Stroke Prediction Dataset:

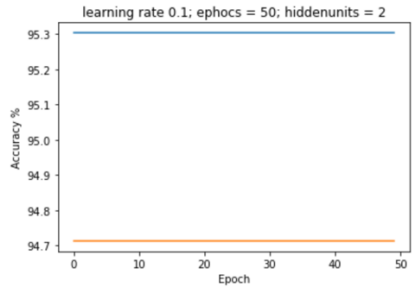
We took a stroke prediction dataset with stroke attribute as 1 for the patient who had stroke and 0 if they did not have stroke.
Based on the total count of 5109 cases from given dataset we designed a multi-layer perceptron (MLP) with two layers: 1 input layer and 1 hidden layer. Input layer has 17 input units and hidden layer has 2-4 units. Output layer has 2 units.
Some of the features such as age, bmi, and avg_gulcose_level was normalized to value between 0 and 1 using min-max feature scaling.

To make the prediction for stroke from the given dataset, we generated a training set and test set that has 80% and 20% of data picked randomly. We then performed a prediction on test dataset for stroke and no stroke result. Since the objective is about predicting stroke, our focus is to check for true prediction of stroke data

We have tested this model for different learning parameter and different hidden units.

<table>
<tr><td colspan="2">Total DataSet = 5109</td></tr>
<tr><td colspan="2">TrainingSet= 70% of total dataset = 3577; TestSet = 30% of total dataset = 1532</td></tr>
<tr><td>Case I: with hidden units 2</td><td>Case II: with hidden units 4</td></tr>
<tr><td>

```
Confusion matrix for test set of 1532 data labels, (Hidden units = 2)
[[1451    0]
 [  81    0]]
```



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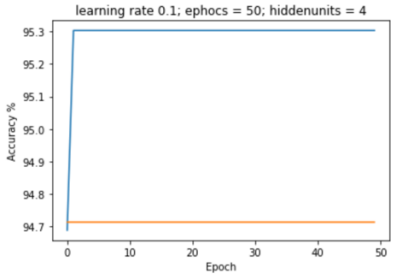
```
Confusion matrix for test set of 1532 data labels, (Hidden units = 4)
[[1451    0]
 [  81    0]]
```



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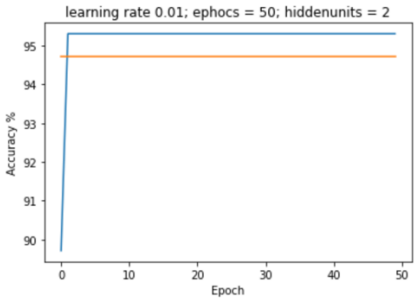

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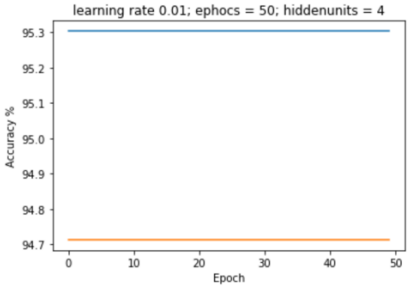

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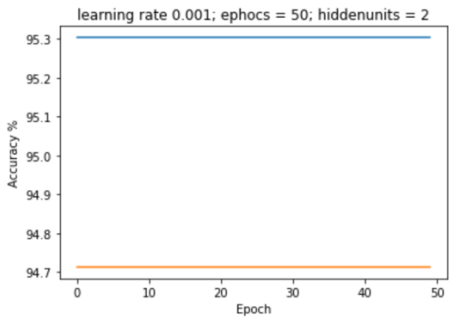


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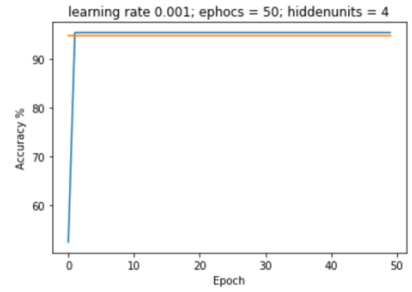

Accuracy Metrics:

	Stroke	No Stroke	Recall
Stroke	0	81	0
No Stroke	0	1451	100%
Precision	0%	94.71%	
Accuracy	94.71%		

From the above result we can conclude that the model is approximately 95% accurate and predicts no stroke case more precisely than the stroke case. Since this is a small dataset, we can see data learning within 1-2 epochs and then it converges for learning rate 0.1 and 4 hidden units, learning rate 0.01 and 2 hidden units. Thus, we can view the learning rate and hidden neuron units plays a significant role while training a data.

To conclude from the above testing, we believe MLP modelling did not give correct prediction of stroke case from the given small dataset. We want to predict the true stroke case, and it is not showing successful result from the training with the given amount of data.

Although the overall accuracy of the model is approximately 95%, the precision for the stroke test is 0 and this does not fit our purpose. So, we would like to explore other model such as Naïve Bayes and K-means which is suitable for smaller dataset and perform the prediction modeling.

Further work can be done such as adding momentum and weight decay parameter and check if that will make our model better. For now, we are keeping this for future expansion and plan to compare with other models such as Naïve Bayes and K-Means for our project.