# Appendix C. Detailed segmentation statistics.

The tables is this appendix show distribution statistics, by finger position, for the segmentation algorithms tested as compared to the hand marked ground truth for 3-inch slap images. The differences between the segmentation algorithm and ground truth are sorted into bins based on the tolerances allowed for correct segmentation. Specifically, the left/right edges must be within -32/+64 pixels of the ground truth, top edge -64/+64 and bottom edge -64/+128. For each finger position there is a column for each of the four segmentation box edges (L, R, T and B).

The first row ("No Finger Found") shows the counts for when a finger was not detected by the segmentation algorithm. The next four rows show statistics for segmentation edges that are within the specified minimum (MN) and maximum (MX) pixel tolerances compared to the ground truth, so these are considered good segmentations. Rows 1 (MN <= d < 0) and 3 (0 <= d <= MX) show the average value for all differences in that range and rows 3 and 5 show the total count occurring in that range.

Rows 6-9 also show average difference values and bin counts but for ranges  $MN-32 \le d \le MN$  and  $MX \le d \le MX+32$ , which are just outside the accepted tolerance ranges. Rows 10-13 tally everything greater than 32 pixels away from the accepted tolerance range,  $d \le MN-32$  and d > MX+32.

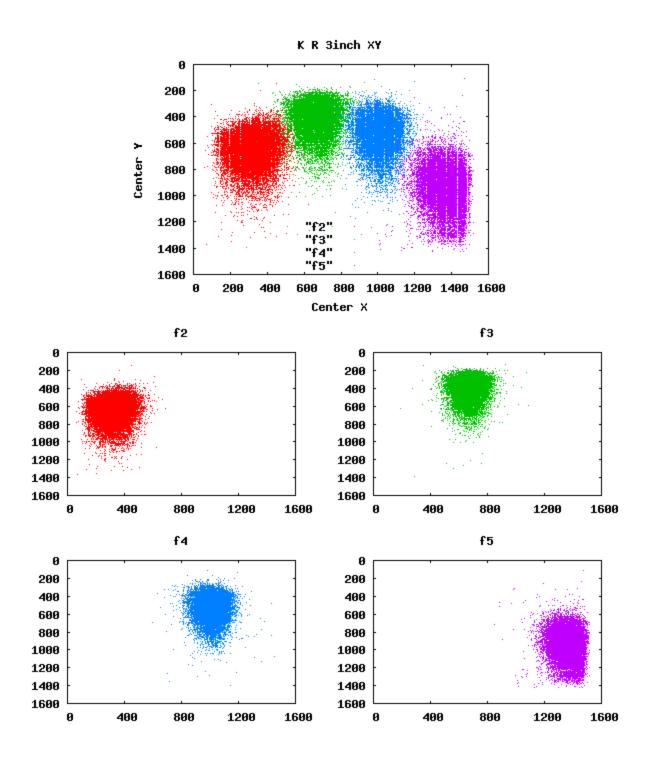
The last three rows show the total count for each bin, the overall average difference value and the standard deviation of all the difference values.

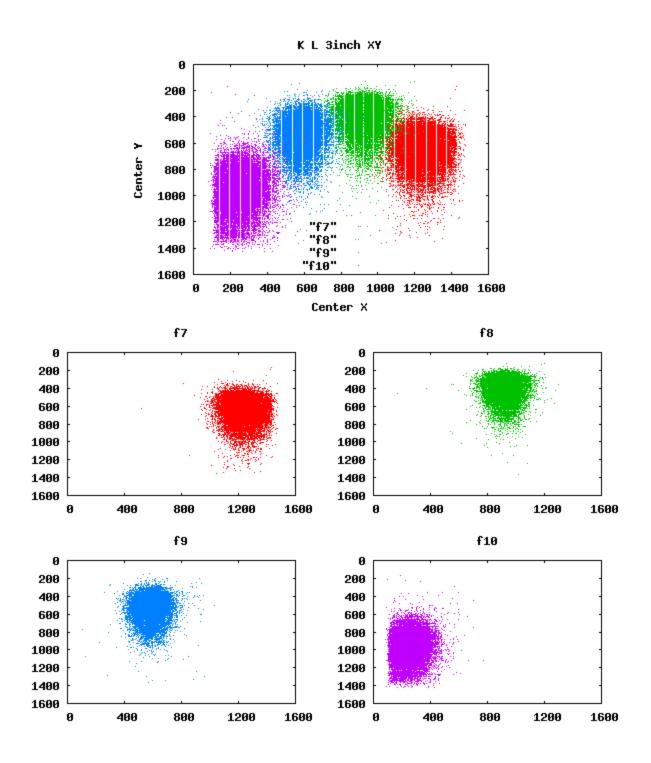
# K = L-1 Identity Solutions

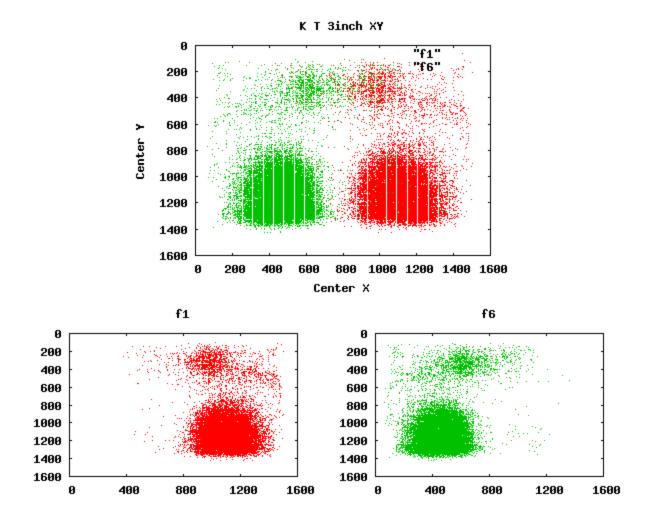
								IX –	r-Tingen	tity Jul										
	R. Thumb					R. Index				R Middle				R. F	Ring		R. Little			
No Finger Fo	No Finger Found 60			15				11				5				170				
U	L	R	т	В	L	R	т	В	L	R	т	В	L	R	т	В	L	R	т	В
MN <= d <	< <b>0</b> -13.28	-12.39	-16.33	-17.64	-7.24	-7.31	-13.18	-11.39	-7.76	-5.82	-14.28	-13.90	-6.31	-8.70	-14.13	-15.06	-8.18	-9.14	-22.42	-14.74
#	10288	7182	4997	1982	556	562	1145	656	1931	279	2083	605	2234	385	1920	477	1584	202	1095	1319
π 0 <= d <= Ν		17.21	23.24	33.26	27.03	28.13	28.10	32.01	20.79	28.30	25.74	32.97	19.12	35.65	27.25		25.73	40.37	34.22	31.81
																34.55				
#	8377	12455	16903	18491	24225	24243	23391	23171	22883	24532	22347	22398	22605	24051	22394	22265	22902	23284	22689	21743
		45 50	70.00	70.27		20 50	70.47	77.64	20.02	40.02	77 70	76.05	42.42	42.65	77 70	70.24	42.60	40.60	70.04	74.24
MN-32 <= d <		-45.50	-79.60	-78.27	-44.41	-38.50	-78.17	-77.64	-38.92	-40.83	-77.70	-76.05	-43.43	-43.65	-77.72	-78.24	-43.69	-48.63	-78.01	-74.24
#	3319	2253	246	97	11	12	63	11	45	3	183	40	28	23	158	25	80	8	102	27
MX < d <= MX		77.08	71.82	144.22	71.80	69.92	70.90	145.56	72.44	70.26	71.94	144.71	71.46	70.47	70.99	144.48	70.63	73.08	70.50	144.25
#	136	119	108	574	103	88	268	189	50	97	195	459	25	430	280	491	90	1073	616	129
d < MN-3		-187.22	-156.09	-811.68	<mark>-223.56</mark>	-287.10	-293.26	-408.22	-294.77	-451.56	-174.09	-307.33	<mark>-334.93</mark>	-268.00	-212.16	-272.38	-148.49	-1123.98	-321.84	-862.39
#	1618	1953	246	2008	17	42	42	41	33	24	107	41	42	28	139	36	88	213	201	233
d > MX+3	<b>305.16</b>	286.40	809.75	222.49	247.82	328.00	297.12	237.72	377.10	356.67	216.45	222.11	277.21	331.00	219.95	223.65	953.88	152.94	619.51	276.41
#	684	460	1922	1270	56	21	59	900	26	33	53	1425	34	51	77	1674	224	188	265	1517
Total #	24422	24422	24422	24422	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968	24968
Average	-8.68	-8.27	74.41	-28.34	26.75	27.17	26.49	38.37	18.53	28.05	21.55	43.95	16.58	35.75	23.15	47.89	31.23	32.26	35.52	36.33
Std Dev		97.99	223.90	251.94	18.65	21.75	29.16	53.32	22.81	25.94	28.63	55.92	23.82	25.63	33.13	58.93	100.23	120.22	77.26	116.18
		L. TI	numb			L. In	dex			L. M	iddle			L. R	Ring			L. Lit	tle	
No Finger Fo	ound		humb 50			L. In 1					iddle 1			L. R	Ring 5			L. Lit 15		
No Finger Fo	ound L			В	L			в	L			В	L	_	_	в	L			в
No Finger Fo MN <= d <	L	1	50	<b>B</b> -17.15	<b>L</b> -5.54	1		<b>B</b> -11.52	L -20.98	2		<b>B</b> -14.32	L -16.40	5	5 T	<b>B</b> -11.71	L -13.71	15	0 Т	<b>B</b> -14.52
_	L < 0 -11.91	1 R -12.89	50 T	-17.15		1 R -13.13	8 T -14.67			2 R -16.57	1 T	-		R	5 T -14.06	_	L -13.71 17885	15 R	0 T -21.90	-14.52
MN <= d < #	   	1 R -12.89 8993	50 T -17.18 5595	-17.15 2097	912	1 R -13.13 18333	8 T -14.67 1338	-11.52 571	15379	2 R -16.57 19315	1 T -13.38 2372	-14.32 749	19270	R -17.52 17708	5 T -14.06 1857	-11.71 797	17885	15 R -8.50 736	0 T -21.90 1199	-14.52 1738
MN <= d < # 0 <= d <= N	L -11.91 8205 MX 16.11	1 R -12.89 8993 14.22	50 T -17.18 5595 22.77	-17.15 2097 33.62	912 22.17	1 R -13.13 18333 7.72	8 T -14.67 1338 28.70	-11.52 571 31.88	<mark>15379</mark> 8.80	2 R -16.57 19315 7.15	1 T -13.38 2372 25.61	-14.32 749 32.24	<mark>19270</mark> 8.10	R -17.52 17708 8.82	5 T -14.06 1857 27.47	-11.71 797 31.18	<mark>17885</mark> 9.74	15 R -8.50 736 36.07	0 T -21.90 1199 34.07	-14.52 1738 28.89
MN <= d < #	  	1 R -12.89 8993	50 T -17.18 5595	-17.15 2097	912	1 R -13.13 18333	8 T -14.67 1338	-11.52 571	15379	2 R -16.57 19315	1 T -13.38 2372	-14.32 749	19270	R -17.52 17708	5 T -14.06 1857	-11.71 797	17885	15 R -8.50 736	0 T -21.90 1199	-14.52 1738
MN <= d < # 0 <= d <= N #	L -11.91 8205 VIX 16.11 11678	1 R -12.89 8993 14.22 10469	50 T -17.18 5595 22.77 16147	-17.15 2097 33.62 17751	912 22.17 23976	1 R -13.13 18333 7.72 4368	8 T -14.67 1338 28.70 23195	-11.52 571 31.88 23072	15379 8.80 572	2 R -16.57 19315 7.15 2188	1 T -13.38 2372 25.61 22083	-14.32 749 32.24 22054	19270 8.10 3137	R -17.52 17708 8.82 1622	5 7 -14.06 1857 27.47 22519	-11.71 797 31.18 21755	17885 9.74 5560	15 R -8.50 736 36.07 23512	0 T -21.90 1199 34.07 22738	-14.52 1738 28.89 21116
MN <= d < # 0 <= d <= N # MN-32 <= d <	L -11.91 8205 MX 16.11 11678 < MN -45.56	1 R -12.89 8993 14.22 10469 -44.59	50 T -17.18 5595 22.77 16147 -79.12	-17.15 2097 33.62 17751 -78.07	912 22.17 23976 -44.25	1 R -13.13 18333 7.72 4368	8 T -14.67 1338 28.70 23195 -78.30	-11.52 571 31.88 23072 -81.77	15379 8.80 572 -40.03	2 R -16.57 19315 7.15 2188 -38.75	1 T -13.38 2372 25.61 22083 -78.47	-14.32 749 32.24 22054 -78.34	19270 8.10 3137 -37.47	R -17.52 17708 8.82 1622 -40.00	5 T -14.06 1857 27.47 22519 -77.71	-11.71 797 31.18 21755 -80.42	17885 9.74 55560 -39.11	15 R -8.50 736 36.07 23512	0 T -21.90 1199 34.07 22738	-14.52 1738 28.89 21116 -75.09
MN <= d < # 0 <= d <= N # MN-32 <= d < #	L -11.91 8205 16.11 11678 < MN -45.56 2122	1 R -12.89 8993 14.22 10469 -44.59 2692	50 T -17.18 5595 22.77 16147 -79.12 275	-17.15 2097 33.62 17751 -78.07 75	912 22.17 23976 -44.25 8	1 R -13.13 18333 7.72 4368	8 T -14.67 1338 28.70 23195 -78.30 104	-11.52 571 31.88 23072 -81.77 11	15379 8.80 572 -40.03 8895	2 R -16.57 19315 7.15 2188 -38.75 3364	T         -13.38         2372         25.61         22083         -78.47         174	-14.32 749 32.24 22054 -78.34 38	19270 8.10 3137 -37.47 2469	R -17.52 17708 8.82 1622 -40.00 5471	T         -14.06         1857         27.47         22519         -77.71         177	-11.71 797 31.18 21755 -80.42 19	17885 9.74 55560 -39.11 1189	15 R -8.50 736 36.07 23512 -42.85 34	0 T -21.90 1199 34.07 22738 -76.27 128	-14.52 1738 28.89 21116 -75.09 11
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= MX	<ul> <li>L</li> <li>-11.91</li> <li>8205</li> <li>MX</li> <li>16.11</li> <li>11678</li> <li></li> <li></li></ul>	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60	50 T -17.18 5595 22.77 16147 -79.12 275 73.25	-17.15 2097 33.62 17751 -78.07 75 144.76	912 22.17 23976 -44.25 8 71.18	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38	8 T -14.67 1338 28.70 23195 -78.30 104 70.16	-11.52 571 31.88 23072 -81.77 11 145.50	15379 8.80 572 -40.03 8895 82.50	R -16.57 19315 7.15 2188 -38.75 3364 71.33	1 T -13.38 2372 25.61 22083 -78.47 174 70.98	-14.32 749 32.24 22054 -78.34 38 144.64	19270 8.10 3137 -37.47 2469 81.79	R -17.52 17708 8.82 1622 -40.00 5471 79.67	5 T -14.06 1857 27.47 22519 -77.71 177 69.44	-11.71 797 31.18 21755 -80.42 19 145.10	17885 9.74 55560 -39.11 1189 78.33	15 R -8.50 736 36.07 23512 -42.85 34 69.05	0 T -21.90 1199 34.07 22738 -76.27 128 69.02	-14.52 1738 28.89 21116 -75.09 11 146.12
MN <= d < # 0 <= d <= N # MN-32 <= d < #	L -11.91 8205 16.11 11678 < MN -45.56 2122	1 R -12.89 8993 14.22 10469 -44.59 2692	50 T -17.18 5595 22.77 16147 -79.12 275	-17.15 2097 33.62 17751 -78.07 75	912 22.17 23976 -44.25 8	1 R -13.13 18333 7.72 4368	8 T -14.67 1338 28.70 23195 -78.30 104	-11.52 571 31.88 23072 -81.77 11	15379 8.80 572 -40.03 8895	2 R -16.57 19315 7.15 2188 -38.75 3364	T         -13.38         2372         25.61         22083         -78.47         174	-14.32 749 32.24 22054 -78.34 38	19270 8.10 3137 -37.47 2469	R -17.52 17708 8.82 1622 -40.00 5471	T         -14.06         1857         27.47         22519         -77.71         177	-11.71 797 31.18 21755 -80.42 19	17885 9.74 55560 -39.11 1189	15 R -8.50 736 36.07 23512 -42.85 34	0 T -21.90 1199 34.07 22738 -76.27 128	-14.52 1738 28.89 21116 -75.09 11
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= M2 #	L -11.91 8205 VIX 16.11 11678 < MN -45.56 2122 X+32 76.66 99	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117	50 T -17.18 5595 22.77 16147 -79.12 275 73.25 116	-17.15 2097 33.62 17751 -78.07 75 144.76 737	912 22.17 23976 -44.25 8 71.18 25	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38 16	8 T -14.67 1338 28.70 23195 -78.30 104 70.16 226	-11.52 571 31.88 23072 -81.77 11 145.50 201	15379 8.80 572 -40.03 8895 82.50 2	2 R -16.57 19315 7.15 2188 -38.75 3364 71.33 6	1 T -13.38 2372 25.61 22083 -78.47 174 70.98 163	-14.32 749 32.24 22054 -78.34 38 144.64 518	19270 8.10 3137 -37.47 2469 81.79 7	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212	-11.71 797 31.18 21755 -80.42 19 145.10 563	17885 9.74 55560 -39.11 1189 78.33 64	15 R -8.50 736 36.07 23512 -42.85 34 69.05 404	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474	-14.52 1738 28.89 21116 -75.09 11 146.12 181
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= M2 # d < MN-3	L -11.91 8205 MX 16.11 11678 < MN -45.56 2122 X+32 76.66 99	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117 -194.41	50 T -17.18 5595 22.77 16147 -79.12 275 73.25 116 -142.45	-17.15 2097 33.62 17751 -78.07 75 144.76 737	912 22.17 23976 -44.25 8 71.18 25 -265.21	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38 16 -206.85	8  T  -14.67  1338  28.70  23195  -78.30  104  70.16  226  -276.39	-11.52 571 31.88 23072 -81.77 11 145.50 201	15379 8.80 572 -40.03 8895 82.50 2 2	R -16.57 19315 7.15 2188 -38.75 3364 71.33 6	1 T -13.38 2372 25.61 22083 -78.47 174 70.98 163 -165.55	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76	19270 8.10 3137 -37.47 2469 81.79 7	R -17.52 17708 8.82 1622 -40.00 5471 79.67 3	5 T -14.06 1857 27.47 22519 -77.71 177 69.44 212 -207.27	-11.71 797 31.18 21755 -80.42 19 145.10 563	17885 9.74 5560 -39.11 1189 78.33 64 -205.07	15 R -8.50 736 36.07 23512 -42.85 34 69.05 404 -305.51	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= M2 # d < MN-3 #	L -11.91 8205 MX 16.11 11678 MN -45.56 2122 X+32 76.66 99 22 -199.69 1896	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117	50 T -17.18 5595 22.77 16147 -79.12 275 116 -73.25 116 -142.45 361	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998	912 22.17 23976 -44.25 8 71.18 25 -265.21 26	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38 16 -206.85 95	8 T -14.67 1338 28.70 23195 -78.30 104 70.16 226 -276.39 51	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31	15379 8.80 572 -40.03 8895 82.50 2 2 -199.44 78	2 R -16.57 19315 7.15 2188 -38.75 3364 71.33 6 -413.50 63	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43	19270 8.10 3137 -37.47 2469 81.79 7 82 -273.87 62	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64	17885 9.74 5560 -39.11 1189 78.33 64 -205.07 108	15 R -8.50 736 36.07 23512 -42.85 34 -42.85 34 -305.51 182	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474 -294.59 160	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= MX # d < MN-3 # d > MX+3	L -11.91 8205 MX 16.11 11678 MN -45.56 2122 X+32 76.66 99 22 24 -199.69 1896 273.22	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117 -194.41 1240 302.21	50 T -17.18 5595 22.77 16147 -79.12 275 73.25 116 -142.45 361 834.91	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998 221.67	912 22.17 23976 -44.25 8 71.18 25 -265.21 26 709.97	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38 16 -206.85 95 349.90	8 T -14.67 1338 28.70 23195 -78.30 104 70.16 226 -276.39 51 253.22	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31 242.99	15379 8.80 572 -40.03 8895 82.50 2 2 -199.44 78 508.12	2 R -16.57 19315 7.15 2188 -38.75 3364 71.33 6 -413.50 63 485.93	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163         -165.55         121         192.32	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43 221.44	19270 8.10 3137 -37.47 2469 81.79 7 -273.87 62 292.34	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114         383.91	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127         252.29	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64 220.49	17885 9.74 5560 -39.11 1189 78.33 64 -205.07 108 190.71	15 R -8.50 736 36.07 23512 -42.85 34 69.05 404 -305.51 182 322.17	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474 -294.59 160 630.47	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237 262.44
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= M2 # d < MN-3 #	L -11.91 8205 MX 16.11 11678 MN -45.56 2122 X+32 76.66 99 22 -199.69 1896	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117	50 T -17.18 5595 22.77 16147 -79.12 275 116 -73.25 116 -142.45 361	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998	912 22.17 23976 -44.25 8 71.18 25 -265.21 26	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38 16 -206.85 95	8 T -14.67 1338 28.70 23195 -78.30 104 70.16 226 -276.39 51	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31	15379 8.80 572 -40.03 8895 82.50 2 2 -199.44 78	2 R -16.57 19315 7.15 2188 -38.75 3364 71.33 6 -413.50 63	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43	19270 8.10 3137 -37.47 2469 81.79 7 82 -273.87 62	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64	17885 9.74 5560 -39.11 1189 78.33 64 -205.07 108	15 R -8.50 736 36.07 23512 -42.85 34 -42.85 34 -305.51 182	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474 -294.59 160	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= M2 # d < MN-3 # d > MX+3 #	L -11.91 8205 WX 16.11 11678 (MN) -45.56 2122 X+32 76.66 99 21896 273.22 422	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117 -194.41 1240 302.21 911	50 T -17.18 5595 22.77 16147 -79.12 275 116 -73.25 116 -142.45 361 834.91 1928	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998 221.67 1764	912 22.17 23976 -44.25 8 71.18 25 -265.21 26 709.97 17	1 R -13.13 18333 7.72 4368 -40.75 2131 80.38 16 -206.85 95 349.90 21	<ul> <li>T</li> <li>-14.67</li> <li>1338</li> <li>28.70</li> <li>23195</li> <li>-78.30</li> <li>104</li> <li>70.16</li> <li>226</li> <li>-276.39</li> <li>51</li> <li>253.22</li> <li>50</li> </ul>	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31 242.99 1078	15379 8.80 572 -40.03 8895 82.50 2 2 -199.44 78 508.12 38	2 R -16.57 19315 7.15 2188 -38.75 3364 71.33 6 -413.50 63 485.93 28	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163         -165.55         121         192.32         51	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43 221.44 1562	19270 8.10 3137 -37.47 2469 81.79 7 -273.87 62 292.34 19	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114         383.91         46	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127         252.29         72	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64 220.49 1766	17885 9.74 55560 -39.11 1189 78.33 64 -205.07 108 190.71 158	15 R -8.50 736 36.07 23512 -42.85 34 69.05 404 -305.51 182 322.17 96	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474 -294.59 160 630.47 265	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237 262.44 1681
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= MX # d < MN-3 # d > MX+3 # Total #	L -11.91 8205 MX 16.11 11678 MN -45.56 2122 X+32 76.66 99 22 2422	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117 -194.41 1240 302.21 911	r         -17.18         5595         22.77         16147         -79.12         275         73.25         116         -142.45         361         834.91         1928	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998 221.67 1764	912 22.17 23976 -44.25 8 71.18 25 -265.21 26 709.97 17 24964	R         -13.13         18333         7.72         4368         -40.75         2131         80.38         16         -206.85         95         349.90         21         24964	8 7 14.67 1338 28.70 23195 -78.30 104 70.16 226 -276.39 51 253.22 50 24964	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31 242.99 1078	15379 8.80 572 -40.03 8895 82.50 2 -199.44 78 508.12 38 24964	R -16.57 19315 7.15 2188 -38.75 3364 71.33 6 -413.50 63 485.93 28	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163         -165.55         121         192.32         51	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43 221.44 1562	19270 8.10 3137 -37.47 2469 81.79 7 -273.87 62 292.34 19 24964	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114         383.91         46         24964	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127         252.29         72         24964	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64 220.49 1766	17885 9.74 5560 -39.11 1189 78.33 64 -205.07 108 190.71 158 24964	15 R -8.50 736 36.07 23512 -42.85 34 -42.85 34 -305.51 182 322.17 96	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474 -294.59 160 630.47 265	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237 262.44 1681
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= M2 # d < MN-3 # d > MX+3 # Total # Average	L -11.91 8205 MX 16.11 11678 MN -45.56 2122 76.66 99 22 1896 273.22 422 24422 24422	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117 -194.41 1240 302.21 911 24422 -1.78	r         r         -17.18         5595         22.77         16147         -79.12         275         116         73.25         116         361         1928         24422         74.38	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998 221.67 1764 224422 -26.31	912 22.17 23976 -44.25 8 71.18 25 -265.21 26 709.97 17 24964 21.36	R         -13.13         18333         7.72         4368         -40.755         2131         80.388         16         -206.855         95         349.900         21         24964         -12.21	T         -14.67         1338         28.70         23195         -78.30         104         70.16         226         -276.39         51         253.22         50         24964         26.13	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31 242.99 1078 24964 40.33	15379 8.80 572 -40.03 8895 82.50 2 -199.44 78 508.12 38 24964 -26.83	R         -16.57         19315         7.15         2188         -38.75         3364         71.33         6         -413.50         63         485.93         28         24964         -17.90	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163         -165.55         121         192.32         51         24964         20.89	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43 221.44 1562 24964 44.10	19270 8.10 3137 -37.47 2469 81.79 7 -273.87 62 292.34 19 24964 -15.78	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114         383.91         46         24964         -20.39	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127         252.29         72         24964         23.45	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64 220.49 1766 24964 44.99	17885 9.74 5560 -39.11 1189 78.33 64 -205.07 108 190.71 158 24964 -8.99	15 R -8.50 736 36.07 23512 -42.85 34 -305.51 182 322.17 96 24964 33.79	T         -21.90         1199         34.07         22738         -76.27         128         69.02         474         -294.59         160         630.47         265         24964         35.70	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237 262.44 1681 24964 34.29
MN <= d < # 0 <= d <= N # MN-32 <= d < # MX < d <= MX # d < MN-3 # d > MX+3 # Total #	L -11.91 8205 MX 16.11 11678 MN -45.56 2122 X+32 76.66 99 22 1896 273.22 422 24422 24422	1 R -12.89 8993 14.22 10469 -44.59 2692 79.60 117 -194.41 1240 302.21 911	r         -17.18         5595         22.77         16147         -79.12         275         73.25         116         -142.45         361         834.91         1928	-17.15 2097 33.62 17751 -78.07 75 144.76 737 -848.47 1998 221.67 1764	912 22.17 23976 -44.25 8 71.18 25 -265.21 26 709.97 17 24964	R         -13.13         18333         7.72         4368         -40.75         2131         80.38         16         -206.85         95         349.90         21         24964	8 7 14.67 1338 28.70 23195 -78.30 104 70.16 226 -276.39 51 253.22 50 24964	-11.52 571 31.88 23072 -81.77 11 145.50 201 -407.19 31 242.99 1078	15379 8.80 572 -40.03 8895 82.50 2 -199.44 78 508.12 38 24964	R -16.57 19315 7.15 2188 -38.75 3364 71.33 6 -413.50 63 485.93 28	T         -13.38         2372         25.61         22083         -78.47         174         70.98         163         -165.55         121         192.32         51	-14.32 749 32.24 22054 -78.34 38 144.64 518 -402.76 43 221.44 1562	19270 8.10 3137 -37.47 2469 81.79 7 -273.87 62 292.34 19 24964	R         -17.52         17708         8.82         1622         -40.00         5471         79.67         3         -106.62         114         383.91         46         24964	T         -14.06         1857         27.47         22519         -77.71         177         69.44         212         -207.27         127         252.29         72         24964	-11.71 797 31.18 21755 -80.42 19 145.10 563 -241.55 64 220.49 1766	17885 9.74 5560 -39.11 1189 78.33 64 -205.07 108 190.71 158 24964	15 R -8.50 736 36.07 23512 -42.85 34 -42.85 34 -305.51 182 322.17 96	0 T -21.90 1199 34.07 22738 -76.27 128 69.02 474 -294.59 160 630.47 265	-14.52 1738 28.89 21116 -75.09 11 146.12 181 -825.20 237 262.44 1681

## Appendix D. Plots of 3-inch segmentation box centers.

The plots in this appendix show the distribution of the segmentation box centers (x,y) for the 3-inch data. There is a combined plot for each slap image and then a smaller plot for each finger position. The individual finger plots are better for seeing the full "spread" of x,y positions detected. The plot for the ground truth (GT) is included as a baseline for comparison. The blank lines that appear in some of the plots are most likely caused by the segmentation algorithm doing some level of sampling of the input image. The reason the lines are not evenly distributed in some plots is an artifact of the sampling when scaling the images for displaying in the report.

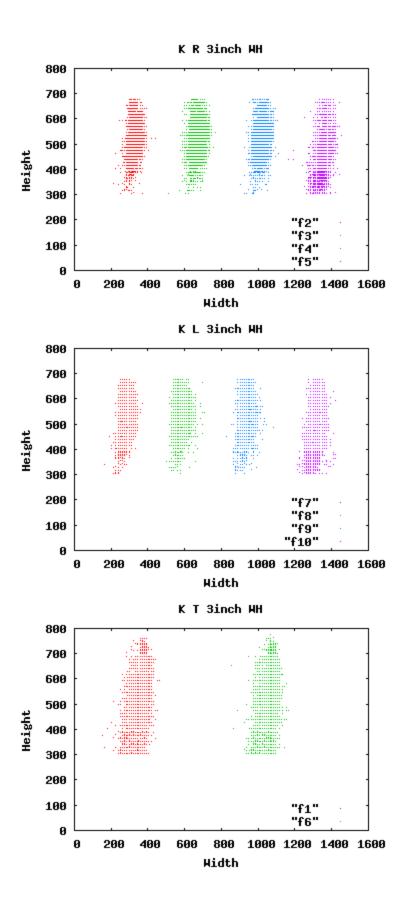






#### Appendix E. Plots of 3-inch segmentation box widths and heights.

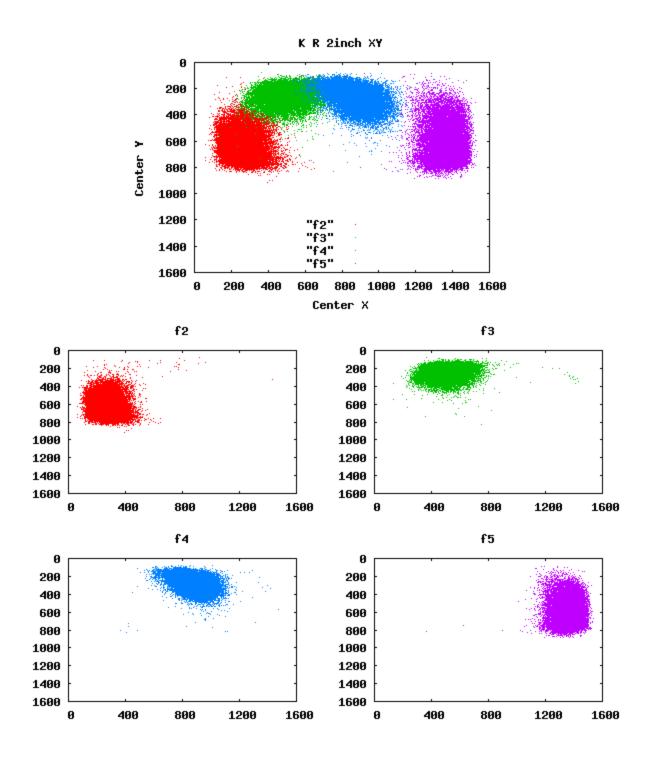
The plots in this appendix show the distribution of the segmentation box widths and heights for the 3-inch data. There is a combined plot for each slap image and then a smaller plot for each finger position. The individual finger plots are better for seeing the full "spread" of widths and heights detected. The widths are "spread out" on the plot by adding 350, 750 and 1050 to the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> widths plotted. The plot for the ground truth (GT) is included as a baseline for comparison. The blank lines that appear in some of the plots are most likely caused by the segmentation algorithm doing some level of sampling of the input image. The reason the lines are not evenly distributed in some plots is an artifact of the sampling when scaling the images for displaying in the report.

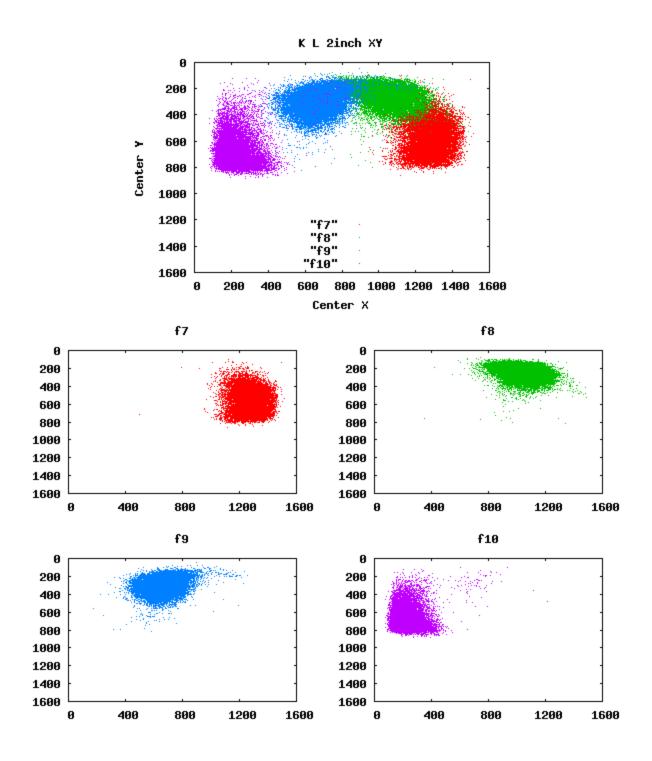


K = L-1 Identity Solutions

## Appendix F. Plots of 2-inch segmentation box centers.

The plots in this appendix show the distribution of the segmentation box centers (x,y) for the 2-inch data. There is a combined plot for each slap image and then a smaller plot for each finger position. The individual finger plots are better for seeing the full "spread" of x,y positions detected. The plot for the ground truth (GT) is included as a baseline for comparison. The blank lines that appear in some of the plots are most likely caused by the segmentation algorithm doing some level of sampling of the input image. The reason the lines are not evenly distributed in some plots is an artifact of the sampling when scaling the images for displaying in the report.





#### Appendix G. Plots of 2-inch segmentation box widths and heights.

The plots in this appendix show the distribution of the segmentation box widths and heights for the 2-inch data. There is a combined plot for each slap image and then a smaller plot for each finger position. The individual finger plots are better for seeing the full "spread" of widths and heights detected. The widths are "spread out" on the plot by adding 350, 750 and 1050 to the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> widths plotted. The plot for the ground truth (GT) is included as a baseline for comparison. The blank lines that appear in some of the plots are most likely caused by the segmentation algorithm doing some level of sampling of the input image. The reason the lines are not evenly distributed in some plots is an artifact of the sampling when scaling the images for displaying in the report.

