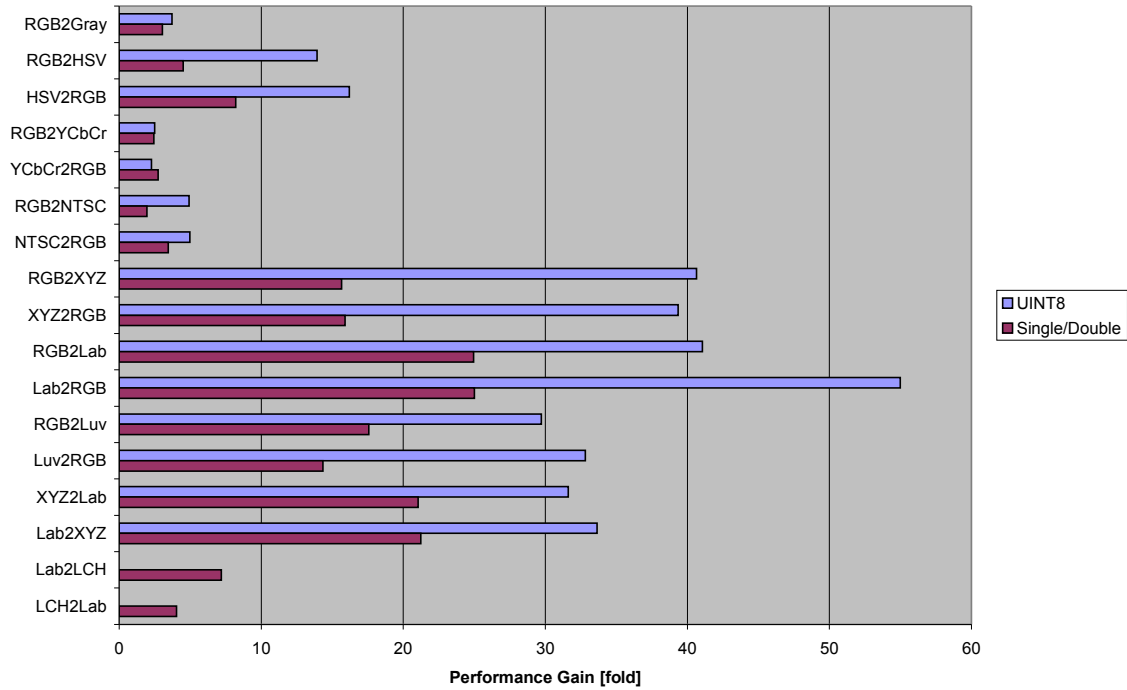


Anona IPT for O-Matrix Benchmarks

1. Color space transformations

Function Name	Data Type	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain[fold]
GammaFwd	uint8	1280x960x3	64.33	N/A	N/A
GammaFwd	single	1280x960x3	356.1	N/A	N/A
Gammaln	uint8	1280x960x3	54.64	N/A	N/A
Gammaln	single	1280x960x3	316.4	N/A	N/A
RGB2Gray	uint8	1280x960x3	13.36	49.75	3.72
RGB2Gray	single	1280x960x3	21.55	65.8	3.05
RGB2HSV	uint8	1280x960x3	75.95	1057	13.92
RGB2HSV	single	1280x960x3	213	960.3	4.51
HSV2RGB	uint8	1280x960x3	73.84	1197	16.21
HSV2RGB	single	1280x960x3	147.3	1208	8.20
RGB2HLS	uint8	1280x960x3	71.75	N/A	N/A
RGB2HLS	single	1280x960x3	143.1	N/A	N/A
HLS2RGB	uint8	1280x960x3	75.53	N/A	N/A
HLS2RGB	single	1280x960x3	140.8	N/A	N/A
RGB2YUV	uint8	1280x960x3	63.19	N/A	N/A
RGB2YUV	single	1280x960x3	90.53	N/A	N/A
YUV2RGB	uint8	1280x960x3	62.88	N/A	N/A
YUV2RGB	single	1280x960x3	90.32	N/A	N/A
RGB2YCbCr	uint8	1280x960x3	64.73	161.9	2.50
RGB2YCbCr	single	1280x960x3	120.5	294.2	2.44
YCbCr2RGB	uint8	1280x960x3	71.56	162.4	2.27
YCbCr2RGB	single	1280x960x3	120.3	329.1	2.74
RGB2NTSC	uint8	1280x960x3	62.82	309.1	4.92
RGB2NTSC	single	1280x960x3	100.3	195.7	1.95
NTSC2RGB	uint8	1280x960x3	62.86	313.4	4.99
NTSC2RGB	single	1280x960x3	90.4	312.9	3.46
RGB2XYZ	uint8	1280x960x3	67.14	2729	40.65
RGB2XYZ	single	1280x960x3	131.5	2059	15.66
XYZ2RGB	uint8	1280x960x3	67.4	2652	39.35
XYZ2RGB	single	1280x960x3	130.7	2078	15.90
RGB2Lab	uint8	1280x960x3	106.6	4376	41.05
RGB2Lab	single	1280x960x3	154	3842	24.95
Lab2RGB	uint8	1280x960x3	80.01	4400	54.99
Lab2RGB	single	1280x960x3	152.7	3819	25.01
RGB2Luv	uint8	1280x960x3	106.3	3159	29.72
RGB2Luv	single	1280x960x3	137.4	2415	17.58
Luv2RGB	uint8	1280x960x3	73.15	2401	32.82
Luv2RGB	single	1280x960x3	167.2	2399	14.35
XYZ2Lab	uint8	1280x960x3	104.5	3304	31.62
XYZ2Lab	single	1280x960x3	129	2715	21.05
Lab2XYZ	uint8	1280x960x3	95.74	3220	33.63
Lab2XYZ	single	1280x960x3	121	2570	21.24
Lab2LCH	single	1280x960x3	111.4	800.4	7.18

Color Transformations - Performance Gain

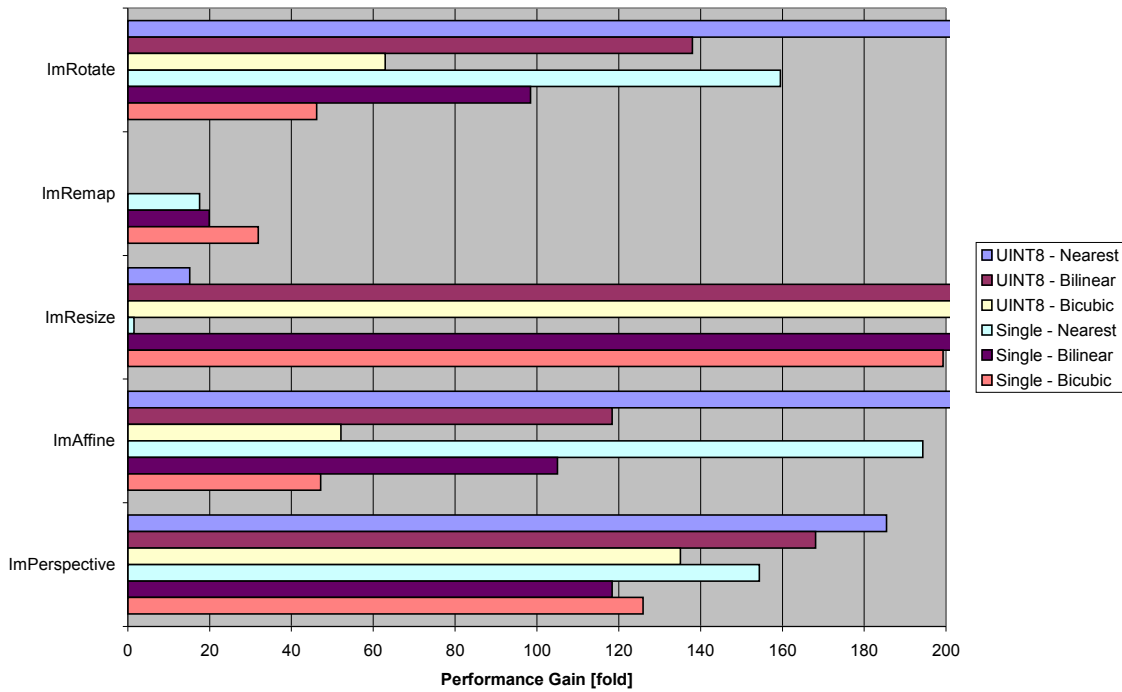


2. Geometrical Transformations

Function Name	Data Type	Interpolation	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain [fold]
ImRotate	uint8	nearest	1280x960	5.896	1748	296.47
ImRotate	uint8	bilinear	1280x960	15.85	2187	137.98
ImRotate	uint8	bicubic	1280x960	51.51	3242	62.94
ImRotate	single	nearest	1280x960	10.77	1718	159.52
ImRotate	single	bilinear	1280x960	22.31	2196	98.43
ImRotate	single	bicubic	1280x960	72.06	3324	46.13
ImRemap	uint8	nearest	1280x960	22.78	N/A	N/A
ImRemap	uint8	bilinear	1280x960	29.45	N/A	N/A
ImRemap	uint8	bicubic	1280x960	49.05	N/A	N/A
ImRemap	single	nearest	1280x960	26.16	458.4	17.52
ImRemap	single	bilinear	1280x960	33.7	670.6	19.90
ImRemap	single	bicubic	1280x960	62.54	1995	31.90
ImResize	uint8	nearest	1280x960	0.12	1.818	15.15
ImResize	uint8	bilinear	1280x960	0.2692	322.6	1198.37
ImResize	uint8	bicubic	1280x960	1.101	399	362.40
ImResize	uint8	super	1280x960	0.9575	N/A	N/A
ImResize	single	nearest	1280x960	1.782	2.681	1.50
ImResize	single	bilinear	1280x960	0.8566	292	340.88
ImResize	single	bicubic	1280x960	1.842	367	199.24

ImResize	single	super	1280x960	1.704	N/A	N/A
ImAffine	uint8	nearest	1280x960	4.553	1208	265.32
ImAffine	uint8	bilinear	1280x960	13.93	1649	118.38
ImAffine	uint8	bicubic	1280x960	49.17	2562	52.10
ImAffine	single	nearest	1280x960	6.274	1219	194.29
ImAffine	single	bilinear	1280x960	18.08	1899	105.03
ImAffine	single	bicubic	1280x960	67.47	3179	47.12
ImPerspective	uint8	nearest	1280x960	7.108	1318	185.42
ImPerspective	uint8	bilinear	1280x960	10.43	1754	168.17
ImPerspective	uint8	bicubic	1280x960	19.72	2663	135.04
ImPerspective	single	nearest	1280x960	8.552	1320	154.35
ImPerspective	single	bilinear	1280x960	16.83	1993	118.42
ImPerspective	single	bicubic	1280x960	25.85	3255	125.92

Geometric Transformations - Performance Gain

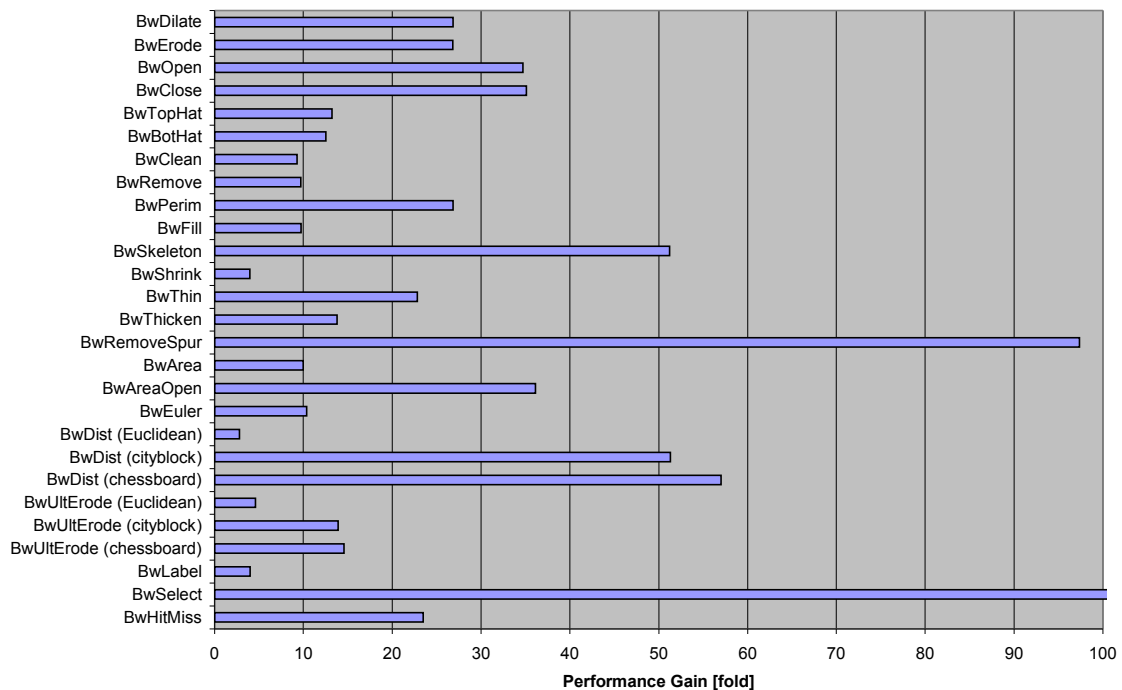


3. BW Morphology

Function Name	Parameters	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain[fold]
BwDilate		255x149	0.09028	2.423	26.84
BwErode		255x149	0.09221	2.471	26.80
BwOpen		255x149	0.1366	4.743	34.72
BwClose		255x149	0.1383	4.856	35.11
BwTopHat		255x149	0.3736	4.942	13.23
BwBotHat		255x149	0.3987	4.993	12.52
BwClean		255x149	0.2626	2.438	9.28
BwRemove		255x149	0.2502	2.434	9.73
BwPerim		255x149	0.1168	3.134	26.83

BwFill		255x149	0.2493	2.426	9.73
BwSkeleton		255x149	16.48	844	51.21
BwShrink		255x149	60.73	241	3.97
BwThin		255x149	22.8	520.6	22.83
BwThicken		255x149	15.4	212.2	13.78
BwRemoveSpur		255x149	0.915	89.07	97.34
BwArea		255x149	0.2026	2.025	10.00
BwAreaOpen		255x149	0.4067	14.69	36.12
BwEuler		255x149	0.2478	2.573	10.38
BwDist (Euclidean)		255x149	2.616	7.317	2.80
BwDist (cityblock)	cityblock	255x149	0.2405	12.34	51.31
BwDist (chessboard)	chessboard	255x149	0.3125	17.82	57.02
BwDist (fastmarching)	fastmarching	255x149	1.358	N/A	N/A
BwUltErode (Euclidean)	euclidean	255x149	4.385	20.17	4.60
BwUltErode (cityblock)	cityblock	255x149	2.265	31.45	13.89
BwUltErode (chessboard)	chessboard	255x149	2.29	33.37	14.57
BwUltErode (fastmarching)	fastmarching	255x149	3.408	N/A	N/A
BwLabel		255x149	0.5118	2.052	4.01
BwSelect		255x149	0.3931	83.32	211.96
BwHitMiss		255x149	0.4136	9.71	23.48

B&W Morphology - Performance Gain

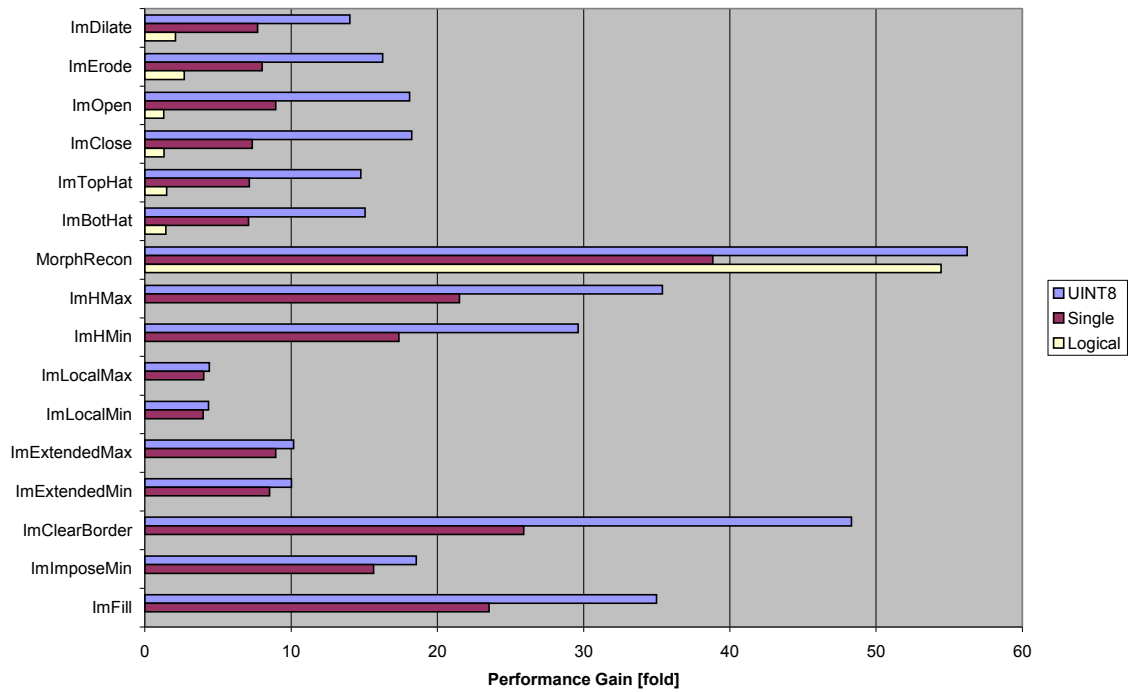


4. Gray Morphology

Function Name	Data Type	Image Size	O-Matrix Time	Matlab Time	Performance Gain
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			[msec]	[msec]	
ImDilate	logical	1280x960	11.87	24.84	2.09
ImDilate	uint8	1280x960	12.12	170	14.03
ImDilate	single	1280x960	30.18	232.7	7.71
ImErode	logical	1280x960	10.31	27.71	2.69
ImErode	uint8	1280x960	10.62	172.6	16.25
ImErode	single	1280x960	29.34	234.8	8.00
ImOpen	logical	1280x960	19.07	24.53	1.29
ImOpen	uint8	1280x960	18.33	331.6	18.09
ImOpen	single	1280x960	50.64	453.1	8.95
ImClose	logical	1280x960	19.07	24.85	1.30
ImClose	uint8	1280x960	18.27	333.3	18.24
ImClose	single	1280x960	61.73	453.7	7.35
ImTopHat	logical	1280x960	19.7	29.37	1.49
ImTopHat	uint8	1280x960	22.73	335.6	14.76
ImTopHat	single	1280x960	64.56	461.7	7.15
ImBotHat	logical	1280x960	21.31	30.81	1.45
ImBotHat	uint8	1280x960	22.21	334.4	15.06
ImBotHat	single	1280x960	65.33	462.7	7.08
MorphRecon	logical	1280x960	11.5	626	54.43
MorphRecon	uint8	1280x960	14.39	809	56.22
MorphRecon	single	1280x960	23.66	918.8	38.83
ImHMax	uint8	1280x960	20.57	728	35.39
ImHMax	single	1280x960	41.28	887.5	21.50
ImHMin	uint8	1280x960	24.14	715.3	29.63
ImHMin	single	1280x960	49.39	858	17.37
ImLocalMax	uint8	1280x960	104.9	461.9	4.40
ImLocalMax	single	1280x960	119.6	482.5	4.03
ImLocalMin	uint8	1280x960	106.6	463.8	4.35
ImLocalMin	single	1280x960	125.2	499.2	3.99
ImExtendedMax	uint8	1280x960	113.1	1150	10.17
ImExtendedMax	single	1280x960	145.1	1299	8.95
ImExtendedMin	uint8	1280x960	114.9	1153	10.03
ImExtendedMin	single	1280x960	148.6	1266	8.52
ImClearBorder	uint8	1280x960	26.39	1275	48.31
ImClearBorder	single	1280x960	54.02	1399	25.90
ImImposeMin	uint8	1280x960	53.53	993	18.55
ImImposeMin	single	1280x960	87.77	1372	15.63
ImFill	uint8	1280x960	28.21	986.5	34.97
ImFill	single	1280x960	55.5	1306	23.53

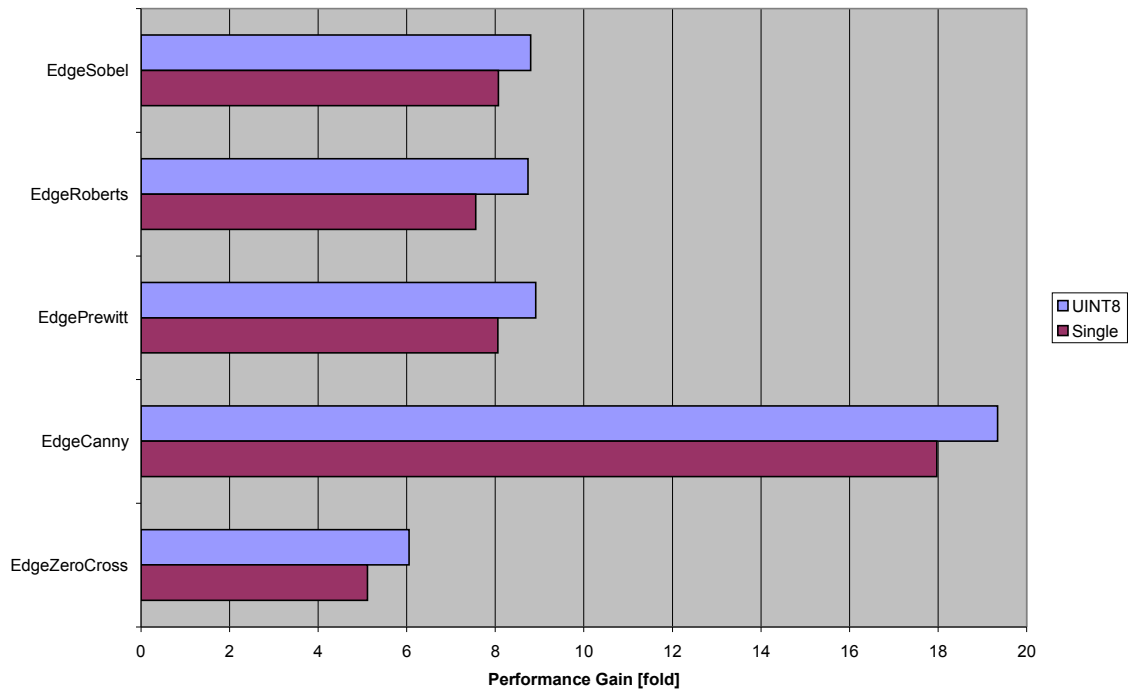
Gray Morphology - Performance Gain



5. Edge Detection

Function Name	Data Type	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain
EdgeSobel	uint8	1280x960	76.1	669.9	8.80
EdgeSobel	single	1280x960	74.19	598.9	8.07
EdgeRoberts	uint8	1280x960	76.24	666.6	8.74
EdgeRoberts	single	1280x960	79.01	596.9	7.55
EdgePrewitt	uint8	1280x960	75.15	669.8	8.91
EdgePrewitt	single	1280x960	74.34	599.3	8.06
EdgeCanny	uint8	1280x960	147.6	2855	19.34
EdgeCanny	single	1280x960	146.8	2638	17.97
EdgeZeroCross	uint8	1280x960	107.3	649.7	6.05
EdgeZeroCross	single	1280x960	106.5	544.5	5.11

Edge Detection - Performance Gain

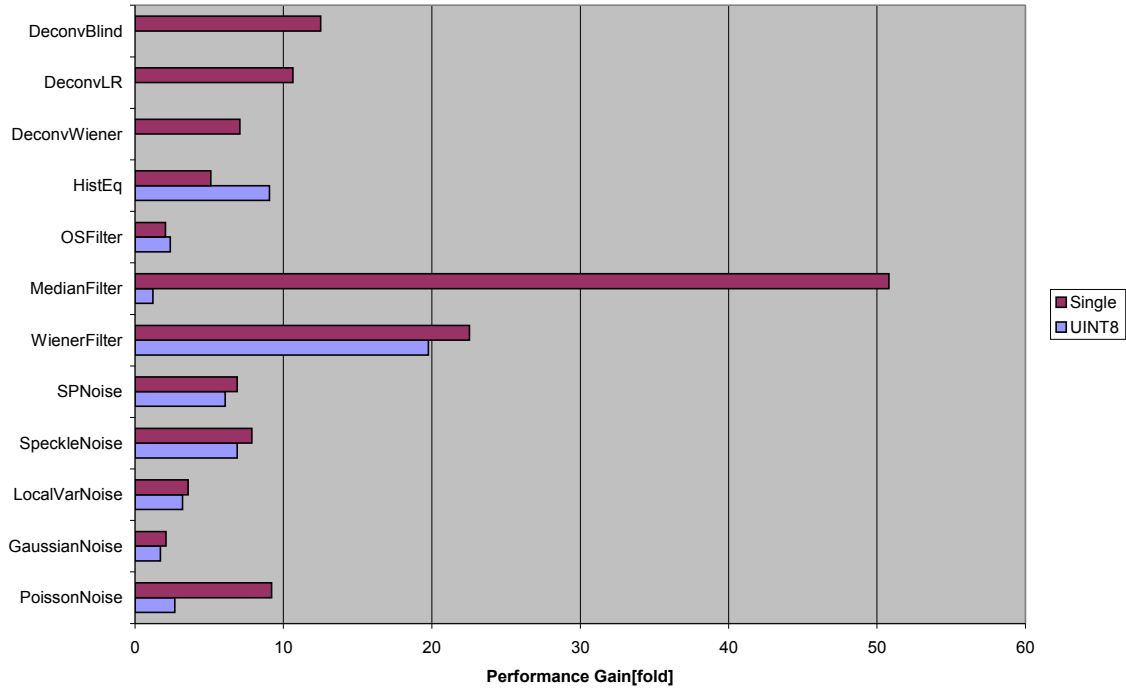


6. Image Enhancement

Function Name	Data Type	Parameters	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain
PoissonNoise	uint8		1280x960	522.2	4804	9.20
PoissonNoise	single		1280x960	235.6	630	2.67
GaussianNoise	uint8		1280x960	85.78	178	2.08
GaussianNoise	single		1280x960	83.98	143.4	1.71
LocalVarNoise	uint8		1280x960	111.7	399.7	3.58
LocalVarNoise	single		1280x960	108.6	346.7	3.19
UniformNoise	uint8		1280x960	18.46	N/A	N/A
UniformNoise	single		1280x960	18.51	N/A	N/A
SpeckleNoise	uint8		1280x960	22.77	179.2	7.87
SpeckleNoise	single		1280x960	23.18	159.1	6.86
SPNoise	uint8		1280x960	27.79	191.2	6.88
SPNoise	single		1280x960	28.12	170.6	6.07
WienerFilter	uint8	7x7 Mask	1280x960	40.53	913.4	22.54
WienerFilter	single	7x7 Mask	1280x960	43.6	861.5	19.76
MedianFilter	uint8	3x3 Mask	1280x960	3.378	171.6	50.80
MedianFilter	single	3x3 Mask	1280x960	210.1	252.1	1.20
OSFilter	uint8	3x5 Mask	1280x960	141.5	290.3	2.05
OSFilter	single	3x5 Mask	1280x960	180.9	428.7	2.37
HistEq	uint8		1280x960	4.183	21.29	5.09
HistEq	single		1280x960	8.826	79.98	9.06
DeconvWiener	single		444x291	297.7	2102	7.06

DeconvLR	single		444x291	1364	1.45E+04	10.64
DeconvBlind	single		444x291	3303	4.13E+04	12.50

Image Enhancement - Performance Gain

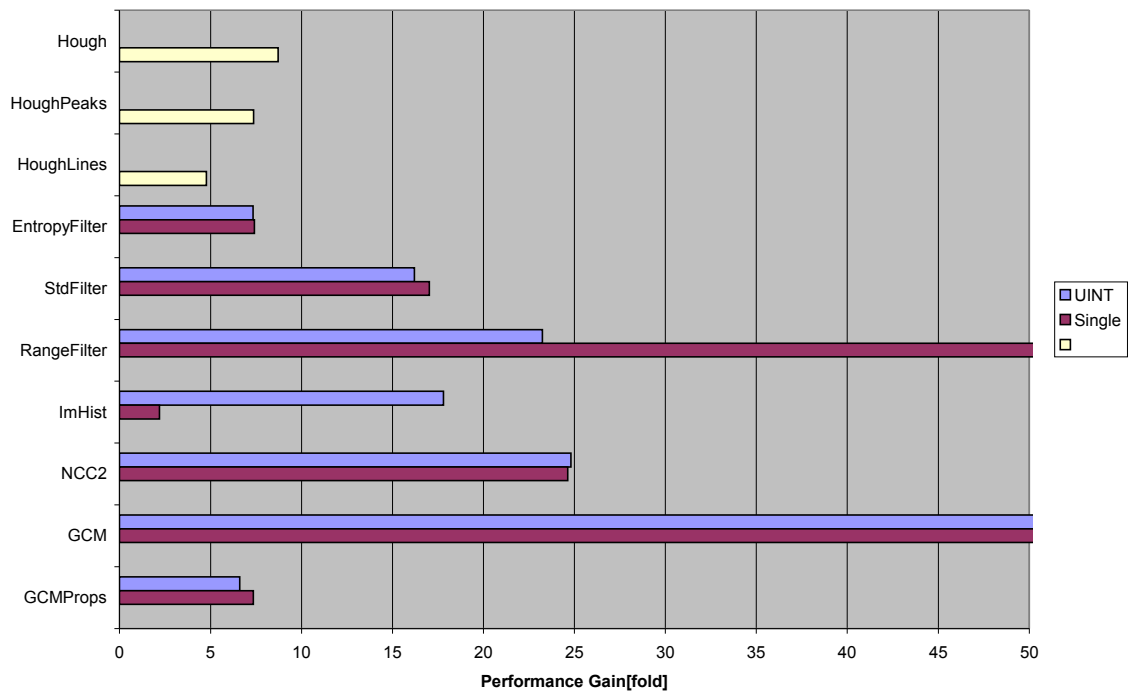


7. Image Analysis

Function Name	Data Type	Parameters	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain[fold]
Hough		ThetaResolution=0.5	292x438	18.81	163.9	8.71
HoughPeaks		ThetaResolution=0.5	292x438	6.763	49.85	7.37
HoughLines		ThetaResolution=0.5	292x438	1.158	5.539	4.78
EntropyFilter	uint8		292x438	43.19	320.2	7.41
EntropyFilter	single		292x438	43.97	322.6	7.34
StdFilter	uint8		292x438	3.521	59.92	17.02
StdFilter	single		292x438	3.715	60.2	16.20
RangeFilter	uint8		292x438	0.5172	39.6	76.57
RangeFilter	single		292x438	2.229	51.81	23.24
ImHist	uint8		292x438	0.2585	0.5675	2.20
ImHist	single		292x438	0.4576	8.149	17.81
NCC2	uint8	Tpl =100x100	292x438	14.9	366.9	24.62
NCC2	single	Tpl =100x100	292x438	15.6	387	24.81
SSD2	uint8	Tpl =100x100	292x438	7.782	N/A	N/A
SSD2	single	Tpl =100x100	292x438	8.675	N/A	N/A
ImNorm	uint8	L1	292x438	0.07345	N/A	N/A
ImNorm	single	L1	292x438	0.2613	N/A	N/A
ImNorm	uint8	L2	292x438	0.9155	N/A	N/A
ImNorm	single	L2	292x438	0.2523	N/A	N/A

ImNorm	uint8	L_inf	292x438	0.07449	N/A	N/A
ImNorm	single	L_inf	292x438	0.2708	N/A	N/A
ImNorm	uint8	MI	292x438	2.037	N/A	N/A
ImNorm	single	MI	292x438	2.987	N/A	N/A
ImNorm	uint8	QI	292x438	0.2622	N/A	N/A
ImNorm	single	QI	292x438	0.3878	N/A	N/A
GCM	uint8	NumLevels=256	292x438	0.9858	100.9	102.35
GCM	single	NumLevels=256	292x438	0.9625	100.5	104.42
GCMProps	uint8		292x438	3.215	23.63	7.35
GCMProps	single		292x438	3.562	23.52	6.60

Image Analysis - Performance Gain



8. Linear Filters/Transforms

Function Name	Parameters	Data Type	Image Size	O-Matrix Time [msec]	Matlab Time [msec]	Performance Gain [fold]
ImFilter	Kernel Size = 7x7	uint8	1280x960	16.84	40.63	2.41
ImFilter	Kernel Size = 7x7	single	1280x960	18.14	54.25	2.99
FixedFilter	Gaussian	uint8	1280x960	16.92	N/A	N/A
FixedFilter	Gaussian	single	1280x960	18.21	N/A	N/A
FixedFilter	Laplacian	uint8	1280x960	5.304	N/A	N/A
FixedFilter	Laplacian	single	1280x960	10.11	N/A	N/A
FixedFilter	Unsharp	uint8	1280x960	5.186	N/A	N/A
FixedFilter	Unsharp	single	1280x960	10.5	N/A	N/A

FixedFilter	Lowpass	uint8	1280x960	3.5	N/A	N/A
FixedFilter	Lowpass	single	1280x960	8.524	N/A	N/A
FixedFilter	Highpass	uint8	1280x960	2.813	N/A	N/A
FixedFilter	Highpass	single	1280x960	9.512	N/A	N/A
FixedFilter	Highpass	uint8	1280x960	3.988	N/A	N/A
FixedFilter	Highpass	single	1280x960	10.55	N/A	N/A
FixedFilter	Sobel	uint8	1280x960	12.16	N/A	N/A
FixedFilter	Sobel	single	1280x960	8.37	N/A	N/A
FixedFilter	Prewitt	uint8	1280x960	12.69	N/A	N/A
FixedFilter	Prewitt	single	1280x960	9.005	N/A	N/A
FixedFilter	Prewitt	uint8	1280x960	12.2	N/A	N/A
FixedFilter	Prewitt	single	1280x960	8.242	N/A	N/A
FixedFilter	Roberts	uint8	1280x960	12.95	N/A	N/A
FixedFilter	Roberts	single	1280x960	8.874	N/A	N/A
DCT2		uint8	1280x960	180.2	641.1	3.56
DCT2		single	1280x960	180.8	632.9	3.50
iDCT2		uint8	1280x960	183.7	1215	6.61
iDCT2		single	1280x960	183.4	1217	6.64
Radon		uint8	256x256	1854	1631	0.88
Radon		single	256x256	2036	1621	0.80
iRadon		uint8	256x256	203.5	3993	19.62
iRadon		single	256x256	203.5	3994	19.63

Linear Filter/Transform - Performance Gain

