

New AASPI Algorithms: March 2019

Application Name	Application Description	Location	Software Documentation	AASPI References
rfc3d	3D random forest decision tree classification of multiple seismic attribute volumes	under aaspi_util > Volumetric Classification	http://mcee.ou.edu/aaspi/documentation/Volume_tric_Classification-rfc3d.pdf	http://mcee.ou.edu/aaspi/submitted/2019/Kim_et_al_2019-Attribute_selection_in_seismic_facies_classification.pdf
attribute_selection	A preprocessing step before alternative classification algorithms where the objective is select a suite of seismic attributes that best differentiates picked seismic facies. Interpreters first draw polygons on a 3D seismic amplitude or attribute volume using AASPI program define_training_data; voxels that fall within these polygons define attribute vectors that serve as the training data. These data clouds are fit with a Gaussian Mixture model for each attribute combination. An exhaustive search based on cumulative distances determines which attribute combination is best.	under aaspi_util > Volumetric Classification	http://mcee.ou.edu/aaspi/documentation/Volume_tric_Classification-attribute_selection.pdf	http://mcee.ou.edu/aaspi/publications/2019/Kim_et_al_2019-Attribute_selection_in_seismic_facies_classification.pdf
cnn_image_classification	Convolution Neural Network solution to the classification of 2D photographic images, including prepared fossils, slabbed core, and thin sections	under aaspi_util> Machine Learning Toolbox	http://mcee.ou.edu/aaspi/documentation/Machine_Learning_Toolbox-cnn_image_classification.pdf	http://mcee.ou.edu/aaspi/submitted/2019/Pires_de_Lima_et_al_2019-CNN_as_an_aid_in_core_lithofacies_classification.pdf
convolutional_modeling	Reads user-defined picked surfaces, convolves them with a simple wavelet, and generates a 3D synthetic - Useful in understanding response of curvature and other algorithms to specific structures	under aaspi_util > Other Utilities	http://mcee.ou.edu/aaspi/documentation/Other_Uilities-convolutional_modeling.pdf	to be written

compensate_for_migration stretch	Uses a matching pursuit algorithm to determine the spectrum of each reflector in the migrated gather and then uses simple NMO equations to correct the spectrum. Algorithm requires migrated gathers and the corresponding velocity model	under aaspi_util_prestack > Prestack Data Conditioning	http://mcee.ou.edu/aaspi/documentation/Prestack_Data_Conditioning-compensate_for_migration_stretch.pdf	to be written
Machine Learning Toolbox		under aaspi_util		
unflatten	A simple utility that unflattens attributes computed from previously flattened volumes, putting them in their correct structural location	under aaspi_util > Formation Attributes	http://mcee.ou.edu/aaspi/documentation/Formation_Attributes-unflatten.pdf	simple utility
LAS file importer	Import LAS format well logs for subsequent processing and clustering	under aaspi_util > Well Log Utilities	http://mcee.ou.edu/aaspi/documentation/Well_Log_Uilities-Importing_exporting_and_plotting_LAS_format_data.pdf	simple utility
LAS file exporter	Export LAS format well logs after processing or clustering	under aaspi_util > Well Log Utilities	http://mcee.ou.edu/aaspi/documentation/Well_Log_Uilities-Importing_exporting_and_plotting_LAS_format_data.pdf	simple utility
Plot well log	A simple utility to plot well logs	under aaspi_util > Well Log Utilities	http://mcee.ou.edu/aaspi/documentation/Well_Log_Uilities-Importing_exporting_and_plotting_LAS_format_data.pdf	simple utility

