

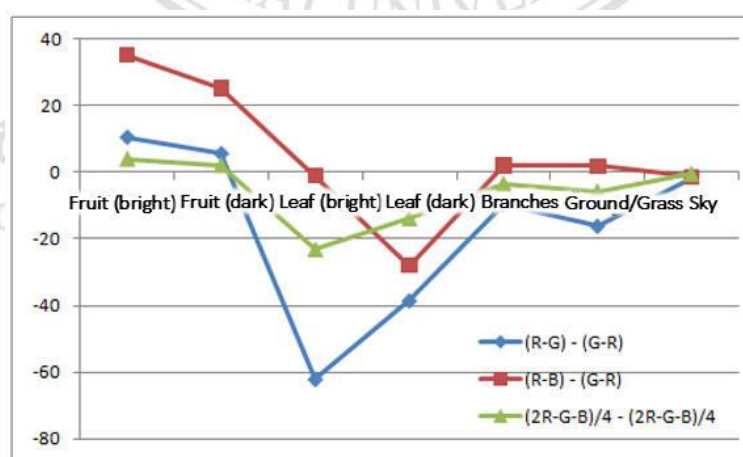
APPENDIX A

The statistic of model in classify Longan fruit on the bush using RGB photo

1. Sunny/less bright condition

The statistic value of sunny/less bright condition

	$(R-G) - (G-R)$	$(R-B) - (G-R)$	$(2R-G-B)/4 - (2R-G-B)/4$
Fruit (bright)	10.56	35.12	3.95
Fruit (dark)	5.65	25.28	2.17
Leaf (bright)	-62.10	-1.11	-22.97
Leaf (dark)	-38.56	-27.92	-13.68
Branches	-9.60	2.10	-3.33
Ground/Grass	-16.17	1.95	-5.66
Sky	-1.45	-1.35	-0.47

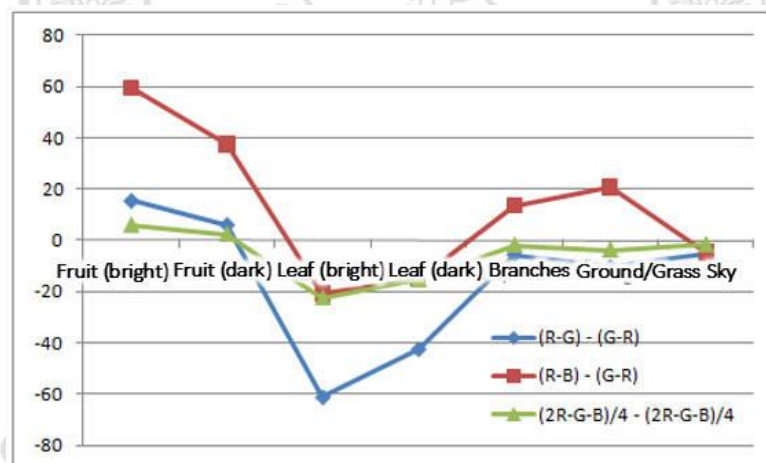


Difference value of sunny/less bright condition

2. sunny/medium bright condition

The statistic value of sunny/ medium bright condition

	$(R-G) - (G-R)$	$(R-B) - (G-R)$	$(2R-G-B)/4 - (2R-G-B)/4$
Fruit (bright)	15.51	59.46	5.81
Fruit (dark)	6.13	37.46	2.31
Leaf (bright)	-61.30	-20.71	-22.45
Leaf (dark)	-42.46	-14.90	-15.35
Branches	-5.60	13.61	-1.96
Ground/Grass	-10.28	20.66	-3.80
Sky	-5.00	-4.61	-1.73



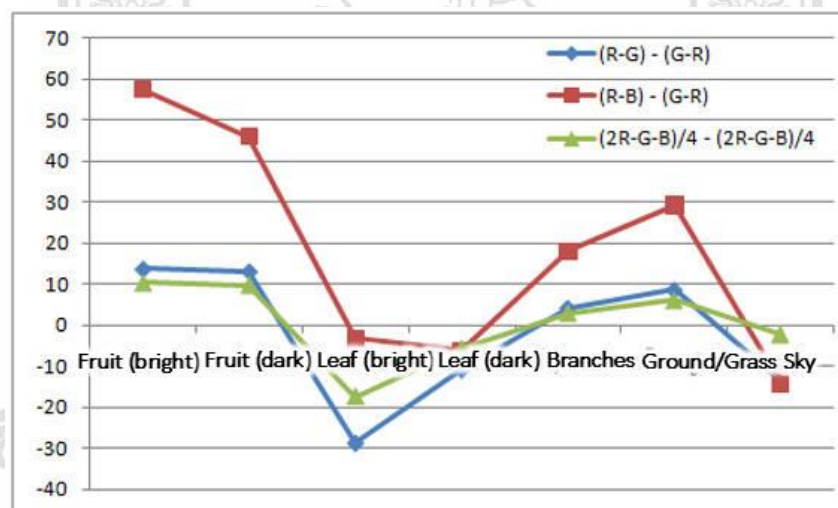
Difference value of sunny/ medium bright condition

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3. sunny/very bright condition

The statistic value of sunny/very bright condition

	(R-G) - (G-R)	(R-B) - (G-R)	(2R-G-B)/4 - (2R-G-B)/4
Fruit (bright)	13.83	57.49	10.34
Fruit (dark)	13.19	46.06	9.88
Leaf (bright)	-28.80	-3.21	-17.47
Leaf (dark)	-10.83	-6.27	-5.71
Branches	4.24	18.06	2.95
Ground/Grass	8.72	29.27	6.06
Sky	-13.64	-14.28	-2.23



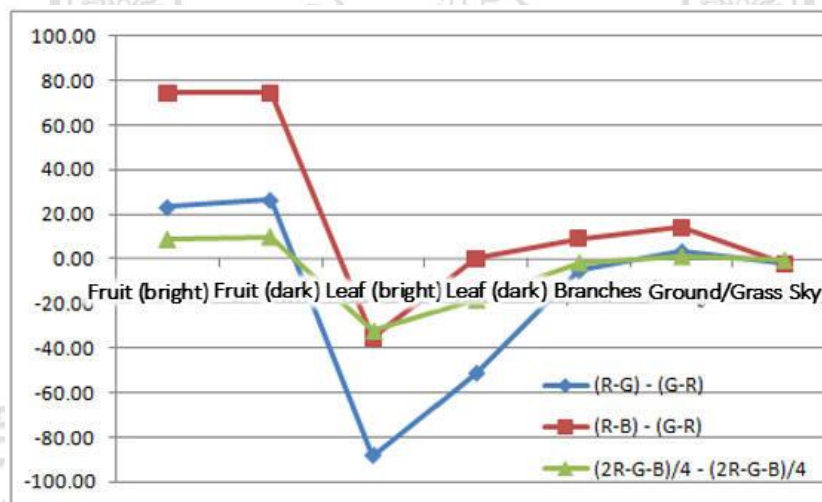
Difference value of sunny/very bright condition

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4. cloudy/less bright condition

The statistic value of cloudy/less bright condition

	$(R-G) - (G-R)$	$(R-B) - (G-R)$	$(2R-G-B)/4 - (2R-G-B)/4$
Fruit (bright)	23.32	74.36	8.75
Fruit (dark)	26.54	74.49	9.97
Leaf (bright)	-88.30	-35.18	-32.40
Leaf (dark)	-51.30	0.19	-18.31
Branches	-5.10	9.22	-1.67
Ground/Grass	3.34	14.17	1.14
Sky	-1.78	-2.27	-0.55

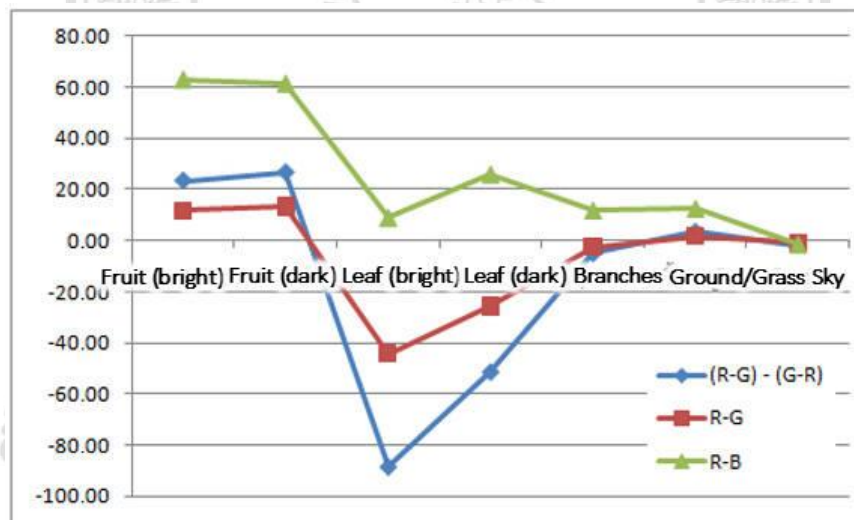


Difference value of cloudy/less bright condition

5. cloudy/medium bright condition

The statistic value of cloudy/medium bright condition

	(R-G) - (G-R)	R-G	R-B
Fruit (bright)	23.32	11.66	62.70
Fruit (dark)	26.54	13.27	61.21
Leaf (bright)	-88.30	-44.15	8.97
Leaf (dark)	-51.30	-25.65	25.84
Branches	-5.10	-2.55	11.77
Ground/Grass	3.34	1.67	12.50
Sky	-1.78	-0.89	-1.38



Difference value of cloudy/medium bright condition

APPENDIX B

1.The detail of CPT

Pruning Suitability:

Pruning Time	Pruning Form	Suitable	average	Not Suitable
Feb- Apr	Form	0.00	0.20	0.80
Feb- Apr	No form	0.00	0.15	0.85
May- July	Form	0.00	0.50	0.50
May- July	No form	0.00	0.40	0.60
Aug- Oct	Form	1.00	0.00	0.00
Aug- Oct	No form	0.95	0.05	0.00
Nov- Jan	Form	0.80	0.20	0.00
Nov- Jan	No form	0.75	0.25	0.00
None- Form	None	0.00	0.00	1.00
None- No form	None	0.00	0.00	1.00

Longan Tree Condition:

Tree Size	Tree Management			
	High	Medium	Low	
Good	good	1.0	0.0	0.0
Good	average	0.8	0.2	0.0
Good	bad	0.2	0.3	0.5
Moderate	good	0.3	0.7	0.0
Moderate	average	0.0	1.0	0.0
Moderate	bad	0.0	0.7	0.3
Poor	good	0.2	0.3	0.5
Poor	average	0.0	0.2	0.8
Poor	bad	0.0	0.0	1.0

Tree Size:

Pruning Suitability	Tree Space	Tree Age	Good	Moderate	Poor
Suitable	Dense	0 to 5	0.00	0.15	0.85
Suitable	Dense	5 to 12	1.00	0.00	0.00
Suitable	Dense	12 to 20	1.00	0.00	0.00
Suitable	Dense	>= 20	0.50	0.50	0.00
Suitable	Moderate	0 to 5	0.00	0.15	0.85
Suitable	Moderate	5 to 12	0.67	0.33	0.00
Suitable	Moderate	12 to 20	0.67	0.33	0.00
Suitable	Moderate	>= 20	0.67	0.33	0.00
Suitable	Sparse	0 to 5	0.00	0.10	0.90
Suitable	Sparse	5 to 12	0.00	1.00	0.00
Suitable	Sparse	12 to 20	0.00	1.00	0.00
Suitable	Sparse	>= 20	0.90	0.10	0.00
average	Dense	0 to 5	0.00	0.10	0.90
average	Dense	5 to 12	0.50	0.50	0.00
average	Dense	12 to 20	0.50	0.50	0.00
average	Dense	>= 20	0.40	0.60	0.00
average	Moderate	0 to 5	0.00	0.05	0.95
average	Moderate	5 to 12	0.00	1.00	0.00
average	Moderate	12 to 20	0.00	1.00	0.00
average	Moderate	>= 20	0.00	0.60	0.40
average	Sparse	0 to 5	0.00	0.00	1.00
average	Sparse	5 to 12	0.00	0.00	1.00
average	Sparse	12 to 20	0.00	0.00	1.00
average	Sparse	>= 20	0.00	0.00	1.00
Not Suitable	Dense	0 to 5	0.00	0.00	1.00
Not Suitable	Dense	5 to 12	0.00	0.30	0.70
Not Suitable	Dense	12 to 20	0.00	0.30	0.70
Not Suitable	Dense	>= 20	0.00	0.20	0.80
Not Suitable	Moderate	0 to 5	0.00	0.00	1.00
Not Suitable	Moderate	5 to 12	0.00	0.20	0.80
Not Suitable	Moderate	12 to 20	0.00	0.20	0.80
Not Suitable	Moderate	>= 20	0.00	0.00	1.00
Not Suitable	Sparse	0 to 5	0.00	0.00	1.00
Not Suitable	Sparse	5 to 12	0.00	0.00	1.00
Not Suitable	Sparse	12 to 20	0.00	0.00	1.00
Not Suitable	Sparse	>= 20	0.00	0.00	1.00

Crop Fertility:				
Soil Fertility	Fertilizer Application	High	Medium	Low
High	Very High	1.00	0.00	0.00
High	High	0.80	0.20	0.00
High	Medium	0.60	0.40	0.00
High	Low	0.50	0.50	0.00
High	None	0.00	0.00	1.00
Medium	Very High	0.80	0.20	0.00
Medium	High	0.40	0.60	0.00
Medium	Medium	0.00	1.00	0.00
Medium	Low	0.00	0.80	0.20
Medium	None	0.00	0.00	1.00
Low	Very High	0.00	0.80	0.20
Low	High	0.00	0.60	0.40
Low	Medium	0.00	0.50	0.50
Low	Low	0.00	0.10	0.90
Low	None	0.00	0.00	1.00

Water Situation:					
Suitability of Rain	Water Resource	Good	Fair	Bad	
Highly Suitable	Irrigation	1.00	0.00	0.00	
Highly Suitable	Ground Water	0.67	0.33	0.00	
Highly Suitable	Surface Water	0.67	0.33	0.00	
Highly Suitable	Rain Only	0.33	0.67	0.00	
Moderately Suitable	Irrigation	0.67	0.33	0.00	
Moderately Suitable	Ground Water	0.67	0.33	0.00	
Moderately Suitable	Surface Water	0.33	0.67	0.00	
Moderately Suitable	Rain Only	0.00	1.00	0.00	
Marginally Suitable	Irrigation	0.67	0.33	0.00	
Marginally Suitable	Ground Water	0.33	0.67	0.00	
Marginally Suitable	Surface Water	0.00	1.00	0.00	
Marginally Suitable	Rain Only	0.00	0.67	0.33	
Not Suitable	Irrigation	0.33	0.67	0.00	
Not Suitable	Ground Water	0.00	1.00	0.00	
Not Suitable	Surface Water	0.00	0.67	0.33	
Not Suitable	Rain Only	0.00	0.00	1.00	

Crop Management:

Activity before Flowering	Pest&Disease application	Fertilizer Application	good	average	bad
High	Both	High	1.00	0.00	0.00
High	Both	Medium	0.95	0.05	0.00
High	Both	Low	0.90	0.05	0.05
High	HorP	High	0.85	0.15	0.00
High	HorP	Medium	0.80	0.20	0.00
High	HorP	Low	0.75	0.20	0.05
High	None	High	0.70	0.30	0.00
High	None	Medium	0.65	0.30	0.05
High	None	Low	0.50	0.30	0.20
Medium	Both	High	0.95	0.05	0.00
Medium	Both	Medium	0.90	0.10	0.00
Medium	Both	Low	0.80	0.15	0.05
Medium	HorP	High	0.75	0.25	0.00
Medium	HorP	Medium	0.70	0.30	0.00
Medium	HorP	Low	0.65	0.25	0.10
Medium	None	High	0.65	0.30	0.05
Medium	None	Medium	0.60	0.30	0.10
Medium	None	Low	0.50	0.30	0.20
Low	Both	High	0.70	0.30	0.00
Low	Both	Medium	0.65	0.35	0.00
Low	Both	Low	0.50	0.40	0.10
Low	HorP	High	0.40	0.60	0.00
Low	HorP	Medium	0.30	0.70	0.00
Low	HorP	Low	0.20	0.60	0.20
Low	None	High	0.10	0.60	0.30
Low	None	Medium	0.05	0.55	0.40
Low	None	Low	0.00	0.10	0.90
None	Both	High	0.00	0.40	0.60
None	Both	Medium	0.00	0.25	0.75
None	Both	Low	0.00	0.20	0.80
None	HorP	High	0.00	0.20	0.80
None	HorP	Medium	0.00	0.15	0.85
None	HorP	Low	0.00	0.10	0.90
None	None	High	0.00	0.20	0.80
None	None	Medium	0.00	0.10	0.90
None	None	Low	0.00	0.00	1.00

Water Efficiency:

Water Method	Water Use	good	average	bad
Springer	High	1.00	0.00	0.00
springer	Medium	0.90	0.10	0.00
Salinger	Low	0.80	0.20	0.00
springer	None	0.00	0.00	1.00
Flood	High	0.90	0.10	0.00
Flood	Medium	0.80	0.20	0.00
Flood	Low	0.70	0.30	0.00
Flood	None	0.00	0.00	1.00
Tube	High	0.80	0.20	0.00
Tube	Medium	0.70	0.30	0.00
Tube	Low	0.60	0.40	0.00
Tube	None	0.00	0.00	1.00
None	High	0.00	0.00	1.00
None	Medium	0.00	0.00	1.00
None	Low	0.00	0.00	1.00
None	None	0.00	0.00	1.00

Water Management:

Water Situation	Water Efficiency	good	average	bad
Good	good	1.00	0.00	0.00
Good	average	0.70	0.30	0.00
Good	bad	0.00	0.30	0.70
Fair	good	0.70	0.30	0.00
Fair	average	0.00	1.00	0.00
Fair	bad	0.00	0.40	0.60
Bad	good	0.00	0.40	0.60
Bad	average	0.00	0.10	0.90
Bad	bad	0.00	0.00	1.00

Flower Promotion Suitability

Promotion Chemical	Chemical use	good	average	bad
KCLO3+ETHEPHON	recommendation	1.00	0.00	0.00
KCLO3+ETHEPHON	Other	0.75	0.25	0.00
KCLO3 or Other	recommendation	0.75	0.25	0.00
KCLO3 or Other	Other	0.50	0.50	0.00
None	recommendation	0.00	0.00	1.00
None	Other	0.00	0.00	1.00

Flowering stage:

Flowering Promotion Suitability	Temperature during November - February	Longan Tree Condition	High		
			Moderate	Low	
good	Highly Suitable	High	1.00	0.00	0.00
good	Highly Suitable	Medium	0.67	0.33	0.00
good	Highly Suitable	Low	0.33	0.67	0.00
good	Moderately Suitable	High	0.67	0.33	0.00
good	Moderately Suitable	Medium	0.33	0.67	0.00
good	Moderately Suitable	Low	0.33	0.67	0.00
good	Marginally Suitable	High	0.33	0.67	0.00
good	Marginally Suitable	Medium	0.33	0.67	0.00
good	Marginally Suitable	Low	0.00	0.67	0.33
good	Not Suitable	High	0.67	0.33	0.00
good	Not Suitable	Medium	0.33	0.67	0.00
good	Not Suitable	Low	0.33	0.67	0.00
average	Highly Suitable	High	0.33	0.67	0.00
average	Highly Suitable	Medium	0.33	0.67	0.00
average	Highly Suitable	Low	0.00	0.67	0.33
average	Moderately Suitable	High	0.33	0.67	0.00
average	Moderately Suitable	Medium	0.00	0.67	0.33
average	Moderately Suitable	Low	0.00	0.00	1.00
average	Marginally Suitable	High	0.67	0.33	0.00
average	Marginally Suitable	Medium	0.33	0.67	0.00
average	Marginally Suitable	Low	0.00	0.67	0.33
average	Not Suitable	High	0.33	0.67	0.00
average	Not Suitable	Medium	0.00	0.67	0.33
average	Not Suitable	Low	0.00	0.67	0.33
bad	Highly Suitable	High	0.00	0.67	0.33
bad	Highly Suitable	Medium	0.00	0.67	0.33
bad	Highly Suitable	Low	0.00	0.00	1.00
bad	Moderately Suitable	High	0.33	0.67	0.00
bad	Moderately Suitable	Medium	0.00	0.67	0.33
bad	Moderately Suitable	Low	0.00	0.67	0.33
bad	Marginally Suitable	High	0.00	0.67	0.33
bad	Marginally Suitable	Medium	0.00	0.67	0.33
bad	Marginally Suitable	Low	0.00	0.00	1.00
bad	Not Suitable	High	0.00	0.67	0.33
bad	Not Suitable	Medium	0.00	0.00	1.00
bad	Not Suitable	Low	0.00	0.00	1.00

Tree Management:

Water	Crop Management			
	good	average	bad	
good	good	1.00	0.00	0.00
good	average	0.70	0.30	0.00
good	bad	0.50	0.45	0.05
average	good	0.65	0.35	0.00
average	average	0.00	1.00	0.00
average	bad	0.00	0.30	0.70
bad	good	0.00	0.40	0.60
bad	average	0.00	0.20	0.80
bad	bad	0.00	0.00	1.00

Yield Prediction:

Flowering state	Activity After Flowering	Very High	High	Moderate	Low	Very Low
		High	High	0.20	0.20	0.20
High	Medium	0.14	0.43	0.14	0.14	0.14
High	Low	0.13	0.50	0.13	0.13	0.13
High	None	0.20	0.20	0.20	0.20	0.20
Moderate	High	0.20	0.20	0.20	0.20	0.20
Moderate	Medium	0.08	0.08	0.69	0.08	0.08
Moderate	Low	0.05	0.05	0.79	0.05	0.05
Moderate	None	0.20	0.20	0.20	0.20	0.20
Low	High	0.20	0.20	0.20	0.20	0.20
Low	Medium	0.17	0.17	0.17	0.17	0.33
Low	Low	0.17	0.17	0.17	0.33	0.17
Low	None	0.20	0.20	0.20	0.20	0.20

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- 1994 -1997 B.Sc. (Horticulture), Faculty of Agriculture,
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- 1999 – 2004 M.S. Agriculture (Agricultural Systems),
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- 2009 – 2014 Ph.D. in Agricultural Systems, Faculty of Agriculture,
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Working Experiences

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