Machine learning as a tool for avalanche forecasting

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Assessing and forecasting avalanche hazard is crucial for the safety of people and infrastructure in mountain areas. Over 20 years of data covering snow precipitation, snowpack properties, weather, on-site observations, and avalanche danger has been collected in the context of operational avalanche forecasting for the Swiss Alps. The quality and breadth of this dataset makes it suitable for machine learning techniques.

Forecasters mainly process a huge and redundant dataset "manually" to produce daily avalanche bulletins during the winter season. The purpose of this work is to provide the forecasters automated tools to support their work.

By combining clustering and classification algorithms, we are able to reduce the amount of information that needs to be processed and identify relevant weather and snow patterns that characterize a given avalanche situation.