

A comparison of machine learning models for suspended sediment load classification

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Abstract

The suspended sediment load (SSL) is one of the major hydrological processes affecting the sustainability of river planning and management. Moreover, sediments have a significant impact on dam operation and reservoir capacity. To this end, reliable and applicable models are required to compute and classify the SSL in rivers. The application of machine learning models has become common to solve complex problems such as SSL modeling. The present research investigated the ability of several models to classify the SSL data. This investigation aims to explore a new version of machine learning classifiers for SSL classification at Johor River, Malaysia. Extreme gradient boosting, random forest, support vector machine, multi-layer perceptron and k-nearest neighbors classifiers have been used to classify the SSL data. The sediment values are divided into multiple discrete ranges, where each range can be considered as one category or class. This study illustrates two different scenarios related to the number of categories, which are five and 10 categories, with two time scales, daily and weekly. The performance of the proposed models was evaluated by several statistical indicators. Overall, the proposed models achieved excellent classification of the SSL data under various scenarios