | Ambiguity |
| Naïve Bayes | 58.23 ± 5.5 % | 0.19 | 3.00 % |
| Adaboost | 60.03 ± 6.2 % | 0.19 | 0.40% |
| Logistic Regression | 57.77± 5.8 % | 0.13 | 2.20% |
| Support Vector Machines | 58.42% ± 5.69% | 0.19 | 0.24% |
| Knn | 53.47% ± 5.2% | 0.16 | 1.90% |
| XGBoost | 55.42 ± 5.9 % | 0.23 | 7.10 % |
| Extra Trees Classifier | 59.51 ± 5.9 % | 0.19 | 4.30% |
| Random Forest Classifier | 60.04 ± 6.3 % | 0.18 | 1.40% |

*Table 17: Accuracies from various algorithms with their ambiguity and Cohen Kappa Score*