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Bootstrapped neural nets versus regression kriging in the digital mapping of pedological attributes: the automatic and time-consuming perspectives

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Digital soil mapping procedures are widespread used to build two-dimensional continuous maps about several pedological attributes. Our work addressed a regression kriging (RK) technique and a bootstrapped artificial neural network approach in order to evaluate and compare (i) the accuracy of prediction, (ii) the susceptibility of being included in automatic engines (e.g. to constitute web processing services), and (iii) the time cost needed for calibrating models and for making predictions.
Regression kriging is maybe the most widely used geostatistical technique in the digital soil mapping literature. Here we tried to apply the EBLUP regression kriging as it is deemed to be the most statistically sound RK flavor by pedometricians. An unusual multi-parametric and nonlinear machine learning approach was accomplished, called BAGAP (Bootstrap aggregating Artificial neural networks with Genetic Algorithms and Principal component regression). BAGAP combines a selected set of weighted neural nets having specified characteristics to yield an ensemble response.
The purpose of applying these two particular models is to ascertain whether and how much a more cumbersome machine learning method could be much promising in making more accurate/precise predictions. Being aware of the difficulty to handle objects based on EBLUP-RK as well as BAGAP when they are embedded in environmental applications, we explore the susceptibility of them in being wrapped within Web Processing Services. Two further kinds of aspects are faced for an exhaustive evaluation and comparison: automaticity and time of calculation with/without high performance computing leverage.