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# A Study on the Characteristics of Applying Oversampling Algorithms to Fosberg Fire-Weather Index (FFWI) Data

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## ABSTRACT

Oversampling algorithms are methods employed in the field of machine learning to address the constraints associated with data quantity. This study aimed to explore the variations in reliability as data volume is progressively increased through the use of oversampling algorithms. For this purpose, the synthetic minority oversampling technique (SMOTE) and the borderline synthetic minority oversampling technique (BSMOTE) are chosen. The data inputs, which included air temperature, humidity, and wind speed, are parameters used in the Fosberg Fire-Weather Index (FFWI). Starting with a base of 52 entries, new data sets are generated by incrementally increasing the data volume by 10% up to a total increase of 100%. This augmented data is then utilized to predict FFWI using a deep neural network. The coefficient of determination ($R^2$) is calculated for predictions made with both the original and the augmented datasets. Suggesting that increasing data volume by more than 50% of the original dataset quantity yields more reliable outcomes. This study introduces a methodology to alleviate the challenge of establishing a standard for data augmentation when employing oversampling algorithms, as well as a means to assess reliability.

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