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Features ranking for avalanche forecasting: method and results for north-western Himalaya

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The complex interaction of snow and meteorological features leads to formation of avalanches. Thus, the identification of significant governing features in the avalanche formation process is very critical aspect for developing any prediction scheme. This has direct implication on the design complexity of prediction scheme, computational effort involved and in turn on the overall performance. In this direction, numerical feature selection methods have immense potential to rank the features according to their importance in the problem domain. In the present study, two feature ranking methods: Sequential Forward Generation (SFG) and Relief-F have been explored for finding the relative significance of snow and meteorological features which are believed to be critically connected with avalanche occurrences. The paper describes the methods and their outcome for two climatologically different areas of North-western Himalaya. The outcome of the methods was further applied to a Nearest-Neighbours method based avalanche prediction model used as classifier. The efficacy of the proposed methods has been analyzed in the backdrop of classification results thus obtained, using statistical skill scores. The study establishes the potential of these methods to be used as objective tools to find relative significance of features in quantitative terms for avalanche forecasting.