Software Engineering of Web Applications
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Bayesian Curve Fitting

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1 Project Description

In this project, we need to implement the formula for Bayesian curve fitting and use this project to predict the price of the stock market. Also, we need to compare the predicted price with the actual price of the stock market.

There are some parameters such as alpha, beta, the number of input values N, and the order of the fitting curve M. In the project and the following evaluation, I assume alpha is 0.005, beta is 11.1, N is 10, and M is 5. Also, I use stock prices of 10 different companies as the 10 different datasets.

2 Results

I use 10 companies as follows: FB, YHOO, GPS, JPM, AMZN, WMT, AAPL, BAC, PGR, EBAY. For each company, I predict the price of date 2/22/2017.

Here are the results for 10 different input datasets:

```
Enter how many days before the predict date you want to use as inputs(1-10):
10
-------------------------Result1-------------------------
inputs are:
131.84
134.2
134.14
134.19
134.05
133.85
133.44
133.84
133.53
133.72
predict date: 2/22/17
actual price: 136.31
predict price: 135.81488213348348
absolute error: 0.495117866516523
relative error: 0.0036322930563900155

-------------------------Result2-------------------------
inputs are:
44.37
45.07
45.08
45.03
45.46
45.02
45.65
45.16
45.1
45.5
predict date: 2/22/17
actual price: 45.98
predict price: 47.9337397899646
absolute error: 1.953739789964601
relative error: 0.04249107851162682
```

```
-------------------------Result3-------------------------
inputs are:
812.5
819.71
821.36
827.46
836.53
836.39
842.7
844.14
845.07
856.44
predict date: 2/22/17
actual price: 855.61
predict price: 896.0860184786317
absolute error: 40.47601847863166
relative error: 0.047306621566638604

-------------------------Result4-------------------------
inputs are:
22.74
23.31
23.97
24.36
23.63
24.2
24.39
24.06
24.47
25.03
predict date: 2/22/17
actual price: 24.87
predict price: 26.24585105357328
absolute error: 1.3758510535732782
relative error: 0.055321715061249624
```

```
-------------------------Result5-------------------------
inputs are:
86.72
85.96
87.2
87.0
88.15
89.56
90.59
90.53
90.23
91.01
predict date: 2/22/17
actual price: 91.06
predict price: 95.17372860362411
absolute error: 4.113728603624111
relative error: 0.045176022442610486

-------------------------Result6-------------------------
inputs are:
66.89
67.81
69.08
68.02
67.77
68.66
68.69
68.87
69.37
71.45
predict date: 2/22/17
actual price: 71.71
predict price: 77.10035265298102
absolute error: 5.390352652981022
relative error: 0.07516877217934768
```

```
-------------------------Result7-------------------------
inputs are:
131.53
132.04
132.42
132.12
133.29
135.02
135.51
135.35
135.72
136.7
predict date: 2/22/17
actual price: 137.11
predict price: 143.66989711472777
absolute error: 6.559897114727761
relative error: 0.04784404576418759

-------------------------Result8-------------------------
inputs are:
22.9
22.67
23.12
23.08
23.4
24.06
24.58
24.58
24.52
24.78
predict date: 2/22/17
actual price: 24.79
predict price: 26.127267070758716
absolute error: 1.3372670707587169
relative error: 0.05394381084141658
```

```
-------------------------Result9-------------------------
inputs are:
37.04
36.97
37.32
37.66
37.6
37.45
38.39
38.61
38.57
38.93
predict date: 2/22/17
actual price: 38.84
predict price: 38.68681098662601
absolute error: 0.15318901337399637
relative error: 0.003944104360813501

------------------------Result10-------------------------
inputs are:
32.43
33.25
33.12
33.63
33.79
33.63
34.01
33.54
33.76
33.92
predict date: 2/22/17
actual price: 33.82
predict price: 35.487815638895334
absolute error: 1.667815638895334
relative error: 0.04931447779110982
```

3   Evaluation

Finally, I compute the absolute mean error and average relative error to evaluate the performance.
The result is as follows:

```
-------------------------Evaluation-------------------------
absolute mean error: 6.3522977283047
average relative error: 0.04350590869327239
```

Since both absolute mean error and average relative error are small, it seems that the performance is good
based on the condition I assume in this project.