Digital Soil Mapping of Soil Subgroup Class Information in Coimbatore District using Decision Tree approach

SUPPLEMENTARY MATERIALS

Table 1. Decision tree rulesets generated by the See5 algorithm

See5 [Release 2.11a] Fri Jan 19 05:06:15 2024

Options:
Rule-based classifiers

Class specified by attribute `dep'

Read 348 cases (36 attributes) from taxon_sg.data

Rules:

Rule 1: (6/1, lift 52.2)
band22 > 12
band31 > 197.647
band32 <= 6
band33 > 4
-> class 2 [0.750]

Rule 2: (11/1, lift 16.4)
band22 > 7
band22 <= 8
band29 <= 33013.4
-> class 3 [0.846]

Rule 3: (7/1, lift 15.0)
band09 > 22.0458
band10 > 899.514
band14 <= 11.2152
band20 <= 0.656602
band22 <= 1
-> class 3 [0.778]

Rule 4: (2, lift 87.0)
band09 > 22.0458
band11 > 10
band12 > 0.833146
band22 <= 8
-> class 4 [0.750]

Rule 5: (4/1, lift 58.0)
band01 > 127
band04 > 193
band22 <= 8
-> class 5 [0.667]

Rule 6: (3, lift 92.8)
band22 > 12
band31 <= 197.647
band33 > 4
-> class 6 [0.800]

Rule 7: (3, lift 55.7)
band08 <= 28.8666
band16 <= 0.00333332
band22 <= 3
-> class 7 [0.800]

Rule 8: (2/1, lift 87.0)
band22 > 7
band22 <= 8
band29 > 33013.4
-> class 8 [0.500]

Rule 10: (5, lift 24.9)
band05 > 1
band16 <= 0.00333332
band20 > 0.656602
band22 > 3
-> class 10 [0.857]

Rule 11: (4, lift 24.2)
band01 <= 107
band20 <= 0.656602
band22 > 1
band22 <= 7
band33 > 8
-> class 10 [0.833]

Rule 12: (24/20, lift 5.6)
band01 > 102
band16 <= -0.00333333
-> class 10 [0.192]

Rule 13: (4, lift 16.1)
band20 <= 0.656602
band22 > 1
band22 <= 6
band23 <= 0.00054037
band29 <= 78436.1
-> class 11 [0.833]

Rule 14: (3, lift 15.5)
band01 <= 127
band04 > 193
band08 > 30.4249
band22 <= 8
band32 > 9
-> class 11 [0.800]

Rule 15: (4/1, lift 12.9)
band05 > 1
band16 > 0.00333332
band20 > 0.656602
-> class 11 [0.667]

Rule 16: (3, lift 92.8)
band01 > 107
band20 <= 0.656602
band22 > 1
band22 <= 8
-> class 12 [0.800]

Rule 17: (4/1, lift 77.3)
band05 <= 1
band32 <= 6
band33 <= 4
-> class 14 [0.667]

Rule 18: (4, lift 72.5)
band05 <= 1
band32 > 6
-> class 15 [0.833]

Rule 19: (3/1, lift 29.8)
band09 > 22.0458
band10 <= 899.514
band11 <= 10

Rule 21: (2, lift 65.3)
band02 > 109
band04 <= 193
band09 <= 22.0458
band21 <= -0.00145336
band22 <= 8
band25 <= 7.9759
-> class 17 [0.750]

Rule 22: (3/1, lift 52.2)
band01 <= 107
band22 > 6
band22 <= 7
band29 <= 78436.1
band33 <= 8
-> class 17 [0.600]

Rule 23: (7, lift 5.2)
band04 > 193
band04 <= 214
band19 > -0.00032872
band22 <= 1
band32 <= 5
-> class 19 [0.889]

Rule 24: (4, lift 4.9)
band04 > 126
band06 <= 2
band20 <= 0.656602
band22 > 8
band29 <= 65923.7
band32 > 13
-> class 19 [0.833]

Rule 25: (55/40, lift 1.7)
band10 <= 478.091
-> class 19 [0.281]

Rule 26: (325/266, lift 1.1)
band05 > 1
-> class 19 [0.183]

Rule 27: (11, lift 6.7)
band10 <= 684.276
band22 <= 1
band23 <= 0.00042801
band24 <= 0.0001571
band31 > 349.691
band32 > 15
-> class 20 [0.923]

Rule 28: (11/1, lift 6.1)
band04 <= 193
band06 > 1
band09 <= 22.0458
band22 <= 8
band31 > 349.691
band32 <= 13
band33 > 8
-> class 20 [0.846]

Rule 29: (4, lift 6.0)
band01 > 97
band06 <= 2

Rule 9: (2, lift 130.5)
band02 > 141
band06 > 2
band08 <= 31.7458
band22 > 8
-> class 9 [0.750]

band12 > 0.833146
band22 <= 8
-> class 16 [0.600]

Rule 20: (7/5, lift 16.6)
band09 <= 21.6916
band29 > 122837
-> class 16 [0.333]

band10 <= 679.284
band22 > 8
band32 <= 13
-> class 20 [0.833]

Rule 30: (3, lift 5.8)
band05 <= 1
band17 <= 0.00061281
band22 <= 12
-> class 20 [0.800]

Rule 31: (55/38, lift 2.3)
band08 > 31.7458
band09 <= 21.6916
band10 > 478.091
band33 > 1
-> class 20 [0.316]

Rule 32: (4, lift 11.6)
band02 <= 141
band03 > 194
band06 > 2
band08 <= 31.7458
band09 <= 21.6916
band15 <= 441
band22 > 8
-> class 21 [0.833]

Rule 33: (3, lift 11.1)
band04 <= 193
band20 <= 0.656602
band22 <= 8
band32 > 13
band32 <= 15
-> class 21 [0.800]

Rule 34: (6/1, lift 10.4)
band04 <= 193
band15 > 383
band15 <= 410
band22 <= 8
band32 > 5
band33 <= 8
-> class 21 [0.750]

Rule 35: (6/2, lift 8.7)
band04 <= 147
band08 > 31.7458
band11 <= 12
band33 <= 1
-> class 21 [0.625]

Rule 36: (189/171, lift 1.4)
band02 <= 109
-> class 21 [0.099]

Rule 37: (4, lift 9.4)
band01 > 107
band09 <= 21.6916
band11 > 12
band11 <= 19
band22 > 8
band29 <= 65923.7
-> class 22 [0.833]

Rule 38: (3, lift 9.0)
band01 <= 127
band04 > 214
band22 <= 1
band32 <= 9
-> class 22 [0.800]

Rule 39: (7/1, lift 8.7)
band04 <= 193
band09 <= 22.0458
band10 <= 804.466
band15 <= 383
band21 > -0.00145336
band22 <= 1
band31 > 188.77
band33 <= 1
-> class 22 [0.778]

Rule 40: (2, lift 8.4)
band06 <= 1
band09 <= 22.0458
band20 <= 0.656602
band22 <= 8
-> class 22 [0.750]

Rule 41: (59/44, lift 2.9)
band09 <= 22.0458
band22 <= 1
band33 <= 8
-> class 22 [0.262]

Rule 42: (325/294, lift 1.1)
band05 > 1
-> class 22 [0.098]

Rule 43: (2, lift 11.3)
band08 > 31.7458
band09 <= 21.6916
band11 > 19
band22 > 8
-> class 23 [0.750]

Rule 44: (5/1, lift 10.8)
band04 <= 193
band11 > 11
band15 > 383
band22 <= 1
band32 <= 5
band33 <= 8
-> class 23 [0.714]

Rule 45: (4/1, lift 10.1)
band04 > 147
band08 > 31.7458
band15 > 400
band22 > 8
band33 <= 1
-> class 23 [0.667]

Rule 46: (12/7, lift 6.5)
band10 > 804.466
band20 <= 0.656602
band33 <= 1
-> class 23 [0.429]

Rule 47: (27/20, lift 4.2)
band09 <= 22.0458
band10 > 684.276
band20 <= 0.656602
band22 <= 8
-> class 23 [0.276]

Rule 48: (3/1, lift 52.2)
band08 > 31.7458
band08 <= 31.8041
band10 > 478.091
band11 <= 12
band18 <= 0.367192
band22 > 8
-> class 24 [0.600]

Rule 49: (4, lift 26.4)
band08 > 28.8666
band20 > 0.656602
band22 <= 3
band33 > 6
-> class 25 [0.833]

Rule 50: (4/1, lift 21.1)
band09 > 22.0458
band22 <= 1
band29 > 10424.62
-> class 25 [0.667]

Rule 51: (7, lift 7.7)
band05 > 1
band09 <= 21.6916
band25 <= 5.2993
band29 > 65923.7
band29 <= 122837
-> class 26 [0.889]

Rule 52: (6, lift 7.6)
band08 > 31.8041
band10 > 478.091
band11 <= 12
band18 <= 0.367192
band22 > 8
band29 <= 65923.7
band33 > 1
-> class 26 [0.875]

Rule 53: (5, lift 7.5)
band01 <= 96
band02 > 89
band09 > 21.6916
band22 > 8
band30 > 6.1e-007
band30 <= 3.7e-006
-> class 26 [0.857]

Rule 54: (5/1, lift 6.2)
band09 <= 22.0458
band22 <= 1
band31 <= 349.691
band32 > 5
band33 > 8
-> class 26 [0.714]

Rule 55: (89/65, lift 2.4)
band05 > 1
band09 <= 21.6916
band22 > 8
-> class 26 [0.275]

Rule 56: (6/1, lift 52.2)
band09 > 21.6916
band15 > 349
band22 > 8
band33 > 6
-> class 27 [0.750]

		Default class: 19

Table 2. Confusion Matrix derived for the derived digital soil subgroup map

Classes		REFERENCE																											Row Total	UA %
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
CLASSIFIED	1	2																												2	100
	2		5																											5	100
	3			3																						1				4	75
	4				3																									3	100
	5					2																								2	100
	6						2																							2	100
	7							2						1																3	67
	8								2										2											4	50
	9									2																				2	100
	10										3																			3	100
	11											3						2											1	6	50
	12												2																	2	100
	13													0																0	0
	14														2															2	100
	15															2														2	100
	16																1										1			2	50
	17																	0												0	0
	18																		0											0	0
	19											1		1						7				1			1			11	64
	20																				6									6	100
	21																					3								3	100
	22			1																			3							4	75
	23																						1	3					1	5	60
	24																								3					3	100
	25																				1					3				4	75
	26																2					1					6			9	67
	27																											3		3	100
	28																												0	0	0
Column Total		2	5	4	3	2	2	2	2	2	3	4	2	2	2	2	3	2	2	7	7	4	4	4	3	4	8	3	2	N=92 CC=73 Kappa:0.78	
PA %		100	100	75	100	100	100	100	100	100	100	75	100	0	100	100	33	0	0	100	85	75	75	75	100	75	75	100	0		

Note: PA% : Producers Accuracy %; UA: User's Accuracy, Class1 :Aquic Haplustalfs, 2: Aquic Ustifluvents,3: Fluventic Haplustalfs, 4: Fluventic Ustropepts, 5: Gypsic Haplusterts, 6: Humic Dystrustepts, 7: Kandic Paleustalfs, 8: Lithic Calciustepts, 9: Lithic Haplustalfs, 10: Lithic Haplustepts, 11: Lithic Rhodustalfs, 12: Lithic Ustorthents, 13: Lithic Ustropepts, 14: Oxic Dystrustepts, 15: Oxyaquic Haplustepts, 16: Paralithic Ustropepts, 17: Rhodic Paleustalfs, 18: Typic Calciustepts, 19: Typic Haplustalfs, 20: Typic Haplustepts, 21: Typic Haplusterts, 22: Typic Rhodustalfs, 23: Typic Ustropepts, 24: Udic Haplustalfs, 25: Ultic Haplustalfs, 26: Vertic Haplustepts, 27: Vertic Ustorthents, 28: Paralithic Ustorthents , CC- represents the correctly classified pixels, N represents the number of elements studied.