Predicting Customer Churn using ANN and SVM

The Techniques which I have used is:-

ANN and SVM

Step 1: Loading of the data.

Step 2 :-> To check the missing values

Step 3: - Unfactoring the variables for data imputation

Step 4: Rows selection for training data set in the ratio of 70:30 here prob=0.7

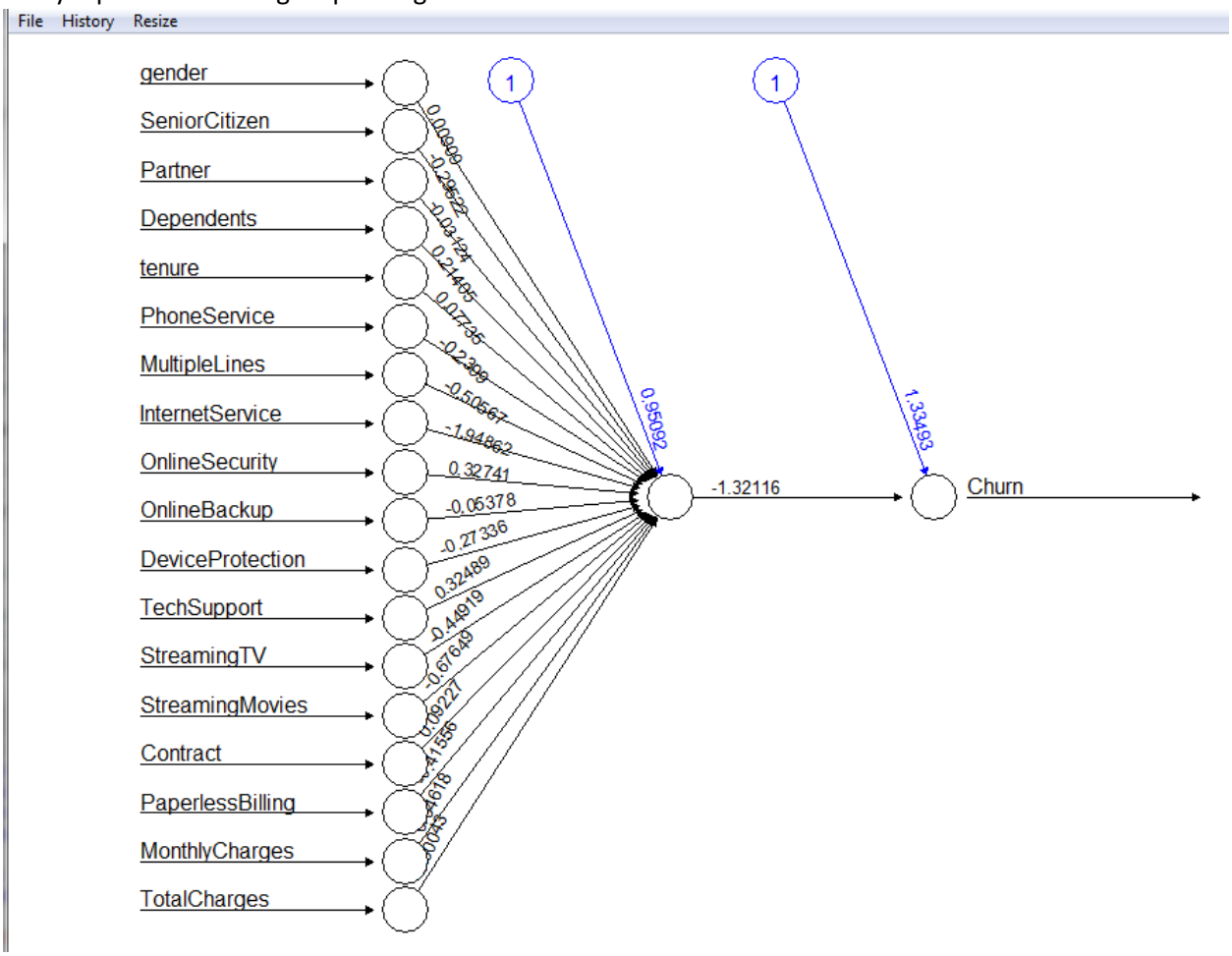
Step 5: Implementing Artificial Neural Network Model

Below we can visualize the network topology using the plot ()

Here, there are 19 Inputs and 1 hidden layer and the output is the Churn.

Here 1 stands for the layer constants/Intercepts. If there is no constants then output would be an average.

Every Input has the weights per stage.



concrete_model$net.result[[1]] ## here number are between 0 and 1 which are outcomes of the **logistics function**

```
D:/AMRIT/PGCBAMD/courses/M
3     0.323159053051
4     0.022903939770
5     0.714019987032
6     0.822590336928
9     0.491984235381
```

Above output shows that **for customer 6 , ANN will predict 82 % of the time correctly**.

OutputvsPred = cbind(my_training_data$Churn,nn1)

```
D:/AMRIT/PGCBAMD/course
681      1     1
683      0     0
684      0     0
685      0     1
687      0     0
688      1     0
```

Here in reality customer 685 did not left the service but Model predicted as left.

STEP 6 : Checking the output classifier

ANN Confusion Matrix:

```
> table(actual,prediction)
      prediction
actual    0    1
     0 1405  147
     1  295  266
>
```

Checking the Specificity/Accuracy/Sensitivity of the ANN Model:-

```
D:/AMRIT/PGCBAMD/courses/ML/assignment2/
> #sensitivity=TP/TP+FN
> sensitivity(conf_matrix)
[1] 0.8318465656
> specificity(conf_matrix)
[1] 0.6440972222
> #We can use the confusion matrix to obtain the accuracy and error rate. Since
> #the accuracy is (TP + TN) / (TP + TN + FP + FN)
> Accuracy <-(1865+371)/(1865+371+377+205)
> Accuracy    ## 64 % is the accuracy
[1] 0.7934705465
>
```

STEP 6 and 6.1: - SVM Model Development:-

Step 7:- Improving THE ACCURACY using as SVM Radial. Implemented SVM Radial

Step 8: Performed the Accuracy check of the using SVM Radial

Below is the performance of SVM Radial:-

```
telecom_predictions    0    1
                   0 1426  327
                   1  126  234
> specificity(conf_matrix1)
[1] 0.4171122995
> sensitivity(conf_matrix1)
[1] 0.918814433
> Accuracy = (1899+333)/(1899+333+171+415)
> Accuracy
[1] 0.7920511001
>
```

Step 8

Sensitivity analysis for both the models:

SVM Performed better and faster.

Result:

I have used Neural network and SVM to predict the data.

As I can be seen the Accuracy for SVM is 79% and that for ANN I got 79% too

Moreover the sensitivity analysis is comparatively better for SVM this denotes that SVM model in this case can predict accurately at least with 80% accuracy. Therefore we can take the SVM model to be the final model which is better in this scenario.