Antonio Garlisi

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Final Exam Write Up

In this dataset, we are provided with a list of MLB regular season games ranging from the past seven years. Statistics such as umpire name, ID, home and away team runs, number of pitches called, correct vs expected calls, and overall accuracy of umpires are provided. The goal of the analysis is to provide meaningful insight to MLB executives along with commissioner Rob Manfred on the performance and overall effectiveness of MLB umpires, and make recommendations for groups based on how they perform in key areas. I determined that the most insightful and meaningful technique for this analysis is K Means Clustering. This technique will cluster umpires together based on key performance metrics. Using this information, we can pinpoint the overall accuracy and efficiency of umpires compared to expectations. The clusters effectively summarize top performing umpires by showing key performance metrics. Higher performing umpires generally exceed expectations in terms of correct calls, accuracy, and consistency while avoiding significant home bias. The dataset also contains clusters of the least accurate and efficient umpires, who generally fall short of accuracy, consistency, and correct call expectations. The clustered data can be used to evaluate which umpires should officiate high stake games in the playoffs and World Series, and can also pinpoint certain weaknesses or deficiencies. Using the cluster analysis, it is easier to identify areas of opportunity for lower performance umpires and recommend specific training to improve performance.

Using K Means Clustering analysis for this dataset, we see a display of five unique clusters. Four of the clusters are sizable while the fifth contains one umpire with exceptionally high value for the “favor home” metric. Cluster 4 (blue) shows the highest performing umpires. For these umpires, statistics such as accuracy, consistency, correct calls all indicate above average performance while having a below average impact on total runs scored, which supports that they are not influencing the outcome of games. Cluster 1 (red) indicates average performers. All data metrics such as accuracy and consistency are meeting expectations or slightly above average. Cluster 2 (yellow) indicates below average performers in terms of accuracy, correct calls, and consistency while having above average impact, which indicates that they had a greater impact on the outcome of games. In Cluster 3 (green) we are shown the lowest performing umpires. This cluster indicates these umpires are significantly below average in terms of accuracy, correct calls, and consistency. In addition, they have a significantly higher impact on total runs scored, indicating that the performance of the umpires could be impacting the outcome of the game instead of the performance of the players. Cluster 5 (purple) consists of one umpire. His performance is slightly below average in terms of correct calls and accuracy, but still contains above average consistency. The favor home metric for this cluster is extremely high, suggesting that this umpire could be performing reasonably well although the data suggests an extreme home bias.

Based on the findings of my analysis, I would recommend assigning the umpires in cluster 4 to the World Series and involve them in the development of off-season training programs that could be given to the clusters of umpires who are performing below average, particularly cluster 3 and 2. Cluster 1 is performing as expected so they can be used in addition to cluster 4 throughout the regular season and playoffs without too much concern on them influencing the outcomes of games. Cluster 2 should be required to complete additional offseason training to reach their expected level of performance. Cluster 3 contains umpires that would need extensive training or may need termination or demotion to the minor leagues if offseason training does not significantly improve their performance. Cluster 5 contains only one outlier, Anthony Johnson. Some offseason training in addition to a focused training on resisting the influence of home crowds is recommended since the data suggests a strong bias for home teams and a slightly below average performance for correct calls and accuracy. Although the strong home bias is suspicious, Anthony’s consistency rating is the highest of the five clusters, suggesting his potential to perform well if he can correct the home bias issue.