PCA Exercise 02

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2.1.2 results

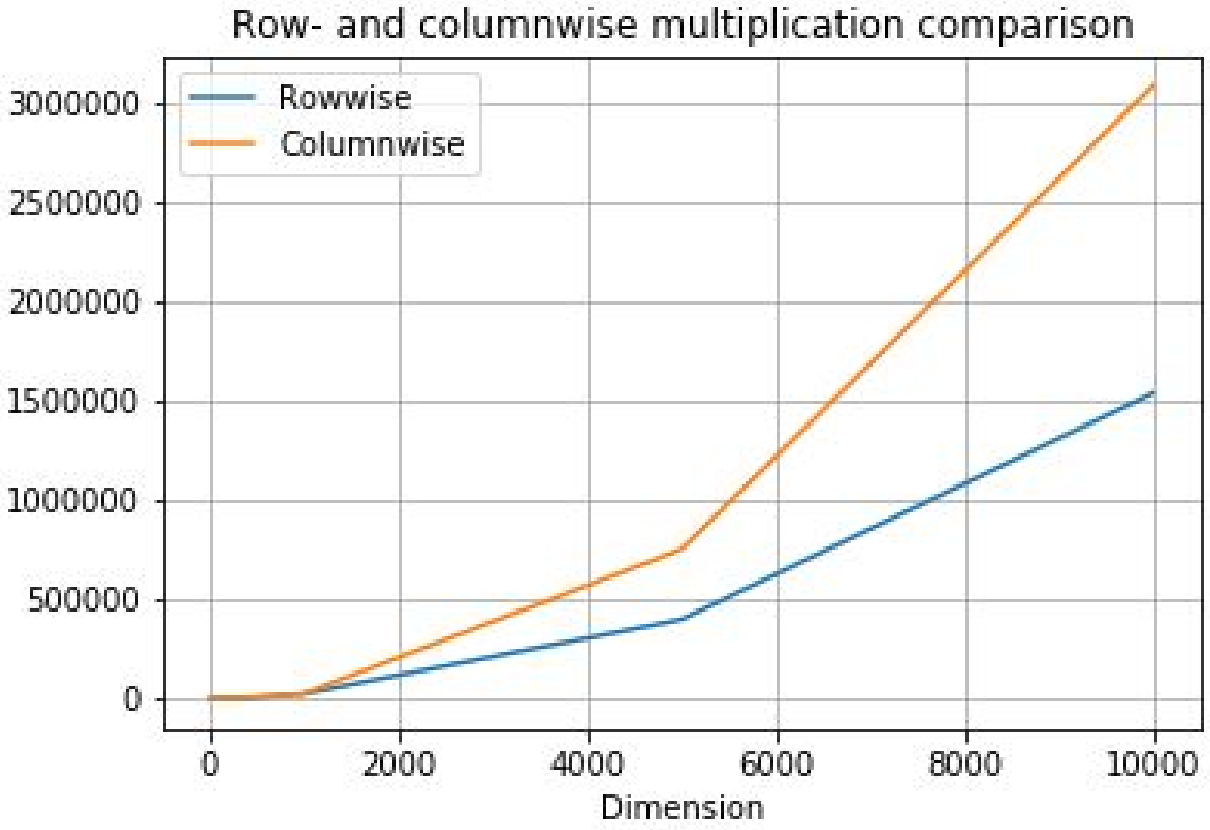
a)

M x N	t_row (microseconds)	t_col (microseconds	Ratio
10 x 10	3	3	1
100 x 100	264	271	1,0265
500 x 500	6863	7417	1,0807
1000 x 1000	24822	24957	1,0054
5000 x 5000	398357	751883	1,8874
10000 x 10000	1539988	3088557	2,0055

b)

The differences in the time measurements can be explained by looking at the amount of memory accesses for both used methods. The columnwise multiplication needs more accesses, because in every inner iteration step only a partial sum of the result is generated, meaning the index of the result array has to be accessed at a later point in time again. This is not the case for the rowwise multiplication, because in every inner loop iteration the whole sum of the according index is generated.

c)


Row- and columnwise multiplication comparison
Rowwise
Columnwise
3000000
2500000
2000000
1500000
1000000
500000
0
0
2000
4000
6000
8000
10000
Dimension