Report

AI Assignment # 2

Submitted by:

Muhammad Tanzeel Saleem

Submitted to:

Dr. Ayyaz Hussain

Reg. No:

04071913026

Class:

BSCS-7th Sem

Problem Statement:

To predict the presidential election, we have to look after that what is the population, density of votes, the ratio of females, percentage of poverty, crime index, and many more of a country. So, some of these features are given in our dataset. On the basis of them, I'll predict whether Bill Clinton will win or not.

Data Set:

This dataset contains county-level demographics and whether or not Bill Clinton won each county during the 1992 U.S presidential election. The goal for this dataset is to successfully predict if Bill Clinton won a county using the demographic variable.

Processing:

- Due to larger values in the dataset, I performed normalization of data between 1 and 0.

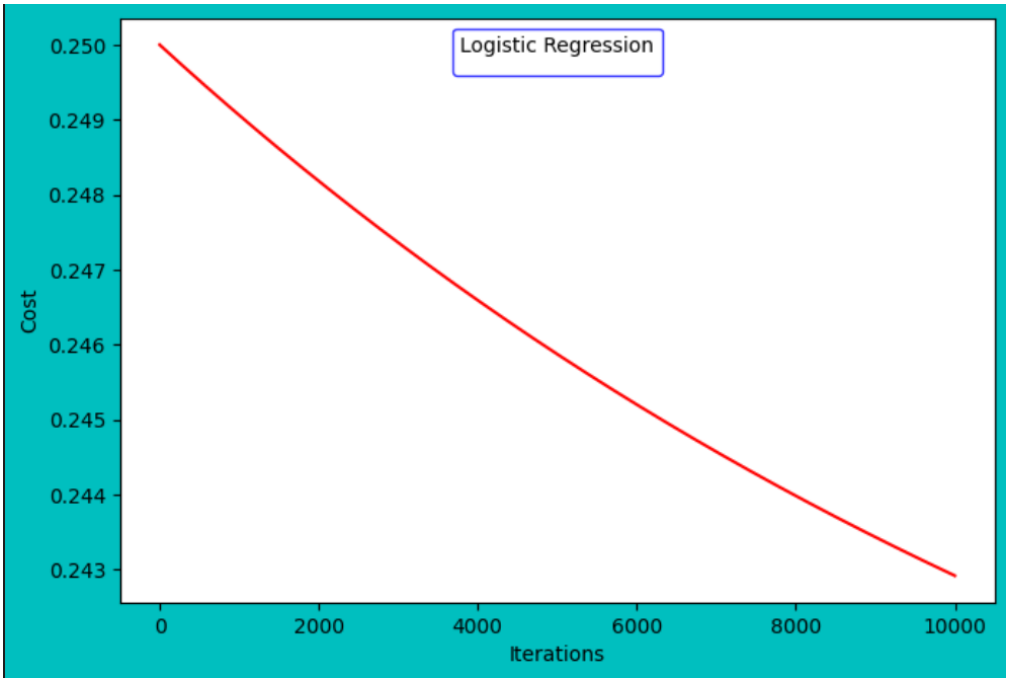
Results:

❖ Part-1

➢ By initializing weight(w) with zero, the cost I obtained is:

```
Cost 0.2429173857754035
```

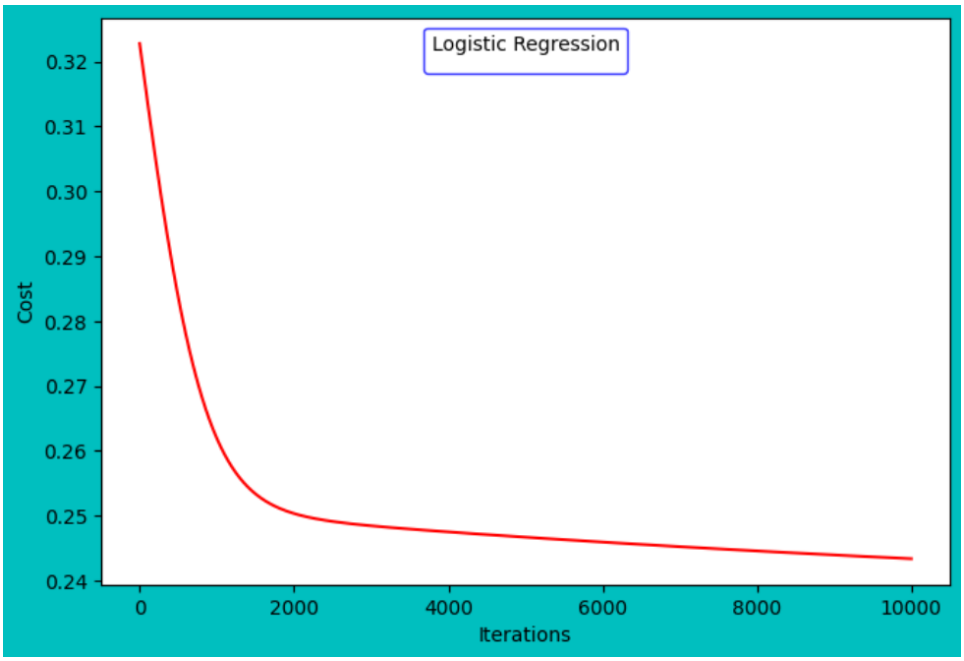
Here is the graph of loss on 10000 iterations:



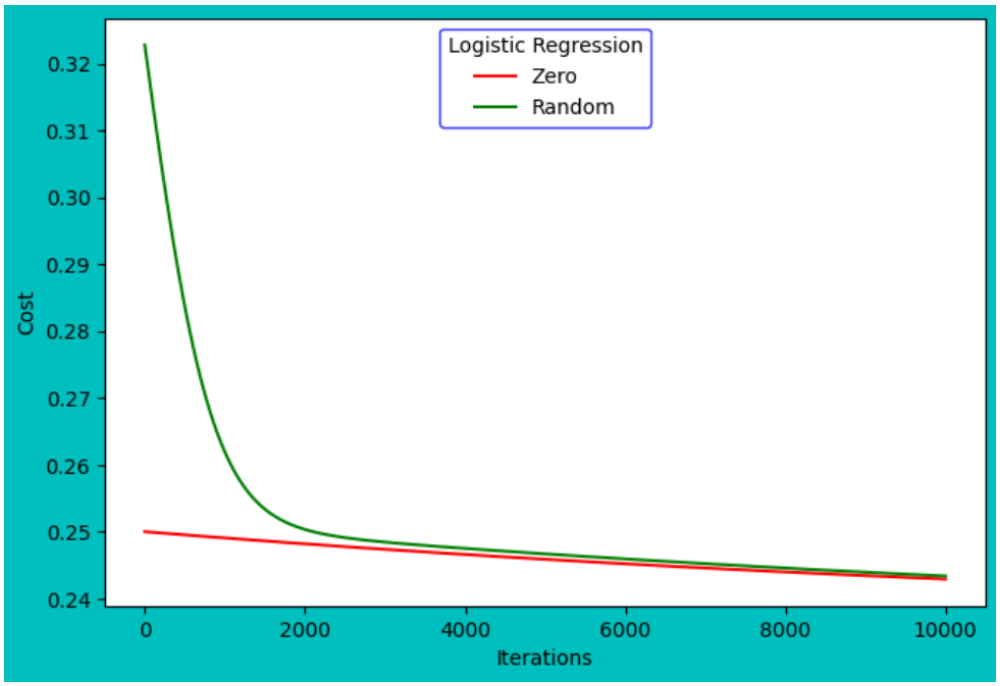
- By initializing weight(w) with random values, the cost I obtained is:

```
Cost 0.24336967116849167
```

Here is the graph of loss on 10000 iterations:



Here is the combined graph of loss initializing (w=0 & w=random) on 10000 iterations:



Here are the costs on different learning rates:

- Cost on learning rate 0.1

```
Cost 0.24292113057494258
```

- Cost on learning rate 0.05

```
Cost 0.24587560920336118
```

- Cost on learning rate 0.01

```
Cost 0.24906137946197976
```

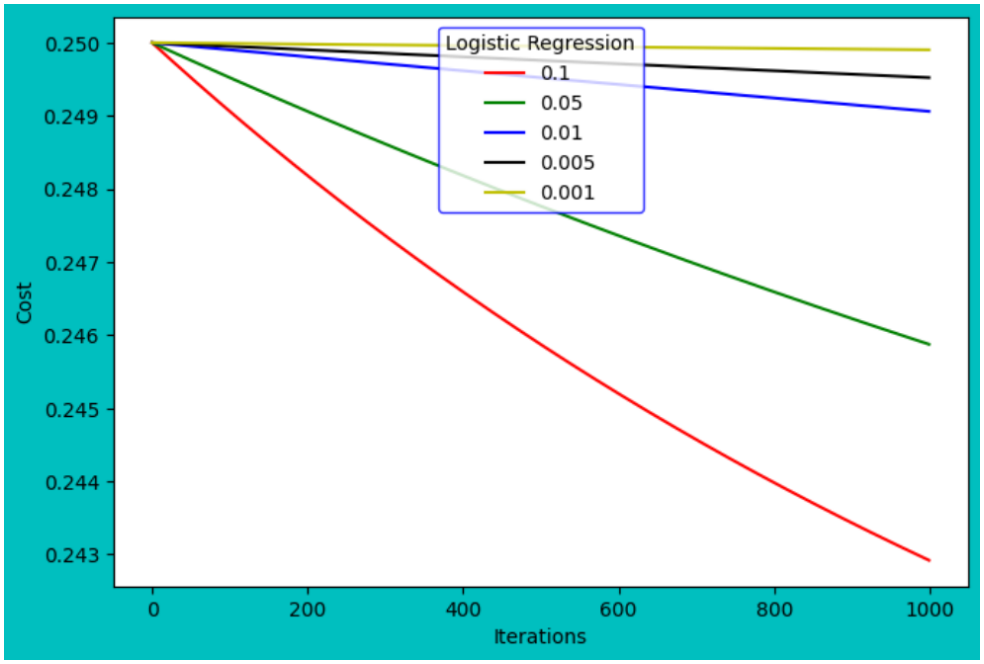
- Cost on learning rate 0.005

```
Cost 0.24952246760408742
```

- Cost on learning rate 0.001

```
Cost 0.24990306863749118
```

Here is the graph of losses at different learning rates such as 0.1, 0.05, 0.01, 0.005, 0.001



The accuracy rate of this algorithm using the given data set is:

Accuracy Rate: `0.5548654244306418`

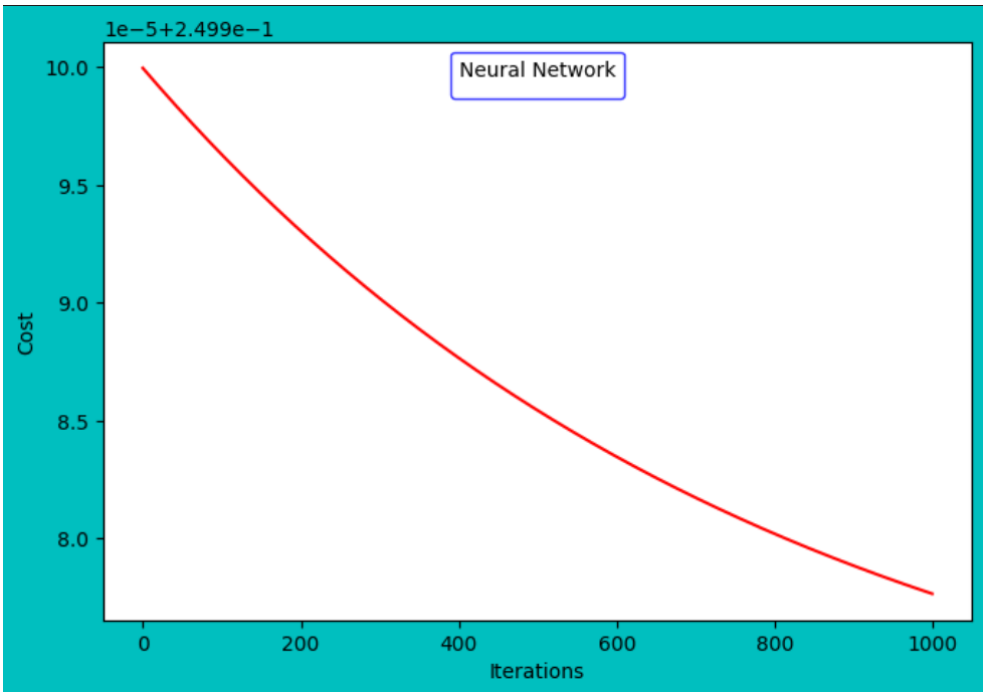
The accuracy is minimum due to noise in the data.

❖ Part-2

- By initializing weight(w) with zero, the loss I obtained is:

`Loss = 0.24997765476429587`

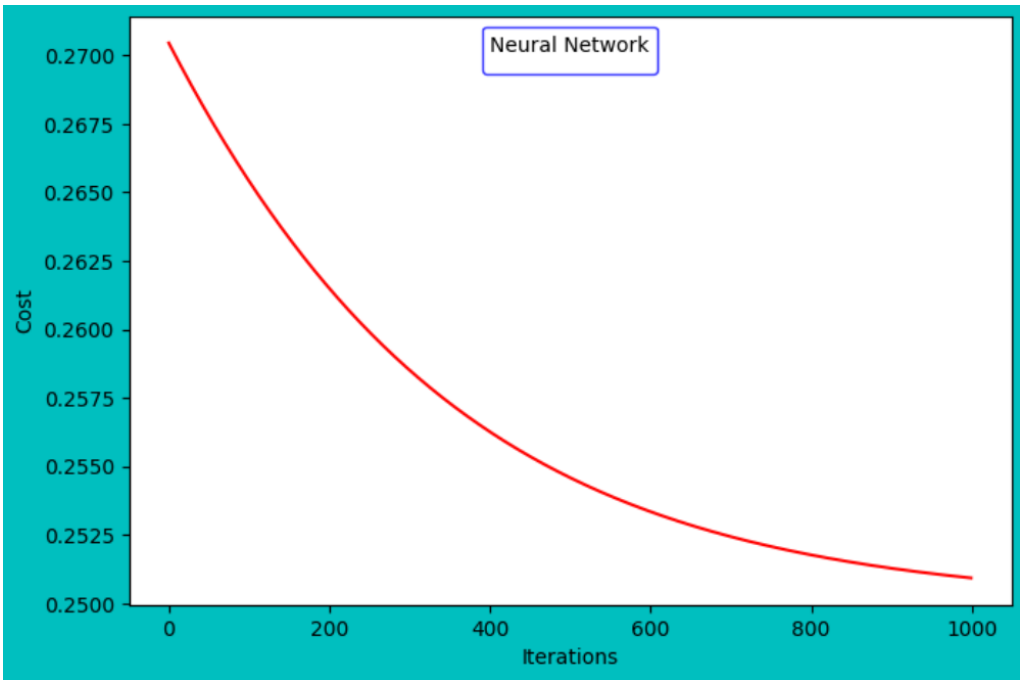
Here is the graph of loss on 1000 iterations:



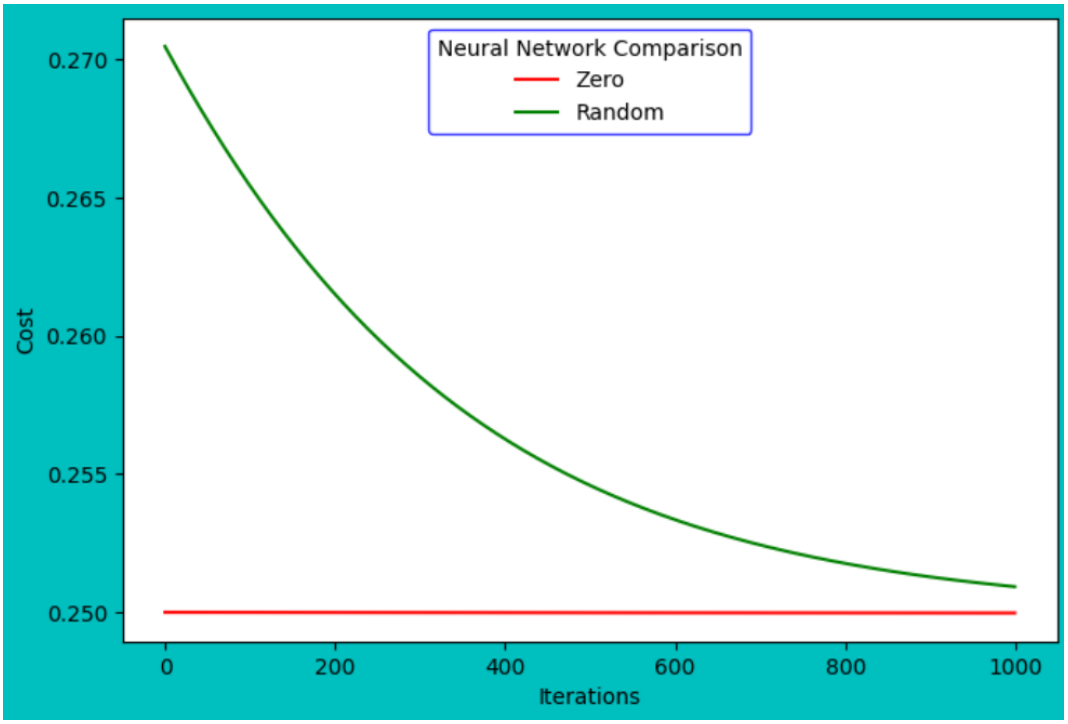
- By initializing weight(w) with random values, the loss I obtained is:

`Loss = 0.25092830991023557`

Here is the graph of loss on 1000 iterations:



Here is the combined graph of loss initializing (w=0 & w=random) on 10000 iterations:



Here are the costs on different learning rates:

- Cost on learning rate 0.1

```
Loss = 0.2499703563380667
```

- Cost on learning rate 0.05

```
Loss = 0.24996273929814214
```

- Cost on learning rate 0.01

```
Loss = 0.24996109908194447
```

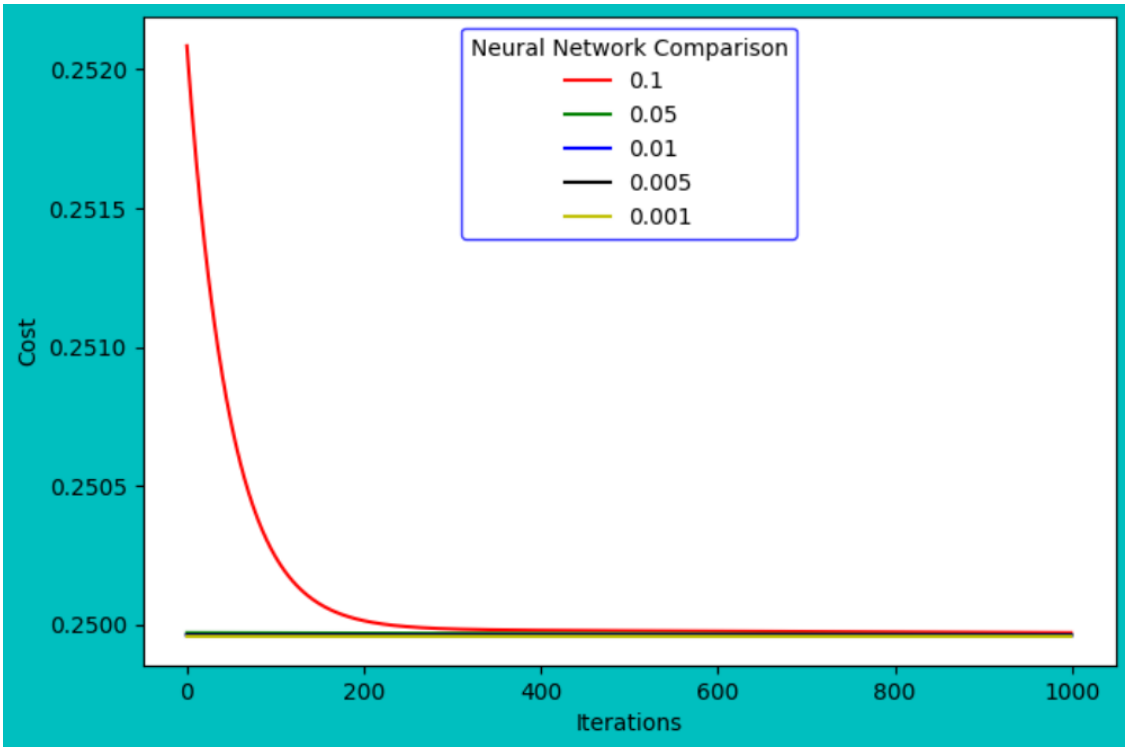
- Cost on learning rate 0.005

```
Loss = 0.24996026165476606
```

- Cost on learning rate 0.001

```
Loss = 0.24996009272787958
```

Here is the graph of losses at different learning rates such as 0.1, 0.05, 0.01, 0.005, 0.001



The accuracy rate of this algorithm using the given data set is:

Accuracy Rate: `0.453416149068323`

The accuracy is minimum due to noise in the data.

❖ Part-3

Following are the accuracy rates that we obtained from L-One Norm, L-two Norm, and L-Infinity Norm.

```
Accuracy from L-One Norm: 0.474120082815735

Accuracy from L-two Norm: 0.5113871635610766

Accuracy from L-infinity Norm: 0.5548654244306418
```

By using this dataset L-Infinity Norm is giving a good accuracy as compared to L-One and L-Two Norm. The accuracy is minimum due to noise in data.