**Results for the IOKR algorithm changing the values of the three parameters. Each column is the average of the 5 subsets for crossvalidation with those values. The best scores are highlighted.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.01  0.01  0.001 | 0.01  0.01  0.003 | 0.01  0.01  0.01 | 0.01  0.01  0.03 | 0.01  0.01  0.1 | 0.01  0.01  0.3 | 0.01  0.01  1 | 0.01  0.01  3 |
| Number 1 | 32.20 | 31.03 | 33.85 | 31.91 | 32.4 | 26.87 | 20.27 | 11.06 |
| Number 2 | 4.76 | 5.24 | 5.72 | 6.11 | 4.56 | 6.21 | 5.72 | 5.24 |
| Number 3 | 3.5 | 4.07 | 2.52 | 4.27 | 3.39 | 4.46 | 2.91 | 2.42 |
| Top 3 | 40.45 | 40.35 | 42.10 | 42.28 | 40.35 | 37.54 | 28.90 | 18.72 |
| Top 5 | 46.07 | 45.20 | 47.43 | 47.33 | 45.98 | 42.58 | 35.11 | 22.99 |
| Top 10 | 55.19 | 54.61 | 55.77 | 55.09 | 55.58 | 51.02 | 45.00 | 32.30 |
| Top 25 | 69.35 | 70.32 | 71.77 | 66.90 | 71.20 | 68.19 | 60.04 | 49.51 |

**The value of lambda 0.01 gives the best outputs so now we’ll change the value of the gammas. First, let’s try changing both of them at the same time.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.001  0.001  0.01 | 0.003  0.003  0.01 | 0.01  0.01  0.01 | 0.03  0.03  0.01 | 0.1  0.1  0.01 | 0.3  0.3  0.01 | 1  1  0.01 | 3  3  0.01 | 10  10  0.01 |
| Number 1 | 31.33 | 30.74 | 33.85 | 31.23 | 31.43 | 31.72 | 30.65 | 33.66 | 51.12 |
| Number 2 | 6.01 | 6.50 | 5.72 | 4.17 | 4.07 | 4.36 | 4.07 | 3.68 | 2.62 |
| Number 3 | 3.49 | 4.66 | 2.52 | 2.91 | 2.71 | 3.2 | 2.42 | 2.13 | 2.13 |
| Top 3 | 40.83 | 41.90 | 42.10 | 38.31 | 38.21 | 39.28 | 37.15 | 39.47 | 55.87 |
| Top 5 | 45.78 | 47.24 | 47.43 | 43.26 | 42.96 | 42.19 | 40.55 | 43.35 | 58.39 |
| Top 10 | 55.00 | 56.36 | 55.77 | 51.41 | 48.59 | 48.69 | 45.30 | 48.40 | 63.92 |
| Top 25 | 70.03 | 69.16 | 71.77 | 64.99 | 59.75 | 60.33 | 58.30 | 59.65 | 72.47 |

**Although the violet column has better scores, it is just because the similarity scores the algorithm gives us are really low so, in some cases, every vector gets 0.0 and the correct one appears in the first position. The one with the gammas at 3, it has a high score for the top 1 but the output s of the algorithm are quite close to 0. Also, the other metrics (top3, top5…) are better for 0.01. Now, let’s try to change the gammas individually.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.001  0.01  0.01 | 0.003  0.01  0.01 | 0.01  0.01  0.01 | 0.03  0.01  0.01 | 0.1  0.01  0.01 | 0.3  0.01  0.01 | 1  0.01  0.01 | 3  0.01  0.01 |
| Number 1 | 31.62 | 33.75 | 33.85 | 29.68 | 28.23 | 29.87 | 31.04 | 31.23 |
| Number 2 | 5.82 | 6.40 | 5.72 | 4.08 | 3.20 | 5.82 | 3.79 | 4.17 |
| Number 3 | 3.98 | 3.88 | 2.52 | 3.2 | 3.00 | 3.01 | 3.30 | 2.33 |
| Top 3 | 41.42 | 44.03 | 42.10 | 36.95 | 34.43 | 38.70 | 38.12 | 37.73 |
| Top 5 | 47.72 | 48.69 | 47.43 | 41.42 | 38.02 | 41.70 | 41.99 | 41.42 |
| Top 10 | 56.64 | 57.80 | 55.77 | 50.53 | 44.23 | 47.62 | 48.01 | 47.33 |
| Top 25 | 71.89 | 78.64 | 71.77 | 65.18 | 57.03 | 58.58 | 58.19 | 57.33 |

**In the gamma X=3, there is some 0.0 scores sometimes again. Therefore, we shouldn’t use a bigger lambda X, otherwise the frequency of columns with all 0 will increase. Gamma X = 0.003 was chosen.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.003  0.001  0.01 | 0.003  0.003  0.01 | 0.003  0.01  0.01 | 0.003  0.03  0.01 | 0.003  0.1  0.01 | 0.003  0.3  0.01 | 0.003  1  0.01 | 0.003  3  0.01 |
| Number 1 | 31.62 | 31.24 | 33.75 | 33.17 | 36.27 | 33.85 | 28.42 | 27.74 |
| Number 2 | 5.62 | 6.30 | 6.40 | 6.50 | 5.34 | 4.85 | 1.84 | 1.1 |
| Number 3 | 4.17 | 3.59 | 3.88 | 3.10 | 3.78 | 2.81 | 1.65 | 0.58 |
| Top 3 | 41.42 | 41.13 | 44.03 | 42.77 | 45.39 | 41.51 | 31.91 | 29.39 |
| Top 5 | 48.01 | 45.2 | 48.69 | 46.85 | 49.86 | 46.17 | 34.24 | 29.68 |
| Top 10 | 57.71 | 55.09 | 57.80 | 56.26 | 57.71 | 51.60 | 37.05 | 30.45 |
| Top 25 | 71.39 | 70.32 | 78.64 | 68.96 | 72.16 | 62.76 | 42.97 | 34.14 |

**USING THE SAME ORDER FOR SEVERAL CONFIGURATIONS THAT HAD MORE THAN 32% IN TOP1**

**FIRST EXPERIMENT:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.01  0.01  0.001 | 0.01  0.01  0.01 | 0.01  0.01  0.1 | | 0.003  0.01  0.01 | 0.003  0.03  0.01 | 0.003  0.1  0.01 | 0.003  0.3  0.01 | 3  3  0.01 |
| Number 1 | 31.33 | 31.72 | 30.16 | 31.72 | | 33.08 | 35.01 | 34.14 | 32.50 |
| Top 3 | 40.64 | 41.32 | 40.54 | 41.42 | | 43.07 | 43.94 | 41.03 | 38.61 |
| Top 5 | 46.07 | 47.23 | 46.85 | 48.50 | | 49.08 | 49.95 | 45.2 | 42.00 |
| Top 10 | 54.03 | 55.77 | 55.09 | 56.84 | | 57.13 | 58.78 | 51.40 | 48.59 |
| Top 25 | 68.28 | 69.74 | 70.03 | 72.36 | | 72.70 | 72.94 | 63.53 | 58.20 |

**Same combination of parameters that had already given us the highest result before.**

**SECOND EXPERIMENT:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.01  0.01  0.001 | 0.01  0.01  0.01 | 0.01  0.01  0.1 | 0.003  0.01  0.01 | 0.003  0.03  0.01 | 0.003  0.1  0.01 | 0.003  0.3  0.01 | 3  3  0.01 |
| Number 1 | 31.33 | 31.81 | 31.03 | 31.52 | 32.98 | 35.31 | 34.24 | 32.39 |
| Top 3 | 40.83 | 41.13 | 40.06 | 41.71 | 42.78 | 44.23 | 40.16 | 39.67 |
| Top 5 | 45.40 | 46.56 | 45.59 | 47.53 | 48.50 | 48.79 | 44.72 | 43.07 |
| Top 10 | 53.93 | 54.71 | 54.51 | 55.49 | 56.94 | 57.62 | 51.51 | 48.01 |
| Top 25 | 68.48 | 70.75 | 70.32 | 71.39 | 72.21 | 72.58 | 62.67 | 58.39 |

**The order from the best parameters to the worst is the same than in the first experiment.**

**THIRD EXPERIMENT:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.01  0.01  0.001 | 0.01  0.01  0.01 | 0.01  0.01  0.1 | 0.003  0.01  0.01 | 0.003  0.03  0.01 | 0.003  0.1  0.01 | 0.003  0.3  0.01 | 3  3  0.01 |
| Number 1 | 32.59 | 33.17 | 32.20 | 32.88 | 34.24 | 36.28 | 34.34 | 32.40 |
| Top 3 | 40.93 | 41.81 | 40.45 | 43.36 | 44.13 | 45.30 | 40.84 | 39.77 |
| Top 5 | 46.36 | 47.24 | 45.59 | 48.11 | 49.08 | 49.57 | 45.78 | 43.36 |
| Top 10 | 55.38 | 55.29 | 54.22 | 56.07 | 56.06 | 56.94 | 51.99 | 48.69 |
| Top 25 | 67.12 | 67.9 | 69.36 | 69.35 | 69.93 | 70.71 | 62.37 | 59.07 |

**Finally, let’s put the average of the three experiments:**

**AVERAGE:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ϒ x  ϒ y  λ | 0.01  0.01  0.001 | 0.01  0.01  0.01 | 0.01  0.01  0.1 | 0.003  0.01  0.01 | 0.003  0.03  0.01 | 0.003  0.1  0.01 | 0.003  0.3  0.01 | 3  3  0.01 |
| Number 1 | 31.75 | 32.23 | 31.13 | 32.04 | 33.43 | 35.53 | 34.24 | 32.43 |
| Top 3 | 40.8 | 41.42 | 40.35 | 42.16 | 43.33 | 44.49 | 40.68 | 39.35 |
| Top 5 | 45.94 | 47.01 | 46.01 | 48.05 | 48.89 | 49.44 | 45.23 | 42.81 |
| Top 10 | 54.45 | 55.26 | 54.61 | 56.13 | 56.71 | 57.78 | 51.63 | 48.43 |
| Top 25 | 67.96 | 69.46 | 69.90 | 71.03 | 71.61 | 72.08 | 62.86 | 58.55 |

**Gamma X = 0.003, Gamma Y = 0.1 and Lambda = 0.01**