

# **INTRODUCTION TO DIGITAL IMAGES AND DIGITAL ANALYSIS TECHNIQUES:**

**A Basic Course for the Appreciation of Digital  
Analysis of Remotely Sensed Multispectral Data**

**(INSTRUCTIONS)  
EXERCISE FORMS  
(EXERCISE SOLUTIONS)**

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FIGURE 1  
A digitized image, 2 bands, 7 x 7 area, line interleaved.

START

5	3	4	5	4	5	5	5	5	4	6	7	7	7	2	2	3	4	4	4	6	2	4
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

6	5	5	6	5	2	2	3	3	6	6	8	5	3	5	7	6	6	8	2	2	6	6
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

9	8	7	3	4	5	6	8	8	7	3	6	8	8	8	7	4	3	5	8	8	8	7
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

1	3	6	8	7	2	3	2	4	5	8	7	1	0	0	4	6	7	3	3	2	1	3
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

6	7	0	0	0	0
---	---	---	---	---	---

END





FIGURE 4  
Intensity profiles.

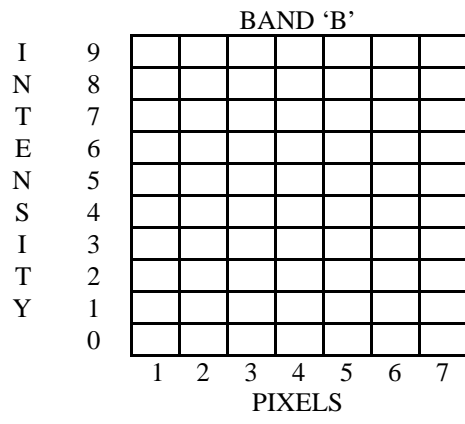
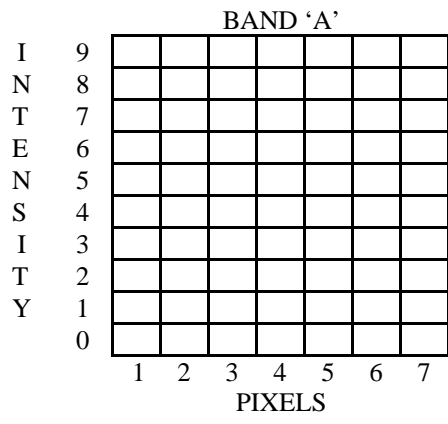
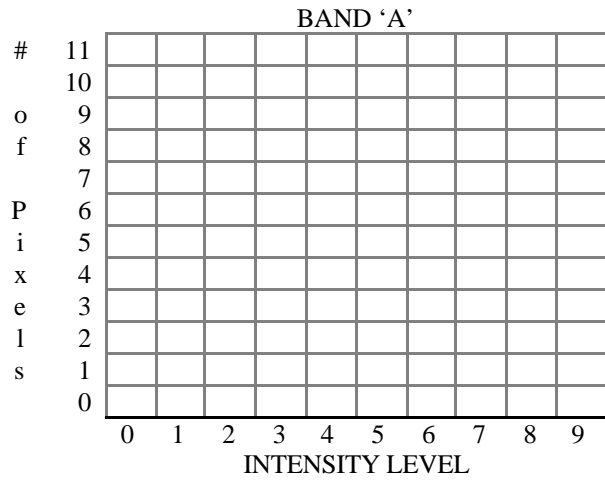


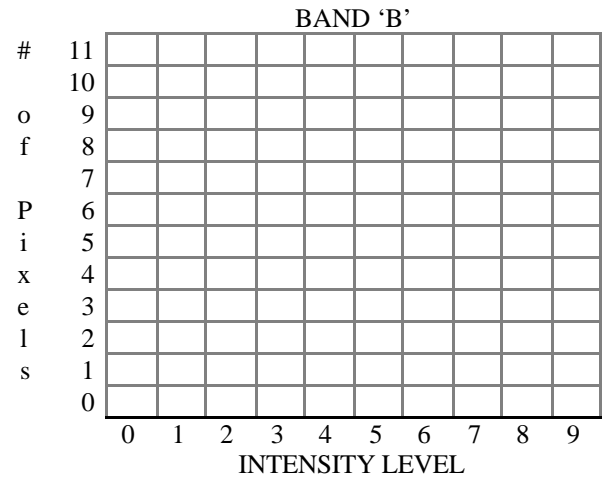
FIGURE 5  
One-dimensional histograms.



Number of pixels:

--	--	--	--	--	--	--	--	--	--

Sum = \_\_\_\_\_



Number of pixels:

--	--	--	--	--	--	--	--	--	--

Sum = \_\_\_\_\_

FIGURE 6  
Two-dimensional histogram.

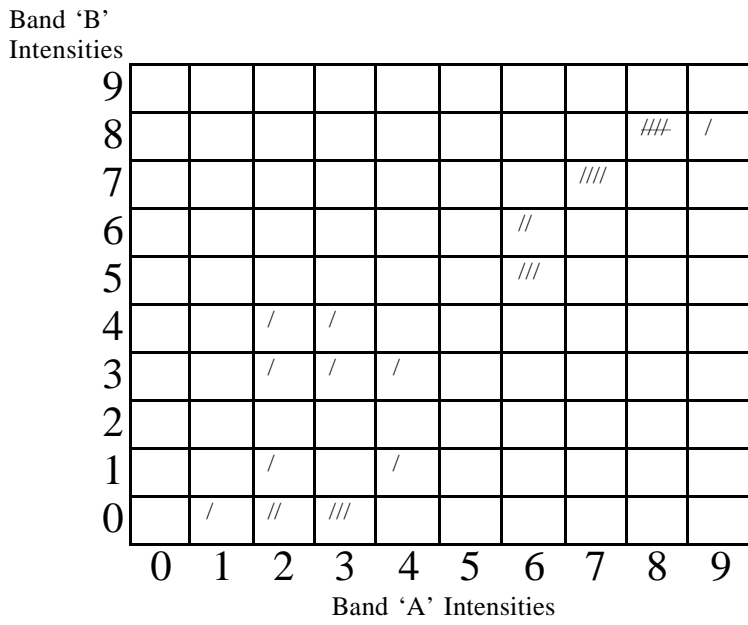


FIGURE 7  
Two-dimensional histogram.

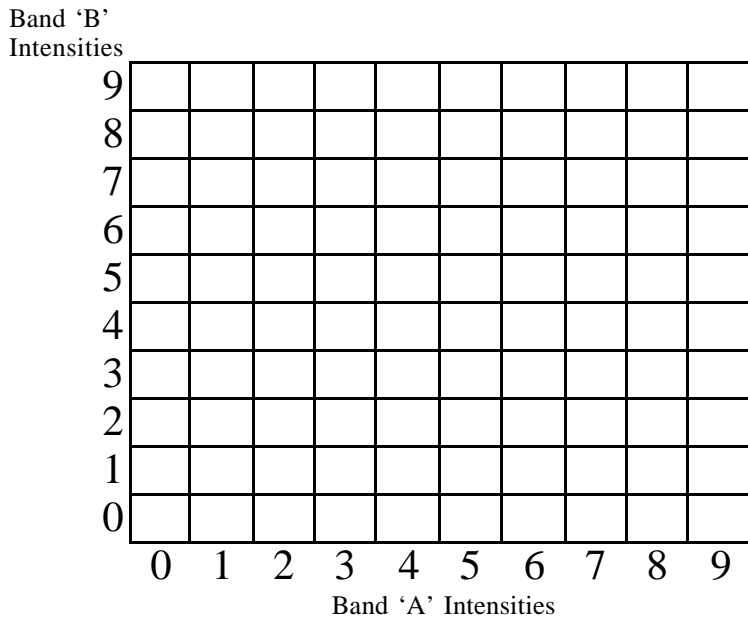


FIGURE 8  
Ground verification map: 'Forest'.

		PIXELS						
		1	2	3	4	5	6	7
L I N E S	1						<b>F</b>	
	2					<b>F</b>		
	3							
	4	<b>F</b>						
	5							
	6							
	7							

Band 'A' intensity values: \_\_ , \_\_ , \_\_

Band 'A' intensity range:  
 minimum: \_\_  
 maximum: \_\_

Band 'B' intensity values: \_\_ , \_\_ , \_\_

Band 'B' intensity range:  
 minimum: \_\_  
 maximum: \_\_



FIGURE 9A  
Forest map from Band 'A'.

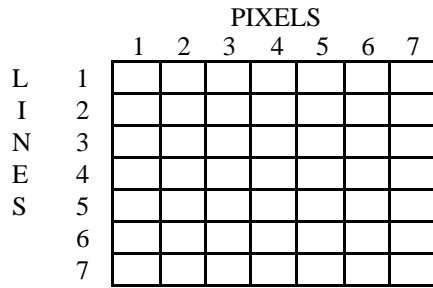


FIGURE 9B  
Forest map from Band 'B'.

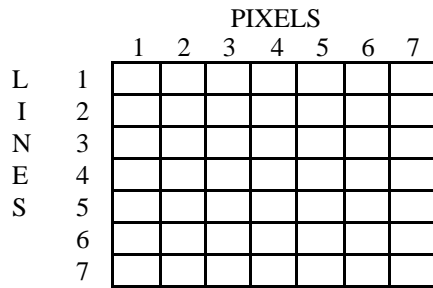


FIGURE 10A  
 Feature space portion representing 'Forest'.

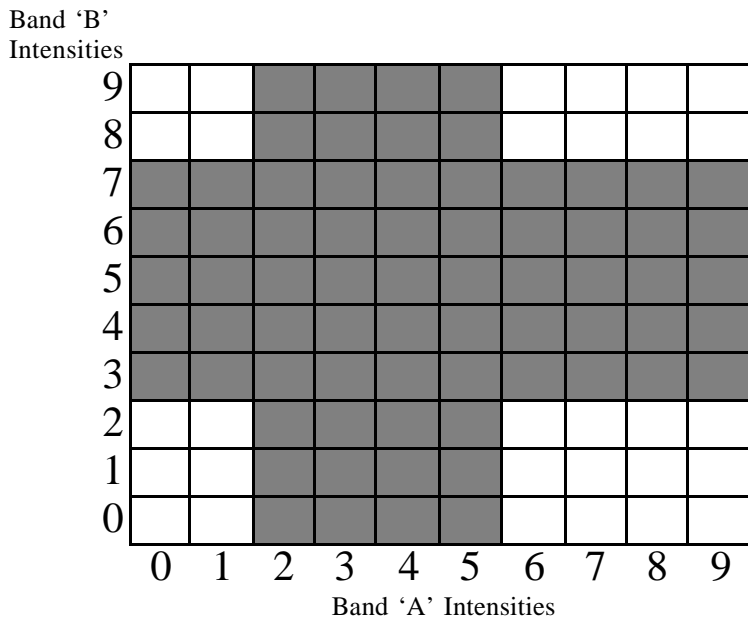


FIGURE 10B  
 'Forest' theme from Bands 'A' and 'B'.

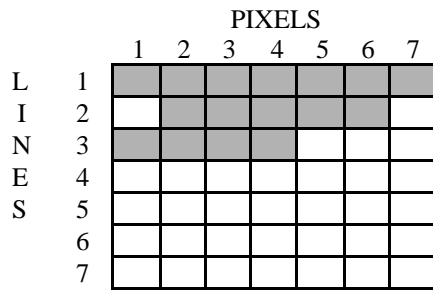


FIGURE 11A  
Ground verification map: 'Forest Types'.

		PIXELS						
		1	2	3	4	5	6	7
L	1	D			D	D	D	D
I	2		C				D	
N	3	C	C		D			
E	4	C	C					
S	5	C						
	6	C						
	7	C						

'C' = coniferous  
'D' = deciduous

FIGURE 11B  
Forest type designation in feature space.

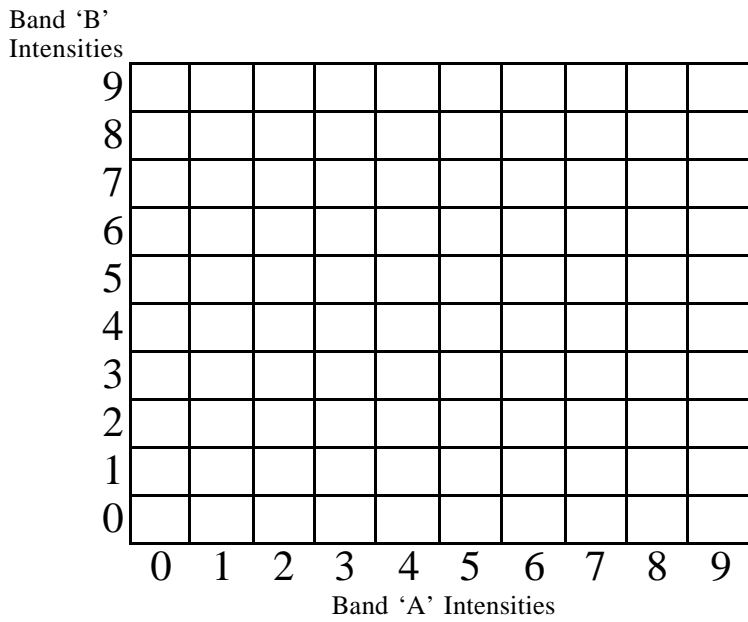


FIGURE 12A  
Scene #2, Band 'A'.

		PIXELS						
		1	2	3	4	5	6	7
L	1	3	4	1	1	2	2	2
I	2	4	4	4	2	1	2	2
N	3	3	3	5	2	2	2	2
E	4	5	5	2	2	2	2	2
S	5	4	5	5	2	2	2	2
	6	4	3	3	4	4	5	5
	7	5	5	3	4	4	5	4

FIGURE 12B  
Scene #2, Band 'B'.

		PIXELS						
		1	2	3	4	5	6	7
L	1	7	7	0	0	0	3	3
I	2	7	7	6	0	0	3	4
N	3	4	4	7	1	1	3	4
E	4	7	7	4	4	3	4	4
S	5	6	7	7	4	5	5	5
	6	7	5	5	5	7	7	6
	7	7	6	6	7	7	7	7

FIGURE 12C  
Scene #2, feature space.

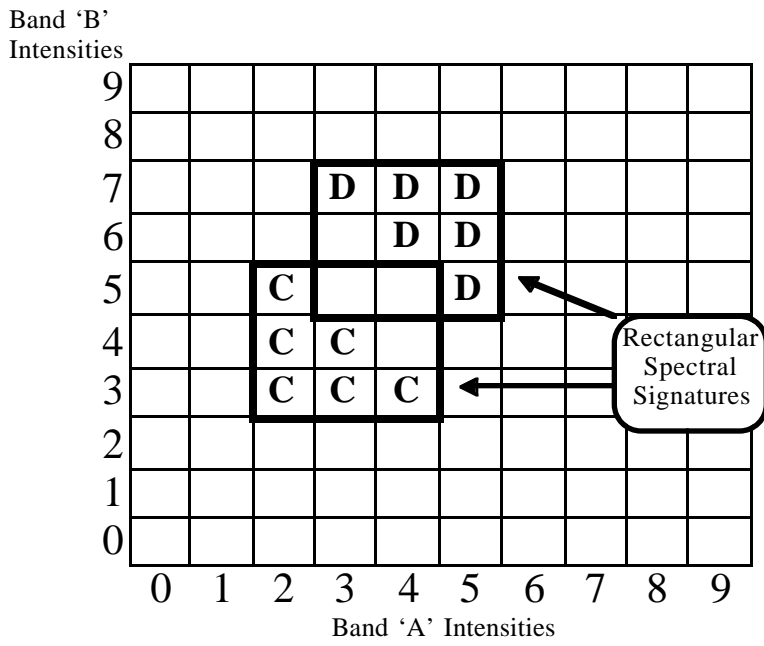


FIGURE 12D  
Scene #2, theme map.

		PIXELS						
		1	2	3	4	5	6	7
L	1							
I	2							
N	3							
E	4							
S	5	<b>D</b>	<b>D</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>
	6	<b>D</b>				<b>D</b>	<b>D</b>	<b>D</b>
	7	<b>D</b>	<b>D</b>		<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>

'C' = Coniferous Forest  
'D' = Deciduous Forest

FIGURE 13A  
Scene #2, Band 'B', one-dimensional histogram.

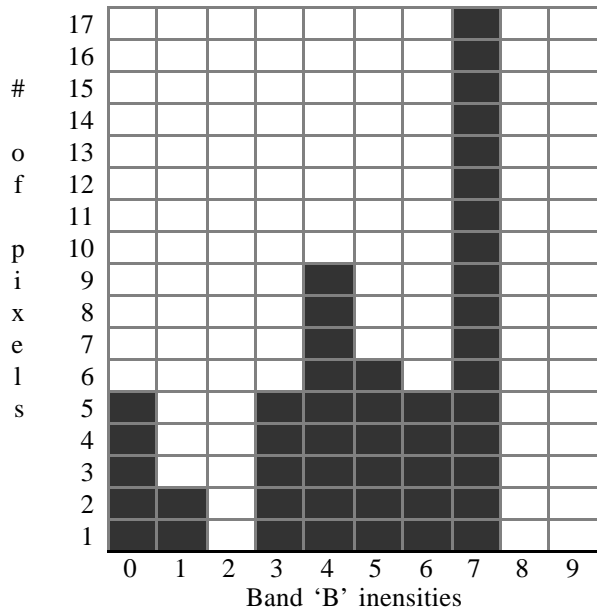


FIGURE 13B  
Scene #2, two-dimensional histogram.

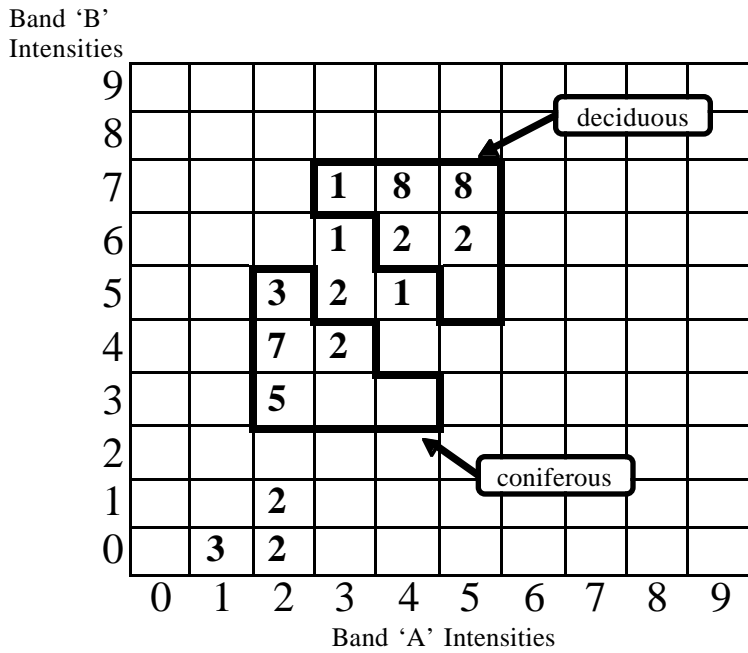




FIGURE 14C  
Scene #2, feature space.

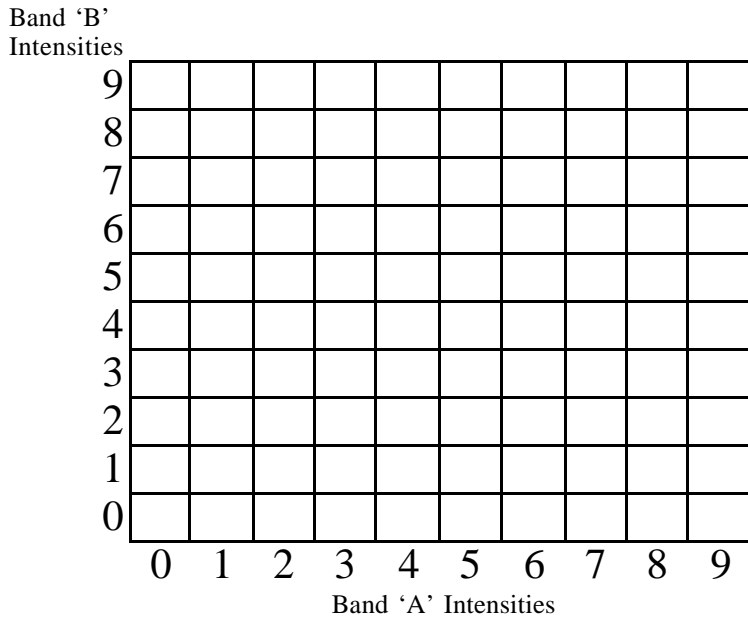


FIGURE 14D  
Scene #2, unsupervised classification.

