A Computational Analysis of a Novel Chromatic k-Nearest Neighbours Algorithm - Appendix 2D

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Scenario	gen	pre range	fast range	naive range	pre mode	fast mode	naive mode
Determining r value							
2D-10000-5-25-20-0-0	3.2	45.1	95.4	5.3	788.1	155.2	2.8
2D-10000-10-25-20-0-0	3.0	39.5	88.8	5.0	6391.3	54.1	2.6
2D-10000-25-25-20-0-0	3.1	39.6	88.9	5.1	73818.1	19.6	2.9
2D-10000-50-25-20-0-0	3.1	37.9	87.7	5.1	414470.6	11.8	2.7

Table 1: Computational results for 2D - Experiment to determine r value for artificial testing. All times averaged over 10 runs, presented in ms. r higher than 50 not computed due to preprocessing being > 1 hour per run.

Scenario	gen	pre range	fast range	naive range	pre mode	fast mode	naive mode
Uniform color scenarios							
2D-1-10-25-20-0-0	0.5	3.3	52.7	46.0	698.8	7.6	5.9
2D-1-10-50-20-0-0	0.5	3.4	53.3	44.2	647.9	7.3	8.2
2D-1-10-75-20-0-0	0.5	3.5	56.5	45.9	642.0	8.4	10.8
2D-1-10-100-20-0-0	0.4	3.5	56.4	44.9	690.4	7.5	13.3
2D-1-10-250-20-0-0	0.4	3.5	60.8	45.1	664.5	7.8	24.5
2D-1-10-500-20-0-0	0.4	3.3	63.3	45.3	666.6	7.8	46.3
2D-1-10-750-20-0-0	0.4	3.4	66.1	46.0	673.8	8.3	66.9
2D-10-10-25-20-0-0	3.1	39.8	89.1	595.5	6616.9	48.6	7.6
2D-10-10-50-20-0-0	3.0	39.3	93.7	620.0	6552.2	52.1	10.4
2D-10-10-75-20-0-0	2.8	36.8	92.6	596.4	6372.7	55.9	11.9
2D-10-10-100-20-0-0	3.1	37.6	96.1	605.0	6503.4	56.3	15.3
2D-10-10-250-20-0-0	2.9	36.1	102.7	603.0	6452.8	52.0	27.4
2D-10-10-500-20-0-0	2.8	35.9	109.0	607.4	6469.1	55.4	49.4
2D-10-10-750-20-0-0	3.0	36.9	113.6	609.4	6384.3	57.5	71.6
2D-10-10-1000-20-0-0	2.9	37.1	111.5	608.1	6326.7	57.6	83.2
2D-10-10-1500-20-0-0	3.3	36.7	113.6	605.5	6465.3	53.1	120.6
2D-10-10-2000-20-0-0	2.9	35.8	119.2	605.5	6497.6	57.8	167.1
2D-100-10-25-20-0-0	30.2	488.6	182.7	7952.8	73718.5	552.2	12.8
2D-100-10-50-20-0-0	29.5	478.6	185.8	8024.1	70610.8	587.5	18.2
2D-100-10-75-20-0-0	29.8	480.0	189.3	7903.2	73474.1	581.2	23.1
2D-100-10-100-20-0-0	29.4	484.0	217.6	7961.9	70467.9	571.3	27.1
2D-100-10-250-20-0-0	30.4	485.5	205.4	7866.1	73289.5	526.9	53.1
2D-100-10-500-20-0-0	29.2	476.2	215.0	7888.8	69399.8	501.2	85.3
2D-100-10-750-20-0-0	30.8	493.4	220.4	7909.8	69674.0	525.1	122.1
2D-100-10-1000-20-0-0	30.3	487.7	227.2	7887.2	71877.2	535.9	157.4
2D-100-10-1500-20-0-0	31.8	525.8	233.2	7894.8	69581.8	514.1	223.2
2D-100-10-2000-20-0-0	31.6	489.8	247.3	7935.7	73204.4	589.4	314.2
2D-1-10-25-100-0-0	0.5	3.3	51.8	47.6	714.3	10.3	6.2
2D-1-10-50-100-0-0	0.4	3.2	55.0	46.2	685.6	10.2	11.0
2D-1-10-75-100-0-0	0.4	3.1	57.4	44.9	700.9	11.3	14.9
2D-1-10-100-100-0-0	0.4	3.1	57.7	45.0	685.2	10.2	18.7
2D-1-10-250-100-0-0	0.4	3.1	61.1	45.5	710.9	10.2	37.4
2D-1-10-500-100-0-0	0.4	3.0	64.1	45.1	692.5	10.6	67.9
2D-1-10-750-100-0-0	0.4	3.1	66.1	44.2	700.8	10.3	94.6
2D-10-10-25-100-0-0	2.8	36.7	83.7	607.2	6798.7	68.4	8.0
2D-10-10-50-100-0-0	3.1	37.4	91.4	605.9	6811.4	62.9	12.5
2D-10-10-75-100-0-0	2.9	38.2	97.4	623.8	6780.0	71.0	17.5
2D-10-10-100-100-0-0	2.9	35.2	95.7	600.6	6823.3	67.4	21.2
2D-10-10-250-100-0-0	2.9	36.8	101.9	604.3	6909.2	68.4	41.6
2D-10-10-500-100-0-0	2.9	36.5	107.5	612.6	6728.4	73.6	72.2
2D-10-10-750-100-0-0	3.0	38.1	112.4	609.3	6664.0	68.0	103.0
2D-10-10-1000-100-0-0	3.0	37.9	112.3	615.5	6752.2	72.2	121.0
2D-10-10-1500-100-0-0	2.9	35.7	113.3	615.0	6527.3	72.7	171.8
2D-10-10-2000-100-0-0	2.9	37.2	115.8	596.6	6711.6	70.7	233.9
2D-100-10-25-100-0-0	31.9	509.4	179.8	7965.0	75788.6	611.6	13.1
2D-100-10-50-100-0-0	32.2	517.8	192.3	8195.9	78053.7	636.2	21.5
2D-100-10-75-100-0-0	30.3	499.9	194.3	7995.6	77561.0	634.4	28.6
2D-100-10-100-100-0-0	31.3	493.8	196.2	8026.1	73894.0	670.5	34.4
2D-100-10-250-100-0-0	29.9	507.5	210.8	8052.7	77093.3	646.6	65.9
2D-100-10-500-100-0-0	30.9	498.3	217.8	8028.4	75582.8	633.3	112.9
2D-100-10-750-100-0-0	31.4	498.7	224.9	8035.3	74352.3	691.4	159.2
2D-100-10-1000-100-0-0	31.7	499.2	226.5	8102.6	75146.2	661.5	192.6
2D-100-10-1500-100-0-0	30.8	488.8	234.7	8062.6	74999.8	589.6	282.2
2D-100-10-2000-100-0-0	30.6	496.9	239.8	8041.4	77912.6	674.7	395.3

Table 2: Computational results for 2D - Generated Uniform with $r = 10$. All times averaged over 10 runs, presented in ms.

Scenario	gen	pre range	fast range	naive range	pre mode	fast mode	naive mode
Clustered color scenarios							
2D-1-10-25-20-30-90	0.5	3.5	53.0	46.7	632.0	5.6	4.0
2D-1-10-50-20-30-90	0.5	3.1	55.7	45.9	656.4	5.3	5.9
2D-1-10-75-20-30-90	0.5	3.2	58.8	46.1	638.6	5.6	7.7
2D-1-10-100-20-30-90	0.5	3.2	58.3	45.6	626.5	5.6	9.2
2D-1-10-250-20-30-90	0.5	3.2	61.0	45.6	643.6	6.1	19.0
2D-1-10-500-20-30-90	0.4	3.1	64.8	45.5	659.2	5.9	38.1
2D-1-10-750-20-30-90	0.4	3.2	67.1	44.7	658.2	5.9	56.4
2D-10-10-25-20-30-90	2.9	37.5	89.6	624.8	6373.9	47.7	6.2
2D-10-10-50-20-30-90	3.0	36.9	93.0	607.4	6377.5	46.2	8.0
2D-10-10-75-20-30-90	3.0	37.1	96.8	612.5	6429.3	47.3	9.1
2D-10-10-100-20-30-90	3.2	36.7	95.5	609.8	6193.2	42.9	11.4
2D-10-10-250-20-30-90	3.1	37.5	104.2	604.6	6414.2	49.4	21.2
2D-10-10-500-20-30-90	3.0	37.2	107.5	620.5	6366.9	44.9	39.5
2D-10-10-750-20-30-90	3.0	36.9	112.6	616.3	6303.9	48.8	57.4
2D-10-10-1000-20-30-90	3.1	38.6	117.6	612.7	6183.9	45.4	67.0
2D-10-10-1500-20-30-90	3.3	37.1	114.7	614.3	6017.8	43.9	100.4
2D-10-10-2000-20-30-90	3.0	37.7	117.5	612.4	6257.5	48.5	144.8
2D-100-10-25-20-30-90	30.7	492.4	183.8	8035.7	72373.0	425.8	11.2
2D-100-10-50-20-30-90	31.4	493.1	190.8	8362.3	70595.2	481.0	16.3
2D-100-10-75-20-30-90	31.6	495.8	192.6	8068.8	73581.8	438.4	20.3
2D-100-10-100-20-30-90	36.9	512.1	195.6	8060.2	66726.8	487.7	24.4
2D-100-10-250-20-30-90	31.3	492.7	209.1	8096.9	69484.5	437.5	44.9
2D-100-10-500-20-30-90	31.3	495.0	219.4	8050.3	69418.3	475.9	80.2
2D-100-10-750-20-30-90	32.7	504.7	225.5	8025.1	70181.1	450.4	111.8
2D-100-10-1000-20-30-90	31.8	497.3	237.8	8099.9	69999.3	448.1	144.2
2D-100-10-1500-20-30-90	32.8	507.6	236.9	8088.4	70485.3	473.0	213.2
2D-100-10-2000-20-30-90	31.1	489.3	240.8	8063.8	68436.6	471.6	301.9
2D-1-10-25-100-150-90	0.5	3.4	51.8	45.3	641.9	5.9	4.1
2D-1-10-50-100-150-90	0.5	3.3	56.9	46.9	654.7	5.3	6.1
2D-1-10-75-100-150-90	0.5	3.2	58.6	47.9	666.8	5.7	7.6
2D-1-10-100-100-150-90	0.5	3.2	58.2	44.5	639.9	5.7	9.5
2D-1-10-250-100-150-90	0.5	3.2	63.6	45.5	686.4	6.2	21.1
2D-1-10-500-100-150-90	0.6	3.5	77.7	52.4	725.0	6.0	43.4
2D-1-10-750-100-150-90	0.5	3.3	69.3	47.6	662.8	6.1	57.2
2D-10-10-25-100-150-90	3.0	37.0	91.2	623.1	6756.4	53.5	6.0
2D-10-10-50-100-150-90	3.1	35.9	90.6	606.2	6426.0	42.0	7.4
2D-10-10-75-100-150-90	3.2	37.7	98.1	614.9	6136.8	47.4	10.1
2D-10-10-100-100-150-90	3.1	36.9	97.8	615.4	6385.5	47.3	11.7
2D-10-10-250-100-150-90	3.0	36.7	103.5	624.2	6191.8	49.4	21.2
2D-10-10-500-100-150-90	3.1	36.8	107.9	612.8	6173.6	47.3	40.8
2D-10-10-750-100-150-90	3.2	37.7	110.7	616.6	6341.3	40.4	58.7
2D-10-10-1000-100-150-90	3.0	36.9	112.6	619.2	6533.7	44.5	69.3
2D-10-10-1500-100-150-90	3.1	37.9	118.1	611.5	6330.1	51.7	106.6
2D-10-10-2000-100-150-90	3.1	38.1	118.2	619.7	6527.9	48.7	151.8
2D-100-10-25-100-150-90	33.9	515.6	188.5	8066.8	69919.7	488.6	10.9
2D-100-10-50-100-150-90	31.6	497.3	189.2	8097.7	72765.9	450.2	15.7
2D-100-10-75-100-150-90	32.3	513.5	192.7	8084.5	72580.6	524.1	20.0
2D-100-10-100-100-150-90	39.3	513.6	196.9	8098.0	72537.4	519.2	26.2
2D-100-10-250-100-150-90	33.3	516.8	209.6	8103.3	71871.3	520.4	45.7
2D-100-10-500-100-150-90	32.6	499.9	218.0	8126.7	73452.0	507.0	79.2
2D-100-10-750-100-150-90	31.5	489.7	223.7	8006.5	71176.7	420.2	113.9
2D-100-10-1000-100-150-90	33.3	507.5	232.8	8082.0	70560.9	528.6	139.5
2D-100-10-1500-100-150-90	33.8	499.3	238.0	8074.1	71612.7	457.7	216.1
2D-100-10-2000-100-150-90	33.3	512.7	242.7	8060.0	71010.2	552.8	317.8

Table 3: Computational results for 2D - Generated Clustered Colors with $r = 10$. All times averaged over 10 runs, presented in ms.

Scenario	n	pre range	fast range	naive range	pre mode	fast mode	naive mode
2D-MAP-25-1	500	1.9	45.5	21.0	316.3	3.0	4.2
2D-MAP-50-1	500	2.2	52.1	21.9	323.1	3.0	6.1
2D-MAP-75-1	500	1.9	50.0	20.7	303.3	2.8	7.1
2D-MAP-100-1	500	1.8	50.4	21.0	296.8	3.2	9.7
2D-MAP-250-1	500	1.8	54.8	21.5	307.7	2.9	17.3
2D-MAP-25-5	2500	10.0	67.0	143.6	1521.8	9.7	4.4
2D-MAP-50-5	2500	9.6	68.0	145.9	1473.8	10.6	6.5
2D-MAP-75-5	2500	10.6	81.1	153.4	1607.0	11.2	8.7
2D-MAP-100-5	2500	10.4	80.0	153.6	1572.8	10.2	10.6
2D-MAP-250-5	2500	9.8	80.1	146.1	1503.6	10.8	19.6
2D-MAP-500-5	2500	10.7	94.4	162.1	1685.9	13.9	42.7
2D-MAP-750-5	2500	10.2	90.4	148.8	1535.6	12.2	58.9
2D-MAP-1000-5	2500	10.6	92.2	158.3	1595.4	11.6	68.2
2D-MAP-1500-5	2500	10.0	92.0	153.5	1564.3	12.1	104.1
2D-MAP-2000-5	2500	11.3	99.3	158.3	1568.5	11.8	148.8
2D-MAP-25-10	5000	22.6	82.0	329.1	3007.6	22.4	5.2
2D-MAP-50-10	5000	21.5	87.4	339.4	3177.0	25.0	7.7
2D-MAP-75-10	5000	21.0	87.5	321.8	3106.4	19.5	9.1
2D-MAP-100-10	5000	20.9	88.8	323.9	3078.2	22.0	10.9
2D-MAP-250-10	5000	20.9	96.8	325.9	2981.6	22.2	21.1
2D-MAP-500-10	5000	20.5	98.9	321.3	3004.1	19.4	39.1
2D-MAP-750-10	5000	19.8	104.5	327.7	3095.4	21.6	59.9
2D-MAP-1000-10	5000	21.2	109.0	329.9	3120.5	19.6	66.4
2D-MAP-1500-10	5000	22.8	113.6	333.8	3221.3	24.2	110.0
2D-MAP-2000-10	5000	21.7	108.7	323.4	2956.6	21.6	146.4
2D-MAP-25-25	12500	53.5	98.3	881.6	7519.7	55.5	6.2
2D-MAP-50-25	12500	52.9	101.0	871.4	7322.1	51.1	8.2
2D-MAP-75-25	12500	49.7	98.2	846.7	7200.6	46.3	9.5
2D-MAP-100-25	12500	48.5	100.3	848.9	7188.0	43.9	11.1
2D-MAP-250-25	12500	49.3	108.5	846.6	7222.8	54.0	20.2
2D-MAP-500-25	12500	52.8	119.5	893.6	7941.4	45.0	40.7
2D-MAP-750-25	12500	53.4	128.1	893.1	7374.4	47.4	58.1
2D-MAP-1000-25	12500	51.9	126.6	891.4	7622.1	49.2	67.6
2D-MAP-1500-25	12500	53.0	132.4	890.3	7867.4	54.9	105.1
2D-MAP-2000-25	12500	55.4	141.5	929.9	8226.2	51.6	152.4

Table 4: Computational results for 2D - Real life map data Part 1. All times averaged over 10 maps, presented in ms.

Scenario	n	pre range	fast range	naive range	pre mode	fast mode	naive mode
2D-MAP-25-50	25000	111.1	120.2	2054.7	16726.5	94.0	8.2
2D-MAP-50-50	25000	124.2	136.6	2115.4	16908.1	123.1	12.4
2D-MAP-75-50	25000	110.9	131.0	1918.2	15505.4	111.3	13.7
2D-MAP-100-50	25000	110.3	134.2	1924.5	15918.3	115.4	15.0
2D-MAP-250-50	25000	119.0	152.2	2100.5	16499.0	104.2	27.5
2D-MAP-500-50	25000	108.0	142.7	1923.4	15938.0	101.3	43.5
2D-MAP-750-50	25000	102.3	140.3	1805.0	14783.7	93.7	58.6
2D-MAP-1000-50	25000	107.1	147.0	1889.8	15420.1	95.7	72.1
2D-MAP-1500-50	25000	124.0	178.7	2108.4	16203.9	114.7	116.3
2D-MAP-2000-50	25000	112.3	166.4	1977.8	16400.8	93.6	165.2
2D-MAP-25-75	37500	184.3	154.4	3198.7	25126.3	156.4	8.7
2D-MAP-50-75	37500	170.8	137.0	2958.2	24456.6	160.0	11.2
2D-MAP-75-75	37500	166.6	141.7	2970.9	24246.6	128.2	13.3
2D-MAP-100-75	37500	180.4	152.5	3069.6	24970.0	150.9	18.0
2D-MAP-250-75	37500	169.8	155.3	3068.3	23849.4	153.5	26.4
2D-MAP-500-75	37500	170.7	164.8	3107.8	24971.8	152.0	48.6
2D-MAP-750-75	37500	173.1	171.8	3088.4	25355.0	158.8	79.9
2D-MAP-1000-75	37500	170.1	166.4	3040.5	23858.3	126.8	73.2
2D-MAP-1500-75	37500	159.9	160.4	2834.7	22575.4	151.1	109.0
2D-MAP-2000-75	37500	165.0	167.5	3059.2	24733.7	141.2	170.2
2D-MAP-25-100	50000	247.4	151.0	4328.7	33830.7	243.0	9.2
2D-MAP-50-100	50000	259.8	160.3	4503.1	34026.3	289.7	18.0
2D-MAP-75-100	50000	242.5	155.9	4152.4	31423.4	238.3	14.4
2D-MAP-100-100	50000	231.2	162.7	4128.6	32916.3	189.9	17.1
2D-MAP-250-100	50000	231.9	172.3	4069.3	32877.1	189.9	28.9
2D-MAP-500-100	50000	234.6	181.8	4273.2	33291.0	185.6	56.0
2D-MAP-750-100	50000	231.8	175.0	4183.3	33645.6	204.0	75.1
2D-MAP-1000-100	50000	229.0	183.2	4105.4	32458.6	204.6	86.3
2D-MAP-1500-100	50000	222.0	177.2	3998.4	30991.8	184.4	125.4
2D-MAP-2000-100	50000	219.9	174.6	3856.8	31473.5	192.5	177.7

Table 5: Computational results for 2D - Real life map data Part 2. All times averaged over 10 maps, presented in ms.

Scenario	pre range	fast range	naive range	pre mode	fast mode	naive mode
2D-TMP-25-2	25.7	72.7	384.4	30.3	176.3	4.9
2D-TMP-50-2	24.7	72.7	373.4	28.9	171.4	6.9
2D-TMP-75-2	25.1	75.5	375.4	30.6	170.7	8.7
2D-TMP-100-2	23.9	76.8	375.1	28.1	169.2	10.8
2D-TMP-250-2	24.1	84.2	378.8	30.0	170.2	20.7
2D-TMP-500-2	23.8	86.3	371.5	29.4	178.6	39.0
2D-TMP-750-2	24.2	88.3	383.0	29.7	173.1	56.9
2D-TMP-1000-2	24.6	87.9	378.8	29.9	174.2	65.5
2D-TMP-1500-2	24.5	91.1	374.9	29.7	172.3	96.7
2D-TMP-2000-2	24.9	89.0	376.6	29.9	181.1	137.3
2D-TMP-25-5	25.1	72.3	382.8	470.8	59.2	4.8
2D-TMP-50-5	26.4	84.2	406.7	524.4	69.0	8.1
2D-TMP-75-5	25.3	80.8	394.0	509.3	63.4	9.6
2D-TMP-100-5	24.1	79.7	385.7	482.9	77.4	11.2
2D-TMP-250-5	24.8	83.7	385.9	468.2	64.0	21.2
2D-TMP-500-5	24.4	88.6	391.0	469.9	64.7	40.3
2D-TMP-750-5	25.2	88.7	389.8	474.4	63.3	56.7
2D-TMP-1000-5	25.4	88.6	386.4	482.3	59.8	66.5
2D-TMP-1500-5	25.0	90.8	386.6	458.8	63.4	98.0
2D-TMP-2000-5	24.7	90.7	388.0	464.1	69.8	138.1
2D-TMP-25-10	23.7	69.9	380.8	3855.6	29.2	4.8
2D-TMP-50-10	24.1	75.4	382.9	3922.9	26.3	7.1
2D-TMP-75-10	23.5	78.5	378.3	3802.0	27.3	8.9
2D-TMP-100-10	23.8	79.6	382.4	3954.7	25.5	11.1
2D-TMP-250-10	23.3	85.0	380.3	3932.0	28.1	21.0
2D-TMP-500-10	23.5	87.5	382.0	3882.2	27.3	39.5
2D-TMP-750-10	23.7	88.8	380.5	3968.4	27.7	56.9
2D-TMP-1000-10	24.0	90.2	382.5	3835.0	27.5	65.4
2D-TMP-1500-10	24.0	89.1	384.8	3978.0	27.7	98.5
2D-TMP-2000-10	24.0	93.9	388.4	3906.8	28.5	137.7
2D-TMP-25-15	23.2	70.4	385.5	12003.5	15.4	4.8
2D-TMP-50-15	23.6	74.6	379.7	11927.7	17.8	7.0
2D-TMP-75-15	23.7	77.9	386.2	11995.9	20.0	9.0
2D-TMP-100-15	23.7	81.1	383.9	12154.0	18.4	11.2
2D-TMP-250-15	23.4	84.5	385.2	12156.7	17.3	20.7
2D-TMP-500-15	23.3	86.5	382.5	11888.4	20.2	39.4
2D-TMP-750-15	23.3	87.3	386.7	12128.8	17.8	57.2
2D-TMP-1000-15	23.9	90.4	387.6	12251.7	18.6	66.9
2D-TMP-1500-15	23.7	89.6	380.5	12117.9	17.8	98.5
2D-TMP-2000-15	24.4	90.9	386.6	12258.3	19.5	138.9
2D-TMP-25-20	23.5	71.8	383.1	26241.5	13.6	4.8
2D-TMP-50-20	23.8	76.3	388.5	26810.9	15.5	10.0
2D-TMP-75-20	23.3	77.9	380.0	26095.4	13.8	10.4
2D-TMP-100-20	23.8	79.4	377.2	25820.1	14.5	12.3
2D-TMP-250-20	24.1	86.5	389.0	27088.1	16.1	23.4
2D-TMP-500-20	23.6	87.3	384.0	26268.8	13.4	39.6
2D-TMP-750-20	22.9	89.1	382.7	26280.8	13.5	57.7
2D-TMP-1000-20	23.8	88.7	381.6	26074.4	12.1	65.4
2D-TMP-1500-20	24.1	95.6	399.7	27465.5	14.4	102.3
2D-TMP-2000-20	25.7	105.8	403.5	28499.0	15.8	150.1

Table 6: Computational results for 2D - Real life temperature data with varying r. All times averaged over 10 maps, presented in ms.