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Integrating empirical models and satellite radar can improve landslide detection for emergency response

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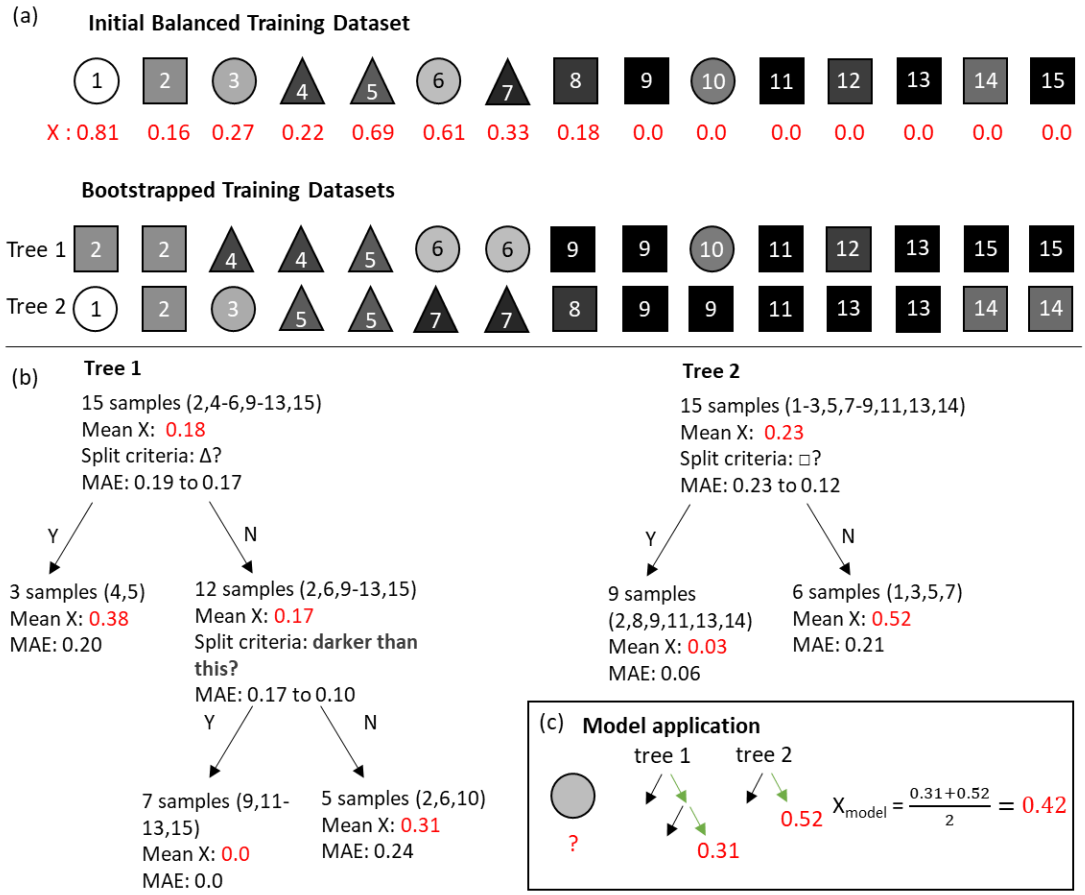

A simple example of the Random Forest Regression technique (developed by Breiman, 2001). Here two trees are used to estimate the value of X a sample should be assigned based on two input features: the colour and shape of each sample. Tree 1 has a "depth" of 3, while Tree 2 has a "depth" of 2.

a) The training data is bootstrapped so that each tree sees only a subset of the original pixels. In this subset, some of the original pixels appear more than once, while some do not appear at all. This reduces overfitting.

b) Each tree carries out a series of splits in which the data are divided in two based on either their colour or shape. The splits are selected based on the improvement they offer to the ability of each tree to correctly predict its training data.
In this example, this improvement is assessed according to the mean absolute error (MAE) of the samples before and after the split.

c) Every tree remembers how it split the training data and applies the same splits as it attempts to model the test data. The mean of the predictions from all the trees is taken as the model output for each test sample.