Corrections and Clarifications

Digital Image Processing

3rd Edition

Gonzalez and Woods

Prentice Hall

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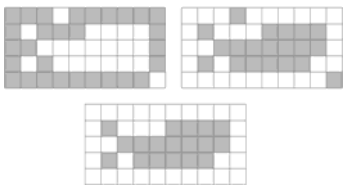
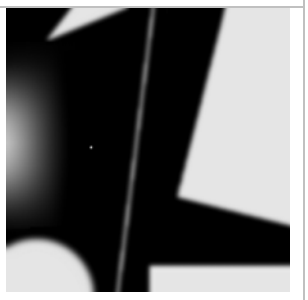
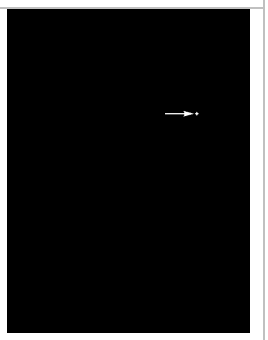
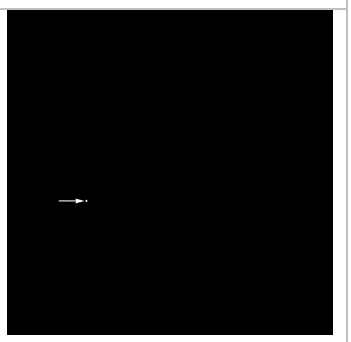
CORRECTIONS

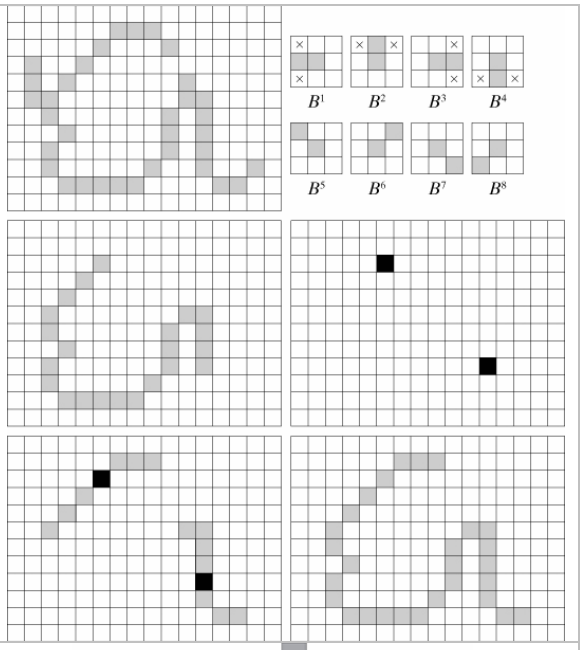
Page	Reads	Should Read
81, 4th paragraph	that all member of the sets	that all members of the sets
88, Table 2.2, 3rd row, 3rd col	$y = v\cos\theta + w\sin\theta$	$y = v\sin\theta + w\cos\theta$
120, 7th line from top	$p(r_k) = r_k / MN$	$p(r_k) = n_k / MN$
133, 2nd line from bottom	$s_4 = 7$	$s_4 = 6$
149, footnote	The footnote should read: Because convolution is commutative, we have that $w(x, y) \star f(x, y) = f(x, y) \star w(x, y)$. This is not true of correlation, as you can see, for example, by reversing the order of the functions in Fig. 3.29(a).	
159, Fig. 3.36(c)	The 8th black dot (counting from the left) should be located on the horizontal axis instead of at -1.	
181, footnote	Change all instances of *med* to *mat*.	
185, Eq. (3.8-20)	. . ., $M\}$	. . ., $N\}$
186, 3 lines above Eq. (3.8-21)	$\mu_{\text{NOT}(A)} =$	$\mu_{\text{NOT}(A)}(z) =$
186, below Eq. (3.8-21)	We see that if all the THEN rules fire at full strength (all their responses are 1)	We see that if any of the THEN rules fires at full strength (its response is 1) . . . .
189, 7th line from top	. . . levels (talk . . .)	. . . levels (tall . . .)
203, 2nd line	$\sqrt{3}$ . . . where . . . 64.4 . . .	$\sqrt{5}$ . . . where . . . 63.4
207, 2nd equation from top	. . . *AT*. . .	. . . *AW*. . .
220, Eq. (4.3-12)	$\ldots \text{sinc}\left[(t - n\Delta T) / n\Delta T\right]$	$\ldots \text{sinc}\left[(t - n\Delta T) / \Delta T\right]$
235, line 8	. . . subject's left eye . . .	. . . subject's right eye . . .
243, 2nd parag of example	its DFT is even and the odd part is odd . . .	its DFT is even and the imaginary part is odd . . .
244, parag below top equations	. . . Eq. (4.6-14)	. . . Eq. (4.6-13)
246, bottom line	. . . Fig. 4.22(b)	. . . Fig. 4.24(b)
247, 5th line from top	. . . Figure 4.22(c) shows the result.	. . . Figure 4.24(c) shows the result.
247, 10th line from top	$(1 + \log\|F(u, v)\|)$	$\log(1 + \|F(u, v)\|)$
252, 6th line from bottom	. . . As rule . . .	. . . As a rule . . .
255, entry number 8	A correction was listed previously. However, the entry in the book actually is correct.	
255, table footnote	The footnote should read: Assumes that the functions have been extended by zero padding. Convolution is associative, commutative, and distributive. Correlation is distributive.	
273, line 6	. . . ILPF of radius 10 . . .	. . . ILPF of radius 5 . . .
277, Fig. 4.47 (c)	0.667	0.607
285, Table 4.5, 1st column	$\begin{cases} 1 \\ 0 \end{cases}$	$\begin{cases} 0 \\ 1 \end{cases}$
291, below Eq. (4.9-24)	we can express Eq. (4.9-23) . . .	we can express Eq. (4.9-22) . . .
299, 4th line below Eq. (4.11-3)	… multiplying this result	… dividing this result
299, 2 lines above section head	. . . its complex conjugate and multiply it . . .	. . . its complex conjugate and divide it . . .
306, Problem 4.18	Change the 1 on the right side of the equation to *MN* (see correction in Table 4.3, pg. 255 above. Also, it is understood that *u* and *v* are integers.	

306, Problem 4.19	Add the following at the bottom of the problem statement, after the equation: where u and v are integer multiples of M and N, respectively.	
316, Eq. (5.2-14)	The entry in the 3rd line of the right side of the equation should be $(1 - P_a - P_b)$ instead of 0.	
329, bottom of Fig. 5.12 caption	. . . $d = 5$.	. . . $d = 6$.
330, 5th line	. . . mean (with $d = 5$) . . .	. . . mean (with $d = 6$) . . .
361, figure caption	Fig. 5.16(b)	Fig. 5.25(b)
362, 5th line from top	With $\beta = 1$, as α decreases below 1/2 . . . . Similarly, when α increases above 1/2 . . .	With $\beta = 1$, as α increases above 1/2 . . . . Similarly, when α decreases below 1/2 . . .
374, Eq. (5.11-9), 1st line	Insert a θ after $y \sin$ in the first line of the equation	
374, Eq. (5.11-11)	$G(\rho,\theta) =$	$G(\omega,\theta) =$
376, Eq. (5.11-16)	On the rightmost side of the equation, replace $y \sin \rho$ by $y \sin \theta$	
380, Eq. (5.11-18)	On the rightmost side of the equation, replace $y \sin \rho$ by $y \sin \theta$	
382, Eq. at bottom of page	$r \cos(\theta - \alpha)$	$r \cos(\theta - \varphi)$
385, 5th line from bottom	$D \sin \gamma$	$D \sin n\gamma$
390, Prob 5.11(a)	. . . elimination . . .	. . . eliminating . . .
393, Problem 5.31(b)	$g(\rho - x_0 \cos_\theta - y_0 \sin_\theta, \theta)$	$g(\rho - x_0 \cos\theta - y_0 \sin\theta, \theta)$
468, 3rd line from top	. . . *order K*.	. . . *order K* – 1.
563, line above Ex 8.12	11000000 and 01000000, respectively.	01000000 and 11000000, respectively.
602, Eq. (8.2-57)	Insert " = 0 " on the right of Eq. (8.2-57)	
620, Eq. (8.3-4)	$\hat{\omega}_i = \hat{c}_i - c_i$	$\hat{\omega}_i = \frac{\hat{c}_i - c_i}{\alpha c_i}$
630, Fig. 9.3	The center section of Fig. 9.3(a) should be 5 elements wide instead of 6.	
6.47, Eq. (9.5-4)	Replace A by X_{k-1}^{i}	
651, Fig. 9.22	Replace Fig. 9.22(c)-(e) with the following: 	
657, Fig. 9.27	The bottom, leftmost pixel in the Marker Image, F, should be white.	
661, Fig. 9.32	The caption in Fig. 9.32(a) should read: Reconstruction-by-dilation of marker image.	
663, Table 9.1, Skeletons	In Skeletons, remove the union sign in the second line. $S_k(A)$ should be as given by Eq. (9.5-12).	
665, last line, before figure	. . . = $b(-x, -y)$	. . . = $b(-x, -y)$
670, 11th line from bottom	disk of radius 2 . . .	disk of radius 1 . . .
677, below Eq. (9.6-20)	. . . as explained in Section 9.5-7.	. . . as explained in our discussion of Eq. (9.5-27).
735, Fig. 10.33(b)	The values shown on the theta axis should be from -80 to +80 to correspond to Fig. 10.32(b).	
751, 5th line	If T is set to the maximum value of . . .	If T is set to any value less than the minimum value of . . .
751, 6th line	. . . will consists of all 0s.	. . . will consist of all 1s.
765, figure caption	(e) should read: (e) Absolute value of the difference between the seed value (255) and (a).	
766, 2nd parag, lines 3 and 4	Should read: . . . the difference between the seed value (255) and Fig. 10.51(a).	
796, Fig. 11.1(d)	The 1-valed pixels in column 6, rows 3:6, should be shifted to column 5, rows 3:6.	
798, line 12 from bottom	That line should read: convert from an 8-code to a 4-code (see Problem 2.12).	
818, Eq. (11.2-5)	The divisor in front of the summation and in the exponent should be K. The summation is still 0 to $P - 1$. You can see why this is so by expanding Eq. (11.2-4) into two summations: one form 0 to $P - 1$ and the other from P to $K - 1$. All the coefficients in the 2nd summation are 0, but the divisor in front of the summation and in the exponent is still K in both expressions.	
832, Table 11.3	The double summations for Homogeneity and Entropy should be i and j, instead of i and i.	
868, last paragraph	The scan of the head is from right to left. Lines 6-7, change "left to right" to "right to left." Line 8, change "left leg" to "right leg." Line 12, change "right leg" to "left leg."	
870, below Eq. (12.2-7b)	. . . spatial convolution . . .	. . . spatial correlation . . .

870, Eq. (12-2-8)	Replace Eq. (12.2-8) with the following: $\gamma(x,y) = \dfrac{\sum_s \sum_t \left[w(s,t) - \bar{w}\right]\left[f(x+s,y+t) - \bar{f}_{xy}\right]}{\left\{\sum_s \sum_t \left[w(s,t) - \bar{w}\right]^2 \sum_s \sum_t \left[f(x+s,y+t) - \bar{f}_{xy}\right]^2\right\}^{\frac{1}{2}}}$	
870, 2nd and 3rd lines below Eq. (12.2-8)	. . . and $\bar{f}(x+s,y+t)$ is the average value of f in the region coincident with *w*.	. . and $\bar{f}_{xy}$ is the average value of f in the region coincident with *w*.
889, Eq. (12.2-47)	In the denominator, replace the + sign in the exponential term by a – sign.	
892, Eq. (12.2-50)	In the denominator, replace the + sign in the exponential term by a – sign.	
921, 12th reference from top	Eng, H.-L. and Ma, K.-K. [2006] . . .	Ng, P.-E. and Ma, K.-K. [2006] . . .

CLARIFICATIONS

Page	Clarifications
59, last sentence, 2nd paragraph.	It is assumed also that the physical dimensions of the chips are the same.
117, 2nd paragraph of Ex 3.3.	Figure 3.12(c) was generated with a transformation function of the *form* shown in Fig. 3.11(b), but with the value of the constant part of the curve set to 0 instead of the high value shown in Fig. 3.11(b) .
661, Fig. 9.31(c).	Although the image appears as a uniform black rectangle (all 0s), there are 1-valued points along its boundary that are difficult to see at the image scale shown and also because the background (page) is white (i.e., 1-valued). See the 3rd sentence in the first paragraph of page 661.
694, Fig. 10.2(a).	The image in Fig. 10.2(a) should have the dot shown. In some printings of the book the dot is barely visible, while in others it shows perfectly, as in the image shown on the right. Also, small, random printing imperfections that sometimes show in white or gray can be confusing, and should be ignored. [Note: If you're using a low resolution monitor you may need to magnify this document in order to see the dot.] 
697, Fig. 10.4(d)	The image in Fig. 10.4(d) should have the single dot shown. The image is black (0) elsewhere. In some printings of the book the dot is barely visible, while in others it shows perfectly, as in the image shown on the right. Also, small, random printing imperfections that sometimes show in white or gray can be confusing, and should be ignored. The correct image consists of a single white dot on a uniform black background. 
872, Fig. 12.9(d).	The image in Fig. 10.9(d) should have the single white dot shown. The image is black (0) elsewhere. In some printings of the book the dot is barely visible, while in others it shows perfectly, as in the image shown on the right. Also, small random printing imperfections that sometimes show in white or gray can be confusing, and should be ignored. The correct image consists of a single white dot on a uniform black background. 

Pg 655, Fig, 9.25	Edit figure to look like the one on the right.	
773, Fig. 10.55.	Note that the pixel identified by the arrow in the top left of the figure is missing in the figure in the book.