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

Thomas van der Plas, Frank Staals, Erwin Glazenburg

10 November 2024

| 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 | $n$ | 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 |

| 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.