

Homework Numero tres

30-Nov-20 3:22 PM

1A)

Error for Linear Regression Heuristic: 0.9703261250168194

1B)

Error for Polynomial Regression Heuristic: 0.7451404030586916

1C)

Error for Linear Regression Heuristic: 0.9703261250168194

Error for Linear Regression AdaGrad: 1.1911100188228987

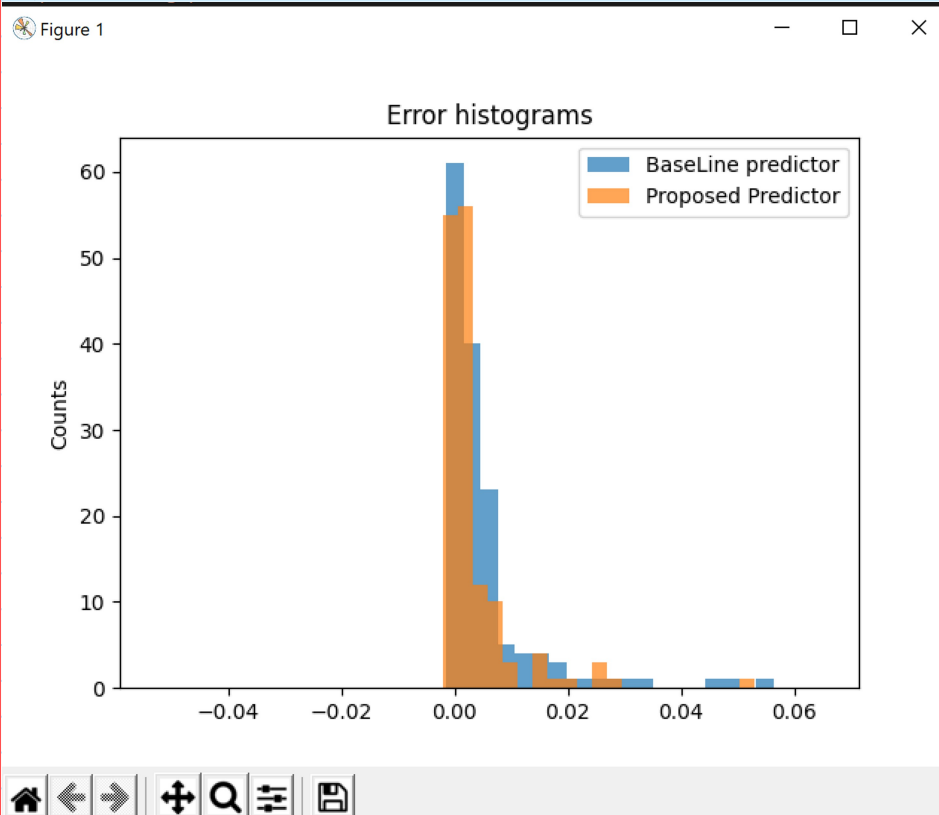
Error for Polynomial Regression Heuristic: 0.7451404030586916

Error for Polynomial Regression AdaGrad: 0.7401387287010563

2a) Let the null hypothesis $H_0 \Rightarrow \mu_1 = \mu_2$

Let the alternative hypothesis $H_1 \Rightarrow \mu_1 > \mu_2$

2b)



Conditions of using a t-test: differences in errors follows a students t-distribution, Which is satisfied if the paired samples are normally distributed.

As we can see from the histogram the errors are normally distributed hence one of the conditions is met. It is centered around zero and is very concentrated around zero.

Also variances aren't similar, there is a 50 times ish difference. So the conditions needed for a t test are not met.

```
The mean of the baseline(Linear) is: 0.006104255798607034
The mean of the learner(Polynomial) is: 0.0046444917764537335
The var of the baseline(linear) is: 0.0001411106457754321
The var of the learner(polynomial) is: 6.412267929175438e-05
The std of the baseline(linear) is: 0.011879000201003118
The std of the learner(polynomial) is: 0.008007663784884727
```

As we can see from those statements there is a large difference in variance (Baseline is linear regression and learner is polynomial regression)

C)

```
The p-value for Polynomial Regression AdaGrad: 0.9999999442604177.
The null Hypothesis is not rejected with threshold p-value = 0.05 !
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Our p value is close to one hence we could not reject the null hypothesis with significance level 0.05 or even 0.01.

Question 3A and 3B

```
Running learner = Logistic Regression on parameters {'epochs': 200, 'batch_size': 128}
Error for Logistic Regression: 23.0
Running learner = Polynomial Logistic Regression on parameters {'epochs': 200, 'batch_size': 128}
Error for Polynomial Logistic Regression: 21.740000000000001
PS C:\Users\karim\Documents\School\Fall 2020\CMPUT 296\Homework 3\3barebones>
```

As we can see polynomial logistic regression has a slightly smaller error than Logistic regression