**Comparative Analysis of KNN and SVM in Multicriteria Inventory Classification Using TOPSIS**

**RESULT**

Sample Size: Row:100; features: **Annual Requirement, Average Unit Cost (Dollars), Lead Time (Weeks)**

**Data Set:**

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Annual Requirement | Average Unit Cost (Dollars) | Lead Time (Weeks) |
| 9 | 120000 | 2.21 | 8 |
| 4 | 113544 | 25.32 | 6 |
| 48 | 96000 | 2.21 | 8 |
| 2 | 89600 | 2.49 | 12 |
| 68 | 77612 | 53.67 | 12 |
| 79 | 73684 | 74.59 | 8 |
| 25 | 61408 | 58.87 | 16 |
| 51 | 58800 | 34.99 | 8 |
| 6 | 57360 | 70.32 | 4 |
| 49 | 56228 | 62.34 | 12 |
| 50 | 48276 | 38.1 | 8 |
| 10 | 44000 | 95.03 | 10 |
| 1 | 44460 | 39.25 | 12 |
| 69 | 40000 | 2.49 | 6 |
| 76 | 37444 | 34.99 | 6 |
| 12 | 36000 | 2.49 | 8 |
| 32 | 35200 | 34.99 | 10 |
| 59 | 33840 | 69.04 | 8 |
| 65 | 34400 | 2.12 | 8 |
| 90 | 30480 | 69.36 | 8 |
| 11 | 30000 | 34.99 | 6 |
| 3 | 28200 | 81.45 | 6 |
| 20 | 28800 | 34.99 | 6 |
| 42 | 26320 | 66.69 | 8 |
| 66 | 20800 | 170.95 | 10 |
| 23 | 24000 | 96.66 | 12 |
| 92 | 24120 | 34.99 | 8 |
| 15 | 24000 | 35.17 | 8 |
| 41 | 23400 | 34.99 | 4 |
| 19 | 24000 | 25.56 | 4 |
| 85 | 22800 | 42.62 | 8 |
| 13 | 20952 | 36.95 | 8 |
| 5 | 20400 | 38.1 | 12 |
| 89 | 19700 | 34.99 | 12 |
| 18 | 20160 | 69.69 | 6 |
| 35 | 20000 | 64.36 | 8 |
| 44 | 20840 | 2.36 | 8 |
| 22 | 18776 | 36.73 | 12 |
| 84 | 20000 | 37.29 | 4 |
| 57 | 20000 | 2.49 | 6 |
| 21 | 19200 | 2.26 | 10 |
| 16 | 18800 | 2.12 | 8 |
| 17 | 18672 | 4.01 | 4 |
| 7 | 16000 | 2.55 | 6 |
| 27 | 13640 | 20.86 | 12 |
| 46 | 10600 | 152.88 | 7 |
| 53 | 13860 | 59.01 | 5 |
| 64 | 12788 | 64.42 | 10 |
| 36 | 13600 | 25.51 | 8 |
| 91 | 13600 | 37.68 | 4 |
| 80 | 13840 | 6.31 | 8 |
| 24 | 12000 | 66.02 | 12 |
| 98 | 13200 | 34.99 | 8 |
| 47 | 12000 | 2.49 | 5 |
| 83 | 12000 | 3.66 | 4 |
| 96 | 11520 | 2.49 | 6 |
| 45 | 9112 | 68.04 | 8 |
| 28 | 9204 | 42.81 | 10 |
| 34 | 8300 | 69.17 | 12 |
| 60 | 8712 | 88.76 | 8 |
| 14 | 10000 | 34.3 | 8 |
| 55 | 10000 | 35.46 | 8 |
| 30 | 6000 | 129.94 | 10 |
| 70 | 5280 | 152.88 | 12 |
| 62 | 8000 | 3.51 | 12 |
| 86 | 7608 | 76.78 | 10 |
| 93 | 6408 | 103.66 | 12 |
| 72 | 3860 | 165.29 | 4 |
| 82 | 8000 | 3.66 | 10 |
| 100 | 7200 | 70.76 | 6 |
| 94 | 7560 | 69.59 | 8 |
| 40 | 6000 | 67 | 12 |
| 43 | 8000 | 2.42 | 8 |
| 81 | 6152 | 87.98 | 8 |
| 77 | 8000 | 3.66 | 6 |
| 52 | 6000 | 26.64 | 12 |
| 26 | 6000 | 65.24 | 8 |
| 88 | 6080 | 34.99 | 10 |
| 97 | 7440 | 2.12 | 8 |
| 73 | 3820 | 112.32 | 12 |
| 8 | 5652 | 41.09 | 8 |
| 39 | 5600 | 3.51 | 10 |
| 54 | 6000 | 34.99 | 8 |
| 61 | 4000 | 104.38 | 8 |
| 38 | 4400 | 72.31 | 8 |
| 71 | 4460 | 72.56 | 8 |
| 75 | 4960 | 68.11 | 6 |
| 56 | 6400 | 11.55 | 8 |
| 95 | 4200 | 74.31 | 12 |
| 78 | 4080 | 64.24 | 10 |
| 31 | 4000 | 31.02 | 10 |
| 63 | 3900 | 39.37 | 8 |
| 58 | 4000 | 48.25 | 6 |
| 37 | 4000 | 3.51 | 10 |
| 99 | 4880 | 8.51 | 4 |
| 74 | 3708 | 36.36 | 4 |
| 87 | 4000 | 2.04 | 8 |
| 67 | 4000 | 3.66 | 7 |
| 29 | 4000 | 3.66 | 6 |
| 33 | 4000 | 3.66 | 6 |

**TOPSIS:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Annual Requirement** | **Average Unit Cost (Dollars)** | **Lead Time (Weeks)** |
| **V+** | 0.151502 | 0.000003 | 0.000003 |
| **V-** | 0.004681 | 0.000216 | 0.00001 |

**TOPSIS DATA**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Annual Requirement** | **Average Unit Cost (Dollars)** | **Lead Time (Weeks)** | **S+** | **S-** | **S+ + S-** | **p** |
| 1 | 0.056131538 | 4.96E-05 | 7.58E-06 | 0.095370601 | 0.004419418 | 0.099790019 | 0.044287177 |
| 2 | 0.113121589 | 3.14E-06 | 7.58E-06 | 0.038380539 | 0.003215617 | 0.041596156 | 0.077305629 |
| 3 | 0.035603 | 0.000102832 | 3.79E-06 | 0.115899171 | 0.008753859 | 0.12465303 | 0.070225799 |
| 4 | 0.143351313 | 3.20E-05 | 3.79E-06 | 0.008150868 | 0.004620035 | 0.012770903 | 0.361762606 |
| 5 | 0.025755362 | 4.81E-05 | 7.58E-06 | 0.125746774 | 0.01113293 | 0.136879704 | 0.081333681 |
| 6 | 0.072418017 | 8.88E-05 | 2.53E-06 | 0.079084158 | 0.001587651 | 0.080671808 | 0.019680364 |
| 7 | 0.020200284 | 3.22E-06 | 3.79E-06 | 0.131301844 | 0.012560617 | 0.143862461 | 0.087309899 |
| 8 | 0.00713575 | 5.19E-05 | 5.05E-06 | 0.144366386 | 0.016161679 | 0.160528065 | 0.100678217 |
| 9 | 0.151502127 | 2.79E-06 | 5.05E-06 | 2.53E-06 | 0.004686399 | 0.004688933 | 0.999459549 |
| 10 | 0.05555078 | 0.000119977 | 6.31E-06 | 0.095951419 | 0.0045304 | 0.100481819 | 0.045086762 |
| 11 | 0.037875532 | 4.42E-05 | 3.79E-06 | 0.113626603 | 0.008232423 | 0.121859027 | 0.067556943 |
| 12 | 0.045450638 | 3.14E-06 | 5.05E-06 | 0.106051489 | 0.006569057 | 0.112620546 | 0.058329116 |
| 13 | 0.026452271 | 4.67E-05 | 5.05E-06 | 0.125049864 | 0.010958181 | 0.136008045 | 0.080570094 |
| 14 | 0.012625177 | 4.33E-05 | 5.05E-06 | 0.138876956 | 0.01460699 | 0.153483946 | 0.095169495 |
| 15 | 0.030300425 | 4.44E-05 | 5.05E-06 | 0.121201709 | 0.010010769 | 0.131212478 | 0.076294335 |
| 16 | 0.023735333 | 2.68E-06 | 5.05E-06 | 0.127766794 | 0.011644943 | 0.139411737 | 0.083529141 |
| 17 | 0.023573731 | 5.06E-06 | 2.53E-06 | 0.127928396 | 0.011686256 | 0.139614653 | 0.083703653 |
| 18 | 0.025452357 | 8.80E-05 | 3.79E-06 | 0.126049799 | 0.011209211 | 0.13725901 | 0.081664666 |
| 19 | 0.030300425 | 3.23E-05 | 2.53E-06 | 0.121201706 | 0.010010769 | 0.131212474 | 0.076294337 |
| 20 | 0.036360511 | 4.42E-05 | 3.79E-06 | 0.115141624 | 0.008578897 | 0.123720522 | 0.069340941 |
| 21 | 0.02424034 | 2.85E-06 | 6.31E-06 | 0.127261787 | 0.011516174 | 0.138777961 | 0.082982728 |
| 22 | 0.023705033 | 4.64E-05 | 7.58E-06 | 0.127797102 | 0.011652685 | 0.139449787 | 0.083561869 |
| 23 | 0.030300425 | 0.000122035 | 7.58E-06 | 0.121201761 | 0.010010768 | 0.131212529 | 0.076294303 |
| 24 | 0.015150213 | 8.34E-05 | 7.58E-06 | 0.136351939 | 0.013912107 | 0.150264045 | 0.092584401 |
| 25 | 0.077528689 | 7.43E-05 | 1.01E-05 | 0.073973474 | 0.000819643 | 0.074793117 | 0.010958804 |
| 26 | 0.007575106 | 8.24E-05 | 5.05E-06 | 0.143927043 | 0.016035027 | 0.159962071 | 0.100242684 |
| 27 | 0.017220742 | 2.63E-05 | 7.58E-06 | 0.134281388 | 0.013351823 | 0.147633211 | 0.090439157 |
| 28 | 0.011620213 | 5.40E-05 | 6.31E-06 | 0.139881924 | 0.014887102 | 0.154769026 | 0.096189157 |
| 29 | 0.005050071 | 4.62E-06 | 3.79E-06 | 0.146452057 | 0.016768181 | 0.163220238 | 0.102733469 |
| 30 | 0.007575106 | 0.000164052 | 6.31E-06 | 0.143927112 | 0.016035027 | 0.159962139 | 0.10024264 |
| 31 | 0.005050071 | 3.92E-05 | 6.31E-06 | 0.146452061 | 0.016768181 | 0.163220242 | 0.102733466 |
| 32 | 0.044440624 | 4.42E-05 | 6.31E-06 | 0.107061512 | 0.006784191 | 0.113845703 | 0.059591105 |
| 33 | 0.005050071 | 4.62E-06 | 3.79E-06 | 0.146452057 | 0.016768181 | 0.163220238 | 0.102733469 |
| 34 | 0.010478897 | 8.73E-05 | 7.58E-06 | 0.141023256 | 0.015207671 | 0.156230926 | 0.097340974 |
| 35 | 0.025250355 | 8.13E-05 | 5.05E-06 | 0.126251797 | 0.011260167 | 0.137511965 | 0.081885001 |
| 36 | 0.017170241 | 3.22E-05 | 5.05E-06 | 0.13433189 | 0.013365386 | 0.147697276 | 0.09049176 |
| 37 | 0.005050071 | 4.43E-06 | 6.31E-06 | 0.146452057 | 0.016768181 | 0.163220238 | 0.102733469 |
| 38 | 0.005555078 | 9.13E-05 | 5.05E-06 | 0.145947076 | 0.01662053 | 0.162567606 | 0.102237649 |
| 39 | 0.007070099 | 4.43E-06 | 6.31E-06 | 0.144432028 | 0.016180638 | 0.160612666 | 0.100743223 |
| 40 | 0.007575106 | 8.46E-05 | 7.58E-06 | 0.143927045 | 0.016035027 | 0.159962072 | 0.100242683 |
| 41 | 0.029542915 | 4.42E-05 | 2.53E-06 | 0.12195922 | 0.010194924 | 0.132154143 | 0.077144184 |
| 42 | 0.033229467 | 8.42E-05 | 5.05E-06 | 0.118272689 | 0.009309514 | 0.127582203 | 0.072968751 |
| 43 | 0.010100142 | 3.06E-06 | 5.05E-06 | 0.141401986 | 0.01531463 | 0.156716616 | 0.097721802 |
| 44 | 0.026310869 | 2.98E-06 | 5.05E-06 | 0.125191258 | 0.010993559 | 0.136184817 | 0.08072529 |
| 45 | 0.011504062 | 8.59E-05 | 5.05E-06 | 0.139998091 | 0.014919607 | 0.154917698 | 0.096306667 |
| 46 | 0.013382688 | 0.000193014 | 4.42E-06 | 0.138119571 | 0.014397185 | 0.152516756 | 0.094397397 |
| 47 | 0.015150213 | 3.14E-06 | 3.16E-06 | 0.136351915 | 0.013912107 | 0.150264022 | 0.092584417 |
| 48 | 0.121201702 | 2.79E-06 | 5.05E-06 | 0.030300426 | 0.003769497 | 0.034069923 | 0.110640031 |
| 49 | 0.070988847 | 7.87E-05 | 7.58E-06 | 0.080513317 | 0.001813886 | 0.082327203 | 0.022032648 |
| 50 | 0.060949306 | 4.81E-05 | 5.05E-06 | 0.090552833 | 0.003525026 | 0.094077859 | 0.037469237 |
| 51 | 0.074236042 | 4.42E-05 | 5.05E-06 | 0.077266096 | 0.00130662 | 0.078572716 | 0.016629435 |
| 52 | 0.007575106 | 3.36E-05 | 7.58E-06 | 0.143927025 | 0.016035027 | 0.159962052 | 0.100242696 |
| 53 | 0.017498496 | 7.45E-05 | 3.16E-06 | 0.134003651 | 0.013277316 | 0.147280967 | 0.090149569 |
| 54 | 0.007575106 | 4.42E-05 | 5.05E-06 | 0.143927027 | 0.016035027 | 0.159962055 | 0.100242695 |
| 55 | 0.012625177 | 4.48E-05 | 5.05E-06 | 0.138876957 | 0.01460699 | 0.153483946 | 0.095169495 |
| 56 | 0.008080113 | 1.46E-05 | 5.05E-06 | 0.143422015 | 0.015889927 | 0.159311942 | 0.099740969 |
| 57 | 0.025250355 | 3.14E-06 | 3.79E-06 | 0.126251773 | 0.011260168 | 0.13751194 | 0.081885017 |
| 58 | 0.005050071 | 6.09E-05 | 3.79E-06 | 0.146452068 | 0.016768181 | 0.163220249 | 0.102733461 |
| 59 | 0.0427236 | 8.72E-05 | 5.05E-06 | 0.10877856 | 0.007154615 | 0.115933176 | 0.061713269 |
| 60 | 0.010999054 | 0.000112061 | 5.05E-06 | 0.140503116 | 0.015061247 | 0.155564363 | 0.096816823 |
| 61 | 0.005050071 | 0.000131782 | 5.05E-06 | 0.146452114 | 0.016768181 | 0.163220295 | 0.102733432 |
| 62 | 0.010100142 | 4.43E-06 | 7.58E-06 | 0.141401986 | 0.01531463 | 0.156716616 | 0.097721802 |
| 63 | 0.004923819 | 4.97E-05 | 5.05E-06 | 0.146578316 | 0.016805174 | 0.16338349 | 0.102857233 |
| 64 | 0.016145077 | 8.13E-05 | 6.31E-06 | 0.135357074 | 0.013641827 | 0.1489989 | 0.091556558 |
| 65 | 0.04343061 | 2.68E-06 | 5.05E-06 | 0.108071518 | 0.007001372 | 0.115072889 | 0.060842931 |
| 66 | 0.026260369 | 0.000215827 | 6.31E-06 | 0.12524194 | 0.011006202 | 0.136248143 | 0.080780569 |
| 67 | 0.005050071 | 4.62E-06 | 4.42E-06 | 0.146452057 | 0.016768181 | 0.163220238 | 0.102733469 |
| 68 | 0.097986526 | 6.78E-05 | 7.58E-06 | 0.053515641 | 0.001830293 | 0.055345935 | 0.03307006 |
| 69 | 0.050500709 | 3.14E-06 | 3.79E-06 | 0.101001418 | 0.005524098 | 0.106525516 | 0.051857039 |
| 70 | 0.006666094 | 0.000193014 | 7.58E-06 | 0.144836159 | 0.016297493 | 0.161133652 | 0.101142701 |
| 71 | 0.005630829 | 9.16E-05 | 5.05E-06 | 0.145871326 | 0.016598426 | 0.162469752 | 0.102163178 |
| 72 | 0.004873318 | 0.000208682 | 2.53E-06 | 0.146628954 | 0.016819979 | 0.163448933 | 0.102906632 |
| 73 | 0.004822818 | 0.000141806 | 7.58E-06 | 0.146679376 | 0.016834791 | 0.163514166 | 0.102956159 |
| 74 | 0.004681416 | 4.59E-05 | 2.53E-06 | 0.146820718 | 0.016876289 | 0.163697007 | 0.103094669 |
| 75 | 0.006262088 | 8.60E-05 | 3.79E-06 | 0.145240064 | 0.016414675 | 0.161654739 | 0.101541566 |
| 76 | 0.047273714 | 4.42E-05 | 3.79E-06 | 0.104228422 | 0.006185921 | 0.110414343 | 0.056024614 |
| 77 | 0.010100142 | 4.62E-06 | 3.79E-06 | 0.141401986 | 0.01531463 | 0.156716616 | 0.097721802 |
| 78 | 0.005151072 | 8.11E-05 | 6.31E-06 | 0.146351076 | 0.01673861 | 0.163089686 | 0.102634388 |
| 79 | 0.093027356 | 9.42E-05 | 5.05E-06 | 0.058474843 | 0.001280476 | 0.059755319 | 0.021428654 |
| 80 | 0.017473245 | 7.97E-06 | 5.05E-06 | 0.134028882 | 0.013284083 | 0.147312965 | 0.090175924 |
| 81 | 0.007767009 | 0.000111076 | 5.05E-06 | 0.143735159 | 0.015979829 | 0.159714989 | 0.100052157 |
| 82 | 0.010100142 | 4.62E-06 | 6.31E-06 | 0.141401986 | 0.01531463 | 0.156716616 | 0.097721802 |
| 83 | 0.015150213 | 4.62E-06 | 2.53E-06 | 0.136351915 | 0.013912107 | 0.150264022 | 0.092584417 |
| 84 | 0.025250355 | 4.71E-05 | 2.53E-06 | 0.126251781 | 0.011260168 | 0.137511948 | 0.081885012 |
| 85 | 0.028785404 | 5.38E-05 | 5.05E-06 | 0.122716734 | 0.010380227 | 0.133096961 | 0.077989965 |
| 86 | 0.009605235 | 9.69E-05 | 6.31E-06 | 0.141896924 | 0.015454823 | 0.157351747 | 0.09821831 |
| 87 | 0.005050071 | 2.58E-06 | 5.05E-06 | 0.146452057 | 0.016768181 | 0.163220238 | 0.102733469 |
| 88 | 0.007676108 | 4.42E-05 | 6.31E-06 | 0.143826026 | 0.016005967 | 0.159831992 | 0.100142445 |
| 89 | 0.024871599 | 4.42E-05 | 7.58E-06 | 0.126630535 | 0.011355931 | 0.137986466 | 0.082297423 |
| 90 | 0.03848154 | 8.76E-05 | 5.05E-06 | 0.113020619 | 0.008095121 | 0.12111574 | 0.066837895 |
| 91 | 0.017170241 | 4.76E-05 | 2.53E-06 | 0.134331894 | 0.013365386 | 0.14769728 | 0.090491757 |
| 92 | 0.030451928 | 4.42E-05 | 5.05E-06 | 0.121050207 | 0.009974076 | 0.131024283 | 0.076123871 |
| 93 | 0.008090214 | 0.000130873 | 7.58E-06 | 0.143411971 | 0.01588703 | 0.159299002 | 0.099730885 |
| 94 | 0.009544634 | 8.79E-05 | 5.05E-06 | 0.141957519 | 0.015472023 | 0.157429542 | 0.098279031 |
| 95 | 0.005302574 | 9.38E-05 | 7.58E-06 | 0.146199582 | 0.016694292 | 0.162893873 | 0.102485694 |
| 96 | 0.014544204 | 3.14E-06 | 3.79E-06 | 0.136957923 | 0.014077715 | 0.151035638 | 0.093207903 |
| 97 | 0.009393132 | 2.68E-06 | 5.05E-06 | 0.142108996 | 0.015515055 | 0.157624051 | 0.098430762 |
| 98 | 0.016665234 | 4.42E-05 | 5.05E-06 | 0.1348369 | 0.013501301 | 0.148338201 | 0.09101702 |
| 99 | 0.006161087 | 1.07E-05 | 2.53E-06 | 0.145341041 | 0.016444022 | 0.161785063 | 0.101641163 |
| 100 | 0.009090128 | 8.93E-05 | 3.79E-06 | 0.142412026 | 0.015601258 | 0.158013284 | 0.098733838 |

**CLASSED DATA**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Annual Requirement** | **Average Unit Cost (Dollars)** | **Lead Time (Weeks)** | **p** | **Cumulative Sum** | **Cumulative Percentage** | **Class** |
| 9 | 120000 | 2.21 | 8 | 0.999459549 | 0.999459549 | 10.38895344 | A |
| 4 | 113544 | 25.32 | 6 | 0.361762606 | 1.361222154 | 14.1493206 | A |
| 48 | 96000 | 2.21 | 8 | 0.110640031 | 1.471862185 | 15.29937628 | A |
| 74 | 3708 | 36.36 | 4 | 0.103094669 | 1.574956854 | 16.37100116 | A |
| 73 | 3820 | 112.32 | 12 | 0.102956159 | 1.677913013 | 17.44118629 | A |
| 72 | 3860 | 165.29 | 4 | 0.102906632 | 1.780819645 | 18.5108566 | A |
| 63 | 3900 | 39.37 | 8 | 0.102857233 | 1.883676878 | 19.58001343 | A |
| 29 | 4000 | 3.66 | 6 | 0.102733469 | 1.986410347 | 20.64788379 | B |
| 33 | 4000 | 3.66 | 6 | 0.102733469 | 2.089143816 | 21.71575415 | B |
| 87 | 4000 | 2.04 | 8 | 0.102733469 | 2.191877285 | 22.7836245 | B |
| 67 | 4000 | 3.66 | 7 | 0.102733469 | 2.294610754 | 23.85149486 | B |
| 37 | 4000 | 3.51 | 10 | 0.102733469 | 2.397344223 | 24.91936522 | B |
| 31 | 4000 | 31.02 | 10 | 0.102733466 | 2.500077688 | 25.98723554 | B |
| 58 | 4000 | 48.25 | 6 | 0.102733461 | 2.60281115 | 27.05510582 | B |
| 61 | 4000 | 104.38 | 8 | 0.102733432 | 2.705544582 | 28.12297579 | B |
| 78 | 4080 | 64.24 | 10 | 0.102634388 | 2.808178969 | 29.18981624 | B |
| 95 | 4200 | 74.31 | 12 | 0.102485694 | 2.910664663 | 30.25511109 | B |
| 38 | 4400 | 72.31 | 8 | 0.102237649 | 3.012902312 | 31.31782761 | B |
| 71 | 4460 | 72.56 | 8 | 0.102163178 | 3.11506549 | 32.37977004 | B |
| 99 | 4880 | 8.51 | 4 | 0.101641163 | 3.216706653 | 33.43628634 | B |
| 75 | 4960 | 68.11 | 6 | 0.101541566 | 3.318248219 | 34.49176738 | B |
| 70 | 5280 | 152.88 | 12 | 0.101142701 | 3.41939092 | 35.54310239 | B |
| 39 | 5600 | 3.51 | 10 | 0.100743223 | 3.520134144 | 36.590285 | B |
| 8 | 5652 | 41.09 | 8 | 0.100678217 | 3.620812361 | 37.6367919 | B |
| 52 | 6000 | 26.64 | 12 | 0.100242696 | 3.721055057 | 38.67877174 | B |
| 54 | 6000 | 34.99 | 8 | 0.100242695 | 3.821297752 | 39.72075157 | B |
| 26 | 6000 | 65.24 | 8 | 0.100242684 | 3.921540436 | 40.76273128 | B |
| 40 | 6000 | 67 | 12 | 0.100242683 | 4.02178312 | 41.80471099 | B |
| 30 | 6000 | 129.94 | 10 | 0.10024264 | 4.122025759 | 42.84669025 | B |
| 88 | 6080 | 34.99 | 10 | 0.100142445 | 4.222168205 | 43.88762803 | B |
| 81 | 6152 | 87.98 | 8 | 0.100052157 | 4.322220362 | 44.9276273 | B |
| 56 | 6400 | 11.55 | 8 | 0.099740969 | 4.42196133 | 45.9643919 | B |
| 93 | 6408 | 103.66 | 12 | 0.099730885 | 4.521692215 | 47.00105168 | B |
| 100 | 7200 | 70.76 | 6 | 0.098733838 | 4.620426054 | 48.0273476 | B |
| 97 | 7440 | 2.12 | 8 | 0.098430762 | 4.718856815 | 49.05049316 | B |
| 94 | 7560 | 69.59 | 8 | 0.098279031 | 4.817135846 | 50.07206154 | C |
| 86 | 7608 | 76.78 | 10 | 0.09821831 | 4.915354156 | 51.09299876 | C |
| 77 | 8000 | 3.66 | 6 | 0.097721802 | 5.013075958 | 52.10877499 | C |
| 43 | 8000 | 2.42 | 8 | 0.097721802 | 5.11079776 | 53.12455121 | C |
| 82 | 8000 | 3.66 | 10 | 0.097721802 | 5.208519561 | 54.14032744 | C |
| 62 | 8000 | 3.51 | 12 | 0.097721802 | 5.306241363 | 55.15610366 | C |
| 34 | 8300 | 69.17 | 12 | 0.097340974 | 5.403582337 | 56.16792135 | C |
| 60 | 8712 | 88.76 | 8 | 0.096816823 | 5.500399161 | 57.17429071 | C |
| 45 | 9112 | 68.04 | 8 | 0.096306667 | 5.596705828 | 58.17535722 | C |
| 28 | 9204 | 42.81 | 10 | 0.096189157 | 5.692894985 | 59.17520227 | C |
| 14 | 10000 | 34.3 | 8 | 0.095169495 | 5.78806448 | 60.16444836 | C |
| 55 | 10000 | 35.46 | 8 | 0.095169495 | 5.883233975 | 61.15369445 | C |
| 46 | 10600 | 152.88 | 7 | 0.094397397 | 5.977631371 | 62.13491491 | C |
| 96 | 11520 | 2.49 | 6 | 0.093207903 | 6.070839275 | 63.10377109 | C |
| 47 | 12000 | 2.49 | 5 | 0.092584417 | 6.163423692 | 64.06614641 | C |
| 83 | 12000 | 3.66 | 4 | 0.092584417 | 6.256008108 | 65.02852172 | C |
| 24 | 12000 | 66.02 | 12 | 0.092584401 | 6.34859251 | 65.99089687 | C |
| 64 | 12788 | 64.42 | 10 | 0.091556558 | 6.440149068 | 66.94258804 | C |
| 98 | 13200 | 34.99 | 8 | 0.09101702 | 6.531166089 | 67.88867094 | C |
| 36 | 13600 | 25.51 | 8 | 0.09049176 | 6.621657849 | 68.82929398 | C |
| 91 | 13600 | 37.68 | 4 | 0.090491757 | 6.712149606 | 69.769917 | C |
| 27 | 13640 | 20.86 | 12 | 0.090439157 | 6.802588763 | 70.70999325 | C |
| 80 | 13840 | 6.31 | 8 | 0.090175924 | 6.892764687 | 71.64733331 | C |
| 53 | 13860 | 59.01 | 5 | 0.090149569 | 6.982914256 | 72.58439943 | C |
| 7 | 16000 | 2.55 | 6 | 0.087309899 | 7.070224155 | 73.49194839 | C |
| 17 | 18672 | 4.01 | 4 | 0.083703653 | 7.153927807 | 74.36201197 | C |
| 22 | 18776 | 36.73 | 12 | 0.083561869 | 7.237489677 | 75.23060177 | C |
| 16 | 18800 | 2.12 | 8 | 0.083529141 | 7.321018818 | 76.09885137 | C |
| 21 | 19200 | 2.26 | 10 | 0.082982728 | 7.404001545 | 76.96142124 | C |
| 89 | 19700 | 34.99 | 12 | 0.082297423 | 7.486298969 | 77.81686767 | C |
| 57 | 20000 | 2.49 | 6 | 0.081885017 | 7.568183985 | 78.6680273 | C |
| 84 | 20000 | 37.29 | 4 | 0.081885012 | 7.650068997 | 79.51918689 | C |
| 35 | 20000 | 64.36 | 8 | 0.081885001 | 7.731953999 | 80.37034637 | C |
| 18 | 20160 | 69.69 | 6 | 0.081664666 | 7.813618665 | 81.21921555 | C |
| 5 | 20400 | 38.1 | 12 | 0.081333681 | 7.894952345 | 82.06464429 | C |
| 66 | 20800 | 170.95 | 10 | 0.080780569 | 7.975732914 | 82.90432366 | C |
| 44 | 20840 | 2.36 | 8 | 0.08072529 | 8.056458204 | 83.74342843 | C |
| 13 | 20952 | 36.95 | 8 | 0.080570094 | 8.137028298 | 84.58092002 | C |
| 85 | 22800 | 42.62 | 8 | 0.077989965 | 8.215018263 | 85.39159225 | C |
| 2 | 89600 | 2.49 | 12 | 0.077305629 | 8.292323892 | 86.19515112 | C |
| 41 | 23400 | 34.99 | 4 | 0.077144184 | 8.369468076 | 86.99703184 | C |
| 19 | 24000 | 25.56 | 4 | 0.076294337 | 8.445762413 | 87.79007876 | C |
| 15 | 24000 | 35.17 | 8 | 0.076294335 | 8.522056748 | 88.58312565 | C |
| 23 | 24000 | 96.66 | 12 | 0.076294303 | 8.598351051 | 89.37617222 | C |
| 92 | 24120 | 34.99 | 8 | 0.076123871 | 8.674474922 | 90.16744722 | C |
| 42 | 26320 | 66.69 | 8 | 0.072968751 | 8.747443674 | 90.9259261 | C |
| 3 | 28200 | 81.45 | 6 | 0.070225799 | 8.817669473 | 91.65589317 | C |
| 20 | 28800 | 34.99 | 6 | 0.069340941 | 8.887010414 | 92.37666252 | C |
| 11 | 30000 | 34.99 | 6 | 0.067556943 | 8.954567357 | 93.07888797 | C |
| 90 | 30480 | 69.36 | 8 | 0.066837895 | 9.021405252 | 93.77363923 | C |
| 59 | 33840 | 69.04 | 8 | 0.061713269 | 9.083118521 | 94.4151222 | C |
| 65 | 34400 | 2.12 | 8 | 0.060842931 | 9.143961452 | 95.04755838 | C |
| 32 | 35200 | 34.99 | 10 | 0.059591105 | 9.203552557 | 95.66698236 | C |
| 12 | 36000 | 2.49 | 8 | 0.058329116 | 9.261881673 | 96.27328851 | C |
| 76 | 37444 | 34.99 | 6 | 0.056024614 | 9.317906287 | 96.85564035 | C |
| 69 | 40000 | 2.49 | 6 | 0.051857039 | 9.369763325 | 97.39467203 | C |
| 10 | 44000 | 95.03 | 10 | 0.045086762 | 9.414850087 | 97.86332958 | C |
| 1 | 44460 | 39.25 | 12 | 0.044287177 | 9.459137264 | 98.3236758 | C |
| 50 | 48276 | 38.1 | 8 | 0.037469237 | 9.496606501 | 98.71315245 | C |
| 68 | 77612 | 53.67 | 12 | 0.03307006 | 9.529676561 | 99.05690154 | C |
| 49 | 56228 | 62.34 | 12 | 0.022032648 | 9.551709209 | 99.28592147 | C |
| 79 | 73684 | 74.59 | 8 | 0.021428654 | 9.573137862 | 99.50866313 | C |
| 6 | 57360 | 70.32 | 4 | 0.019680364 | 9.592818226 | 99.71323208 | C |
| 51 | 58800 | 34.99 | 8 | 0.016629435 | 9.609447662 | 99.88608793 | C |
| 25 | 61408 | 58.87 | 16 | 0.010958804 | 9.620406466 | 100 | C |

**Classes**: A - 7, B - 28 & C - 65 (for Original Dataset of 100 rows)

For KNN: neighbor = 3, p = 1, this is equivalent to using Manhattan Distance (l1)

For SVC: “poly” Kernel is used.

Training Data: 70%

|  |  |  |
| --- | --- | --- |
| Model | Training Accuracy | Testing Accuracy |
| KNN | 99.7% | 98% |
| SVC | 73.4% | 68.6% |

After Random Over Sampling

Dataset Row: 1000, Class: A-200, B-300, C-500

Training Data: 80%

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Training Accuracy | Testing Accuracy | Cross Validation (K=10) |
| KNN | 100% | 100% | 100% |
| SVC | 69.1% | 72% | 68.7% |