## A Comparative Study of Academic Performance between Athletic and Non-Athletic Undergraduates in the Faculty of Science, University of Colombo using Machine Learning Techniques

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**Abstract:** The effect of sports activities is a possible factor affecting the academic work of students. University students face this problem majorly when they want to engage in sports activities but have doubts regarding the fact that it may affect their academic activities. The objectives of the study were to identify whether there is an effect of sports activities on university undergraduates, factors that affect the academic performance of the students, and factors that lead university students to engage in sports, through machine learning techniques. This study was initiated by the survey with a sample of 271 students out of a target population of 2225 through a stratified random sampling technique based on students' academic year. The study revealed that being a sportsperson does not significantly impact the grade point average (GPA) overall, although an influence was noted among 4th-level undergraduates through explanatory data analysis. Moreover, the quantity of sports engaged in exhibited a significant correlation with a student's GPA and the time allocated to academic and sports activities displayed a noteworthy association.

In pursuit of predictive models, 7 machine learning techniques which are Logistic regression, KNN, Linear discriminant analysis, Random Forest regressor, Support vector regressor, Gradient boosting, and decision trees were used to find out the best fitted model through performance indexes for this primary data. Random Forest classification emerged as the most effective model in determining the factors influencing a student's choice to participate in sports with 76% test accuracy. Notably, the student's academic year was identified as a key determinant. However, none of the applied algorithms could accurately predict the factors linked to the GPA of a sportsperson, suggesting a lack of discernible connection between the variables. Comparing students' opinions, it was ascertained that sports were generally perceived to have favourable impacts on academic endeavours, enhancing overall academic performance. Conversely, non-athletic expressed concerns about negative implications, such as time constraints affecting academic achievements.

**Keywords:** Comparative study**,** Athletes, Academic performance, Machine Learning