

BostonHousingDataset

```
the_10_rates = [0.0001, 0.0002, 0.0003, 0.0005, 0.0007, 0.0009, 0.0014, 0.0004,  
0.003, 0.0023]  
num_iters = 5000
```

Run#: 1

```
The seed for random thetas initializing: 10  
Thetas initial vector: [0.77132064 0.02075195 0.63364823 0.74880388 0.49850701  
0.22479665  
0.19806286 0.76053071 0.16911084 0.08833981 0.68535982 0.95339335  
0.00394827]  
COST: 107.28176446292309  
Thetas [[ 9.33412805 -0.81659376 1.19185599 -0.34079183 0.89896671 -0.62510494  
2.26335552 -0.04211155 0.26452391 -0.62497737 -0.37399696 -0.57561354  
0.74972602]]  
Last 10 costs [107.44886559 107.43028353 107.41170529 107.39313087 107.37456026  
107.35599347 107.3374305 107.31887134 107.300316 107.28176446]
```

Run#: 2

```
The seed for random thetas initializing: 3  
Thetas initial vector: [0.5507979 0.70814782 0.29090474 0.51082761 0.89294695  
0.89629309  
0.12558531 0.20724288 0.0514672 0.44080984 0.02987621 0.45683322  
0.64914405]  
COST: 49.327778742686576  
Thetas [[14.44688609 -0.47126827 0.8473072 -0.60846225 1.15832805 -0.15114572  
3.15519125 -0.59263836 -0.27999966 -0.07455344 -0.96216269 -1.31007771  
1.22622578]]  
Last 10 costs [49.45228452 49.43842858 49.42457813 49.41073317 49.39689371  
49.38305975  
49.36923127 49.35540827 49.34159077 49.32777874]
```

Run#: 3

```
The seed for random thetas initializing: 10  
Thetas initial vector: [0.77132064 0.02075195 0.63364823 0.74880388 0.49850701  
0.22479665  
0.19806286 0.76053071 0.16911084 0.08833981 0.68535982 0.95339335  
0.00394827]  
COST: 27.25764003010179  
Thetas [[17.67825515 -0.92789662 0.95550792 -0.50048521 1.07460825 -0.73677648  
3.79128115 -0.23293403 -0.68588427 -0.22592972 -0.43592802 -1.40182239  
0.98313322]]  
Last 10 costs [27.32628712 27.31864172 27.3110008 27.30336438 27.29573245  
27.288105  
27.28048204 27.27286356 27.26524956 27.25764003]
```

Run#: 4

```
The seed for random thetas initializing: 10  
Thetas initial vector: [0.77132064 0.02075195 0.63364823 0.74880388 0.49850701  
0.22479665  
0.19806286 0.76053071 0.16911084 0.08833981 0.68535982 0.95339335  
0.00394827]  
COST: 16.04715874927959  
Thetas [[20.74763126 -0.96646253 0.78096084 -0.55627665 1.0242883 -0.93346239  
4.33432491 -0.48039149 -1.26668111 0.12267813 -0.43826466 -1.67797864
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1.10436079]]
Last 10 costs [16.06415058 16.06225568 16.06036251 16.05847107 16.05658137
16.05469339
16.05280714 16.05092262 16.04903982 16.04715875]
=====
Run#: 5
The seed for random thetas initializing: 1
Thetas initial vector: [4.17022005e-01 7.20324493e-01 1.14374817e-04 3.02332573e-
01
1.46755891e-01 9.23385948e-02 1.86260211e-01 3.45560727e-01
3.96767474e-01 5.38816734e-01 4.19194514e-01 6.85219500e-01
2.04452250e-01]
COST: 14.236401808946379
Thetas [[21.86578549 -0.9315265 0.47648061 -0.63217537 0.9502319 -1.09846027
4.50952114 -0.78348794 -1.56605938 0.62144789 -0.63271897 -1.92022397
1.21902827]]
Last 10 costs [14.24081714 14.24032451 14.23983239 14.23934078 14.23884968
14.23835909
14.23786901 14.23737943 14.23689037 14.23640181]
=====
Run#: 6
The seed for random thetas initializing: 7
Thetas initial vector: [0.07630829 0.77991879 0.43840923 0.72346518 0.97798951
0.53849587
0.50112046 0.07205113 0.26843898 0.4998825 0.67923 0.80373904
0.38094113]
COST: 13.88073114539927
Thetas [[22.28384213 -0.98216804 0.54666653 -0.57045924 0.92707347 -1.14796782
4.60164486 -1.03760342 -1.90501241 0.65709266 -0.63364211 -1.8857371
1.25551884]]
Last 10 costs [13.88255178 13.88234886 13.88214609 13.88194349 13.88174104
13.88153875
13.88133661 13.88113463 13.88093281 13.88073115]
=====
Run#: 7
The seed for random thetas initializing: 5
Thetas initial vector: [0.22199317 0.87073231 0.20671916 0.91861091 0.48841119
0.61174386
0.76590786 0.51841799 0.2968005 0.18772123 0.08074127 0.7384403
0.44130922]
COST: 13.589544277861156
Thetas [[22.51256103 -1.09521017 0.5836538 -0.47651252 0.87465602 -1.52703222
4.57117253 -1.18304259 -2.34738036 1.10468326 -0.89656792 -1.9924817
1.26449166]]
Last 10 costs [13.59045241 13.59035131 13.59025026 13.59014925 13.5900483
13.5899474
13.58984654 13.58974574 13.58964498 13.58954428]
=====
Run#: 8
The seed for random thetas initializing: 6
Thetas initial vector: [0.89286015 0.33197981 0.82122912 0.04169663 0.10765668
0.59505206
0.52981736 0.41880743 0.33540785 0.62251943 0.43814143 0.73588211
0.51803641]
COST: 19.039589085461962
Thetas [[19.60532962 -0.88810203 0.81355842 -0.81629076 0.9830735 -0.46692237
4.1452432 -0.46744611 -0.99537291 0.28995463 -0.67400618 -1.58178344

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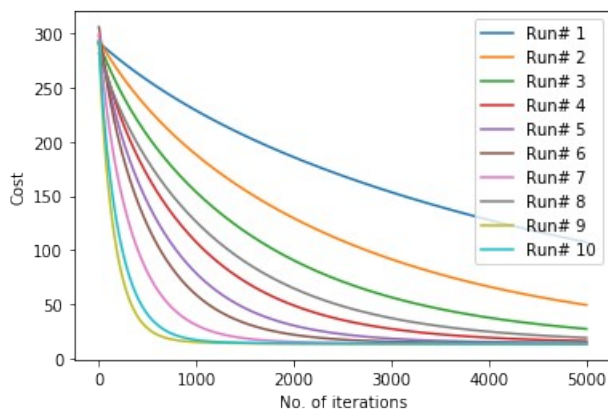
1.21340548]]
Last 10 costs [19.07360387 19.06981283 19.06602471 19.06223949 19.05845718
19.05467776
19.05090125 19.04712764 19.04335691 19.03958909]
=====
Run#: 9
The seed for random thetas initializing: 0
Thetas initial vector: [0.5488135 0.71518937 0.60276338 0.54488318 0.4236548
0.64589411
0.43758721 0.891773 0.96366276 0.38344152 0.79172504 0.52889492
0.56804456]
COST: 13.387204615939218
Thetas [[22.53279975 -1.27386107 0.73790411 -0.46926525 0.85654856 -2.11685477
4.39328858 -1.30915127 -3.0495431 1.63613616 -1.136052 -2.13757945
1.2456713 ]]
Last 10 costs [13.38746283 13.38743407 13.38740532 13.3873766 13.38734789
13.3873192
13.38729053 13.38726187 13.38723323 13.38720462]
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Run#: 10
The seed for random thetas initializing: 2
Thetas initial vector: [0.4359949 0.02592623 0.54966248 0.43532239 0.4203678
0.33033482
0.20464863 0.61927097 0.29965467 0.26682728 0.62113383 0.52914209
0.13457995]
COST: 13.425539589181186
Thetas [[22.53258543 -1.23938752 0.68916164 -0.53060776 0.86553918 -1.99428934
4.43057381 -1.28923235 -2.91991644 1.43545628 -0.95976934 -2.1092659
1.24862089]]
Last 10 costs [13.42590599 13.42586519 13.42582441 13.42578365 13.42574292
13.42570221
13.42566152 13.42562085 13.42558021 13.42553959]
=====

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the_10_rates = [0.0001, 0.0002, 0.0003, 0.0005, 0.0007, 0.0009]

num_iters = 50000

Run#: 1

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The seed for random thetas initializing: 0
Thetas initial vector: [0.5488135 0.71518937 0.60276338 0.54488318 0.4236548
0.64589411

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0.43758721 0.891773 0.96366276 0.38344152 0.79172504 0.52889492
0.56804456]
COST: 13.887691288666094
Thetas [[22.38471638 -1.01154396 0.48701937 -0.5967987 0.90795864 -1.22015987
4.6166861 -0.89168369 -1.78729096 0.70127599 -0.56775265 -1.94776495
1.2682769 ]]
Last 10 costs [13.88786569 13.8878463 13.88782692 13.88780754 13.88778817
13.88776879
13.88774941 13.88773004 13.88771066 13.88769129]
=====
Run#: 2
The seed for random thetas initializing: 2
Thetas initial vector: [0.4359949 0.02592623 0.54966248 0.43532239 0.4203678
0.33033482
0.20464863 0.61927097 0.29965467 0.26682728 0.62113383 0.52914209
0.13457995]
COST: 13.457677060709875
Thetas [[22.53180413 -1.21402998 0.6550375 -0.55693359 0.87032266 -1.89999214
4.45900944 -1.2626524 -2.80364462 1.31940785 -0.87180091 -2.08899837
1.2511829 ]]
Last 10 costs [13.45772352 13.45771835 13.45771319 13.45770803 13.45770287
13.4576977
13.45769254 13.45768738 13.45768222 13.45767706]
=====
Run#: 3
The seed for random thetas initializing: 0
Thetas initial vector: [0.5488135 0.71518937 0.60276338 0.54488318 0.4236548
0.64589411
0.43758721 0.891773 0.96366276 0.38344152 0.79172504 0.52889492
0.56804456]
COST: 13.387224878296182
Thetas [[22.53279961 -1.27383088 0.73786046 -0.46926982 0.85655095 -2.11673998
4.39332468 -1.30911367 -3.04938277 1.63604627 -1.13600478 -2.13755935
1.24567649]]
Last 10 costs [13.38725065 13.38724778 13.38724492 13.38724205 13.38723919
13.38723633
13.38723347 13.3872306 13.38722774 13.38722488]
=====
Run#: 4
The seed for random thetas initializing: 8
Thetas initial vector: [0.8734294 0.96854066 0.86919454 0.53085569 0.23272833
0.0113988
0.43046882 0.40235136 0.52267467 0.4783918 0.55535647 0.54338602
0.76089558]
COST: 13.341207015080558
Thetas [[22.53280632 -1.33898893 0.84808201 -0.33711853 0.83673163 -2.3122131
4.32630508 -1.30913863 -3.24681738 2.06553652 -1.55313824 -2.17441888
1.23990585]]
Last 10 costs [13.34121384 13.34121308 13.34121233 13.34121157 13.34121081
13.34121005
13.34120929 13.34120853 13.34120777 13.34120702]
=====
Run#: 5
The seed for random thetas initializing: 7
Thetas initial vector: [0.07630829 0.77991879 0.43840923 0.72346518 0.97798951
0.53849587
0.50112046 0.07205113 0.26843898 0.4998825 0.67923 0.80373904

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0.38094113]
COST: 13.333127562157623
Thetas [[22.53280632 -1.35705072  0.87788236 -0.27353644  0.82768583 -2.34946679
 4.31067171 -1.30163988 -3.27041897  2.23941596 -1.7403903  -2.18432595
 1.24027815]]
Last 10 costs [13.33313035 13.33313004 13.33312973 13.33312942 13.33312911
13.3331288
13.33312849 13.33312818 13.33312787 13.33312756]
=====

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Run#: 6
The seed for random thetas initializing: 7
Thetas initial vector: [0.07630829 0.77991879 0.43840923 0.72346518 0.97798951
0.53849587
0.50112046 0.07205113 0.26843898 0.4998825  0.67923    0.80373904
0.38094113]
COST: 13.330633840933626
Thetas [[22.53280632 -1.36560164  0.89159124 -0.23490893  0.82229519 -2.3621507
 4.30414536 -1.29673724 -3.27278127  2.33865328 -1.85097854 -2.18910555
 1.24109034]]
Last 10 costs [13.33063484 13.33063473 13.33063462 13.33063451 13.3306344
13.33063428
13.33063417 13.33063406 13.33063395 13.33063384]
=====

```

