

()

*

(// : // :)

x

x

(% /)

(% /)

% /

% /

:

()

()

:

()

()

%

()

()

RGB

RGB

()

...

:

)

(

()

()

۲

HSI

YCrCb

۳

NTSC

۷

()

()

()

()

()

RGB

HSI

۹

۸

()

()

8. Co-occurrence matrix

9. Entropy

1. Hue, Saturation, Intensity

2. Hue

3. Light intensity

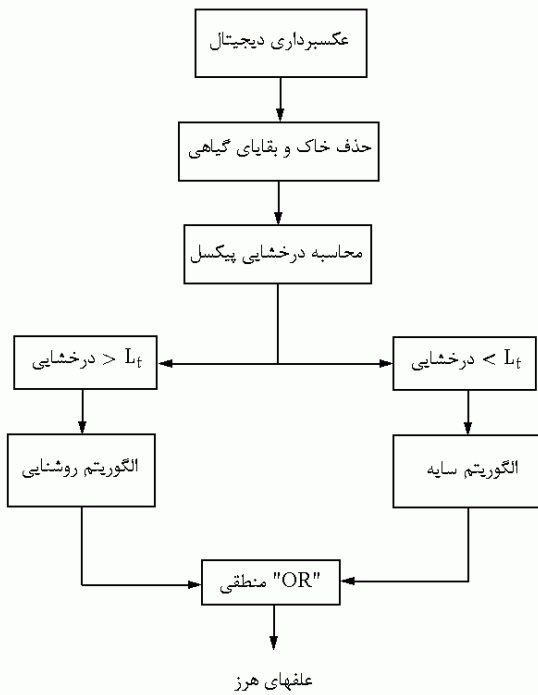
4. Color spaces

5. Luma, Chrominance

6. National Television Standards Committee

7. Chromaticity

()



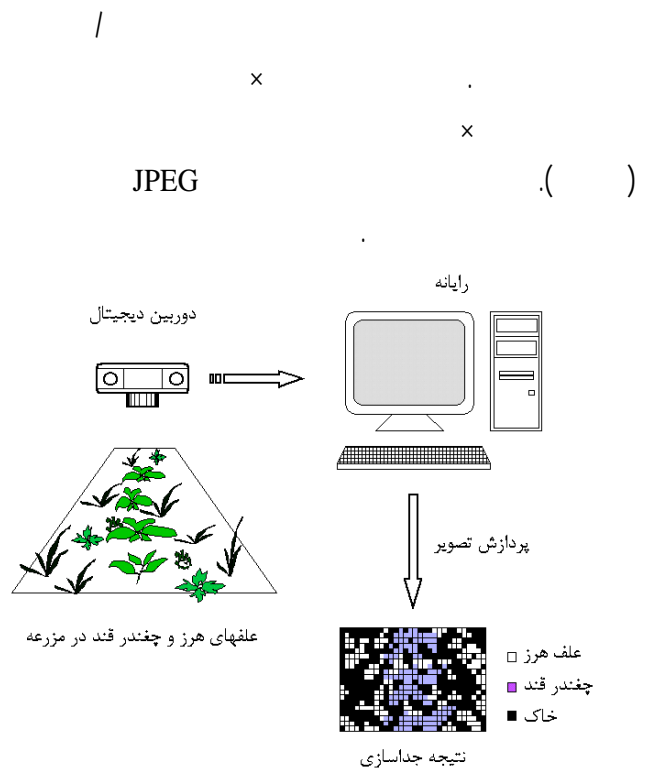
G

R, B

$$G > \frac{R+B}{2} \Rightarrow 2G - R - B > 0 \quad ($$

() $2G - R - B$

()



MATLAB

SPSS

()

()

...

:

$$L = \frac{1}{3}(R + G + B) \quad (1)$$

× × × =

+ =

)

) ()

× (

)

× (MATLAB

γ

× =

×

() (L) RGB

1. Gray level
2. Threshold
3. Resize

RGB

R	G	B	L	R	G	B	L
/ ± /	/ ± /	/ ±	±	/ ±	/ ±	±	±
/ ± /	± /	/ ± /	±	/ ±	/ ± /	/ ± /	±
/ ± /	/ ± /	/ ± /	±	/ ± /	± /	/ ± /	±
/ ± /	/ ± /	/ ± /	±	/ ± /	/ ± /	/ ± /	±
/ ± /	/ ± /	± /	±	/ ± /	/ ± /	/ ± /	±
/ ± /	/ ± /	/ ±	±	/ ± /	/ ±	± /	±
/ ± /	/ ± /	/ ±	±	/ ±	/ ± /	/ ± /	±
/ ± /	/ ± /	/ ± /	±	/ ±	/ ±	/ ± /	±
			±				±

...

:

/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/

()

/	/
/	/

/

()

/	/
/	/

/

/	/	/	/	/	/
/	/	/	/	/	/
		/			/
/	/	/	/	/	/
/	/	/	/	/	/
		/			/
/	/	/	/	/	/
/	/	/	/	/	/
		/			/
/	/	/	/	/	/
/	/	/	/	/	/
		/			/
/	/	/	/	/	/
/	/	/	/	/	/
		/			/
/	/	/	/	/	/
/	/	/	/	/	/
		/			/

(R)

DF7 DF1

IF 0.371 B - 0.114 G > 0.0195 THEN f(i,j) = 1 (

IF 0.371 B - 0.114 G < 0.0195 THEN f(i,j) = 0 (

$$DF_n = b_1 R + b_2 G + b_3 B$$

n n n

B G R DF_n

b₃ b₁

OR

()

(L_t)

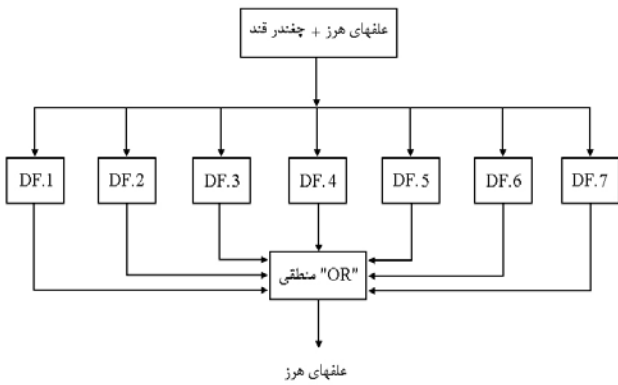
IF L(i,j) < L_t THEN f(i,j) = 0 ELSE f(i,j) is kept up. (

IF L(i,j) > L_t THEN f(i,j) = 0 ELSE f(i,j) is kept up. (

L(i,j)

(i,j)

f(i,j)



()

(DF7 DF1)

()

DF.1 = 0.371B - 0.114G (

1. Binary
2. Logical OR

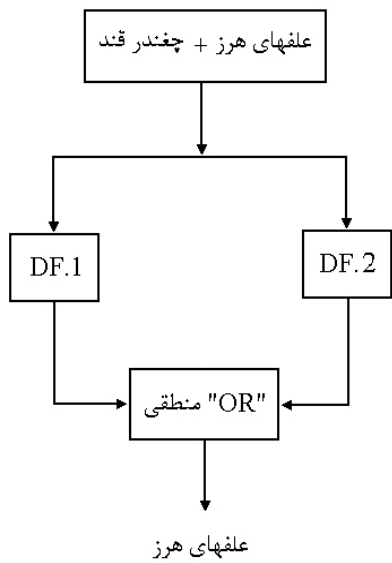
/	/	
/	/	
		/
/	/	
/	/	
		/

() OR

)

(

.(())



()

()

()

.(())

.(())

()



REFERENCES

1. Burks, T. F., S. A. Shearer & F. A. Payne. 2000. Classification of weed species using color texture features and discriminant analysis. *Transaction of the ASAE*. 43(2): 441-448
2. Brown, R. B., G. W. Anderson, B. Proud & J. P. Steckler. 1990. Herbicide application control using GIS weed maps. ASAE Paper No. 90-1061. St. Joseph, Mich.: ASAE.
3. El-Faki, M.S. and N.Zhang & D.E.Peterson, 2000. Factors Affecting Color-Based Weed Detection. *Transaction of the ASAE*.43(4):1001-1009
4. Franz, E., M. R. Gebhardt & K. B. Unklesbay. 1991. Shape description of completely visible and partially occluded leaves for identifying plants in digital images. *Trans. ASAE* 34(2):673-681.
5. Gonzalez, R. C. & R. E. Woods. 1992. *Digital Image Processing*. Reading, Mass.: Addison-Wesley Publishing Co.

6. Guyer, D. E., G. E. Miles, L. D. Gaultney & M. M. Schreiber. 1993. Application of machine vision to shape analysis in leaf and plant identification. *Trans. ASAE* 36(1): 163-171.
7. Hagggar, R. J., C. J. Stent & S. Isaac. 1983. A prototype hand-held patch sprayer for killing weeds activated by spectral differences in crop/weed canopies. *Journal of Agricultural Engineering Research* 28:349-358.
8. Lea, S. 1997. Logistic regression and discriminant analysis. [http:// www. ex. ac.uk/ ~SEGLea / multvar 2/ disclogi. html](http://www.ex.ac.uk/~SEGLea/multvar2/disclogi.html)
9. Mathworks. 2002. MATLAB Image Processing Toolbox. User's Guide version 3.00. Natick, MA: The Mathworks, Inc.
10. Shearer, S. A. & P. T. Jones. 1991. Selective application of post emergence herbicides using photoelectric. *Transaction of the ASAE* 34(4): 1661-1666.
11. Shropshire, G. J. & C. Glas. 1992. Spectral band selection for color machine vision used for plant identification. In *Proc. SPIE 1836, Optics in Agriculture and Forestry*. Eds. J. A. Deshazer and G. E. Meyer, 220-230. Bellingham, Wash.: SPIE.
12. SPSS. 1999. SPSS for Windows. Ver 9.05. Chicago, Ill.: SPSS, Inc.
13. Tian, L., D. C. Slaughter & R. F. Norris. 1997. Outdoor field machine vision identification of tomato seedlings for automated weed control. *Trans. ASAE* 40(6):1761-1768.
14. Woebbeck, D. M., G. E. Meyer, K. Von Bargen & D. A. Mortensen. 1995. Color indices for weed identification under various soil, residue and lighting conditions. *Trans. ASAE* 38(1): 259-269.
15. Woebbeck, D. M., G. E. Meyer, K. Von Bargen & D.A. Mortensen. 1995. Shape features for identifying young weeds using image analysis. *Trans. ASAE* 38(1): 271-281.
16. Yang, C.C., S.O. Prasher, J.A. Landry, H.S. Ramaswamy & A. Ditommaso. 2000. Application of neural networks in image recognition and classification of crop and weeds. *Canadian Agricultural Engineering* 42(3): (147-152).