**Analysis of the Effect of Physical and Mental Sports on Graduate Education with Machine Learning**

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# ABSTRACT

In this study, the likelihood of undergraduate students pursuing graduate education based on their participation in physical and mental sports activities was predicted using various machine learning algorithms. The data for the study were collected through a survey conducted with 260 students from different educational levels. The survey aimed to gather information regarding students' participation in physical and mental sports activities, their academic performance levels, and school-related characteristics. The collected data were filtered to include only undergraduate and graduate students, resulting in a dataset of 239 students for analysis. To ensure the consistency of the analysis, various scaling methods were applied to the dataset. Following the scaling process, two different data groups were created to examine students' tendencies to pursue graduate education: the first group focused on physical sports variables, while the second group concentrated on mental sports variables. In this context, machine learning algorithms such as Linear Regression, Support Vector Machine, Random Forest, Decision Tree, and K-Nearest Neighbors were utilized. During the model evaluation process, the dataset was split into 80% training and 20% test data. Additionally, cross-validation was employed to enhance the reliability of the model results. Among the applied machine learning algorithms, the highest accuracy rate was achieved using the Random Forest algorithm. Accuracy analysis revealed that the probability of students who participate in physical sports activities continuing to graduate education was predicted with an accuracy of 73.84%, whereas for students engaged in mental sports activities, this probability was predicted with an accuracy of 75.45%. The findings indicate that students who engage in physical and mental sports activities exhibit a higher tendency to pursue graduate education upon completing their undergraduate studies. Future research aims to improve the accuracy of the model by expanding the dataset and integrating deep learning algorithms into the analysis.

**Keywords:** Machine Learning, Random Forest, Education and Sports, Artificial Intelligence, Cross-Validation