

Application of Lithological Mapping Based on Advanced Hyperspectral Imager (AHSI) Imagery Onboard Gaofen-5 (GF-5) Satellite

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Some parameters of M3D-DCNN, HybridSN, SSUN, and SVM-RBF methods are shown in Table S1–S8. Table S1 and Table S2 are about M3D-DCNN method; Table S3 and Table S4 are about HybridSN method; Table S5–S7 are about SSUN method; and Table S8 is for SVM-RBF model.

Table S1. Parameters of convolutional layers in M3D-DCNN method [1].

Kernel Name	Kernel Number	Kernel Size (H, W, B) ¹	Kernel Stride Δ (H, W, B)
conv1	16	3, 3, 11	1, 1, 3
conv2_1	16	1, 1, 1	1, 1, 1
conv2_2		1, 1, 3	
conv2_3		1, 1, 5	
conv2_4		1, 1, 11	
conv3_1	16	1, 1, 1	1, 1, 1
conv3_2		1, 1, 3	
conv3_3		1, 1, 5	
conv3_4		1, 1, 11	
conv4	16	2, 2, 3	1, 1, 1
pooling	-	2, 2, 3	2, 2, 3

¹ H, W, B represent the size of kernel along spatial and spectral dimensions respectively.

Table S2. Other parameters of M3D-DCNN method [1].

Name	Value	Name	Value
Training algorithm	AdaGrad algorithm [2]	Dropout	0.6
Base learning rate	0.01	Weight Decay	0.01
Batch size	40	Input Size	$7 \times 7 \times \text{Band}$

Table S3. Parameters of layers in HybridSN method [3].

Convolutional Layers			
Kernel Name	Kernel Number	Kernel Size (H, W, B)	Activation
Conv3d_1	8	3, 3, 7	Rectified linear unit (ReLU)
Conv3d_2	16	3, 3, 5	
Conv3d_3	32	3, 3, 3	

Conv2d_1	64	3, 3	
Fully Connected Layers			
Name	Units	Activation	Dropout
Dense_layer1	256	ReLU	0.4
Dense_layer2	128	ReLU	0.4
Output_layer	14	softmax	-

Table S4. Other parameters of HybridSN method [3].

Name	Value	Name	Value
Optimizer	Adam	Batch size	256
Learning Rate	0.001	Epochs	100
Decay	1e-06	-	-

Table S5. Parameters of LSTM layers in SSUN method [4].

Name	Units	L2 Regularization	Activation
LSTMSpectral	128	0.0001	-
LSTMDense	128	-	ReLU
LSTMSOFTMAX	14	-	softmax

Table S6. Parameters of MSCNN layers in SSUN method [4].

Kernel Name	Function	Kernel Number	Kernel Size (H, W)	Activation	Padding
CONV1	Conv2D	32	3, 3	ReLU	same
POOL1	MaxPooling2D	-	2, 2	-	-
CONV2	Conv2D	32	3, 3	ReLU	same
POOL2	MaxPooling2D	-	2, 2	-	-
CONV3	Conv2D	32	3, 3	ReLU	same
POOL3	MaxPooling2D	-	2, 2	-	-
DENSE1	DENSE	128	-	ReLU	-
DENSE2	DENSE	128	-	ReLU	-
DENSE3	DENSE	128	-	ReLU	-
CNNISOFTMAX	DENSE	14	-	softmax	-

Table S7. Other parameters of SSUN method [4].

Name	Value	Name	Value
Optimizer	Adam	Batch size	64
Learning rate	1e-4	Epochs	500
Beta_1	0.9	Time steps in LSTM	3
Beta_2	0.999	Amsgrad	False

Table S8. Parameters of SVM-RBF method.

Name	Value
Gamma in the kernel function	inverse of the number of bands (1/number of bands)
Penalty parameter	100.00

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