Project 2: Binary Classification on 'Customer_Churn'using Keras

Problem Statement:

You are the Data Scientist at a telecom company "Leo" whose customers are churning out to its competitors. You have to analyse the data of your company and find insights and stop your customers from churning out to other telecom companies.

Customer_churn Dataset:

The details regarding this 'customer_churn' dataset are present in the data dictionary:

customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines	InternetService	...	DeviceProtection
7590-VHVEG	Female	0	Yes	No	1	No	No phone service	DSL	...	No
5575-GNVDE	Male	0	No	No	34	Yes	No	DSL	...	Yes
3668-QPYBK	Male	0	No	No	2	Yes	No	DSL	...	No
7795-CFOCW	Male	0	No	No	45	No	No phone service	DSL	...	Yes
9237-HQITU	Female	0	No	No	2	Yes	No	Fiber optic	...	No

Domain –Telecom

Domain Context –

Customer churn, in simple terms means that the customer has stopped doing business with the company and this is a common problem when it comes to telecom industries. To avoid this, companies use predictive analysis to gauge the factors responsible for a customer to leave the company. These churn prediction models help in finding out the customer base that are most likely to churn out.

Lab Environment: Jupyter Notebook

Tasks to be done:

A) Data Manipulation:
   a. Find the total number of male customers
   b. Find the total number of customers whose Internet Service is 'DSL'
   c. Extract all the Female senior citizens whose Payment Method is Mailed check & store the result in 'new_customer'
   d. Extract all those customers whose tenure is less than 10 months or their Total charges is less than 500$ & store the result in 'new_customer'

B) Data Visualization:
   a. Build a pie-chart to show the distribution of customers would be churning out
   b. Build a bar-plot to show the distribution of 'Internet Service'

C) Model Building:
   a. Build a sequential model using Keras, to find out if the customerwouldchurn or not, using 'tenure' as the feature and 'Churn' as the dependent/target column:
      i. The visible/input layer should have 12 nodes with 'Relu' as activation function.
      ii. This model would have 1 hidden layer with 8 nodes and 'Relu' as activation function
      iii. Use 'Adam' as the optimization algorithm
      iv. Fit the model on the train set, with number of epochs to be 150
      v. Predict the values on the test set and build a confusion matrix
      vi. Plot the 'Accuracy vs Epochs' graph

   b. Build the 2nd model using same target and feature variables:
      i. Add a drop-out layer after the input layer with drop-out value of 0.3
      ii. Add a drop-out layer after the hidden layer with drop-out value of 0.2
      iii. Predict the values on the test set and build a confusion matrix
      iv. Plot the 'Accuracy vs Epochs' graph

   c. Build the 3rd model using 'Tenure', 'Monthly Charges' & 'Total Charges' as the features and 'Churn' as the dependent/target column:
      i. The visible/input layer should have 12 nodes with 'Relu' as activation function.
      ii. This model would have 1 hidden layer with 8 nodes and 'Relu' as activation function
      iii. Use 'Adam' as the optimization algorithm
      iv. Fit the model on the train set, with number of epochs to be 150
      v. Predict the values on the test set and build a confusion matrix
      vi. Plot the 'Accuracy vs Epochs' graph