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Automated Processing of Large Data Volumes for Development of the Hugoton-Panoma Geomodel.

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The Hugoton Asset Management Project has focused on the development of a geomodel for the Hugoton and Panoma fields. This process has required automated processing of large data volumes at several steps, including prediction of lithofacies from geophysical well logs in numerous wells based on a neural network trained on log-facies associations observed in cored wells, generation of geologic controlling variables (depositional environment indicator and relative position in cycle) from a tops dataset, and computation of porosities corrected for mineralogical variations between facies and for washouts. In addition, we have developed code for batch processing the predicted facies and corrected porosities at the wells to estimate water saturations and original gas in place using petrophysical transforms and height above free water level, providing a quickly computed measure of the plausibility of the geomodel. The neural network code, including batch facies prediction based on logs from a large number of LAS files, has been added to an earlier Excel add-in for nonparametric regression and classification. However, the computationally intensive task of determining the optimal neural network parameters through crossvalidation has been accomplished using scripts in the R statistical language. The remaining tasks have been implemented in Excel, with the controlling parameters for each process specified in a simple spreadsheet layout. Due to the data volume involved, automation of these procedures has been crucial to the development of the Hugoton-Panoma geomodel.