Intelligent Customer Retention

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Introduction

Customer churn is often referred to as customer attrition, or customer defection which is the rate at which the customers are lost. Customer churn is a major problem and one of the most important concerns for large companies. Due to the direct effect on the revenues of the companies, especially in the telecom field, companies are seeking to develop means to predict potential customer to churn. Looking at churn, different reasons trigger customers to terminate their contracts, for example better price offers, more interesting packages, bad service experiences or change of customers' personal situations.

Customer churn has become highly important for companies because of increasing competition among companies, increased importance of marketing strategies and conscious behaviour of customers in the recent years. Customers can easily trend toward alternative services. Companies must develop various strategies to prevent these possible trends, depending on the services they provide. During the estimation of possible churns, data from the previous churns might be used. An efficient churn predictive model benefits companies in many ways. Early identification of customers likely to leave may help to build cost effective ways in marketing strategies. Customer retention campaigns might be limited to selected customers but it should cover most of the customer. Incorrect predictions could result in a company losing profits because of the discounts offered to continuous subscribers

1.1 overview

The business requirements for a machine learning model to predict whether the customer will churn or not on customer information, to minimise the number of false positives (customer that predicted as loyal but churn) and false negatives (customer predicted to be churn which could have stayed loyal). Provide an explanation for the **model's decision, for better decision making in order to gain more profitability.**

1.2 purpose

Social Impact:- Proposed model can help improve the overall customer experience and service quality. Companies can also make better decisions about how to retain their customers.
Business Model/ Impact :- This product can generate revenue using a product based model, where the system can be sold as a product to the telecom companies. This product can also be used for subscription based model.

2.LITERATURE SURVEY

Customer Segmentation is an increasingly significant issue in today's competitive commercial area. Many literatures have reviewed the application of data mining technology in customer segmentation, and achieved sound effectives. But in the most cases, it is performed using customer data from a special point of view, rather than from systematical method considering all

stages of CRM. This paper, with the aid of data mining tools, constructs a new customer segmentation method based on RFM, demographic and LTV data. The new customer segmentation method consists of two phases. Firstly, with K-means clustering, customers are clustered into different segments regarding their RFM. Secondly, using demographic data, each cluster again is partitioned into new clusters. Finally, using LTV, a profile for customer is created. The method has been applied to a dataset from Iranian bank, which resulted in some useful management measures and suggestions.

3.THEORITICAL ANALYSIS

The business requirements for a machine learning model to predict whether the customer will churn or not on customer information, to minimise the number of false positives (customer that predicted as loyal but churn) and false negatives (customer predicted to be churn which could have stayed loyal). Provide an explanation for the model's decision, for better decision making in order to gain more profitability.

3.2 HARDWARE /SOFTWARE DESIGNING

The hardware are required for the development of this project is:

Processor   :Intel Core TM i5-9300H

Processor speed :2.4GHz

 RAM size   :8 GB DDR

System type   :X64-based processor

SOFTWARE DESIGNING:

The software required for the development of this project is:

Desktop GUI   : Anaconda Navigator

Operating system   : Windows 10

Front end   : HTML,CSS,JAVASCRIPT

Programming   : PYTHON

Cloud Computing Service : IBM cloud services

4.EXPERIMENTEL INVESTIGATION IMPORTING AND READING THE DATASET

Importing the Libraries

First step is usually importing the libraries that will be needed in the program.

PANDAS:It is a python library mainly used for data manipulation

NUMPY:This is python library is used for numerical analysis

MATPLOTLIB and SEABORN:Both are the data visualization library used for plotting graph which will help us for understanding the data

PICKLE:to serialize your machine learning algorithm and save the serialized formet to a file

Reading the Dataset

This paper proposes an intelligent system for handling the customer retention task, which is getting important due to keen competition among companies in many modern industries. Taking wireless telecommunication industry as a target of research, our system first learns an optimized churn predictive model from a historical services database by the decision tree-based technique to support

the prediction of defection probability of customers. We then construct a retention policy model which maps clusters of churn attributes to retention policies structured in a retention ontology. The retention policy model supports automatic proposing of suitable retention policies to retain a possible churner provided that he or she is a valuable subscriber. Our experiment shows the learned churn predictive model has around 85% of correctness in tenfold cross-validation. And a preliminary test on proposing suitable package plans shows the retention policy model works equally well as a commercial website. The fact that our system can automatically propose proper retention policies for possible churners according to their specific characteristics is new and important in customer retention study.

1.Data visulation

2.Collabrative and Filtering

3.Creating the Model

4.Test and save the model

5.Buil Python Code

6.Build HTML Code

7.Run the application

FLOW CHART
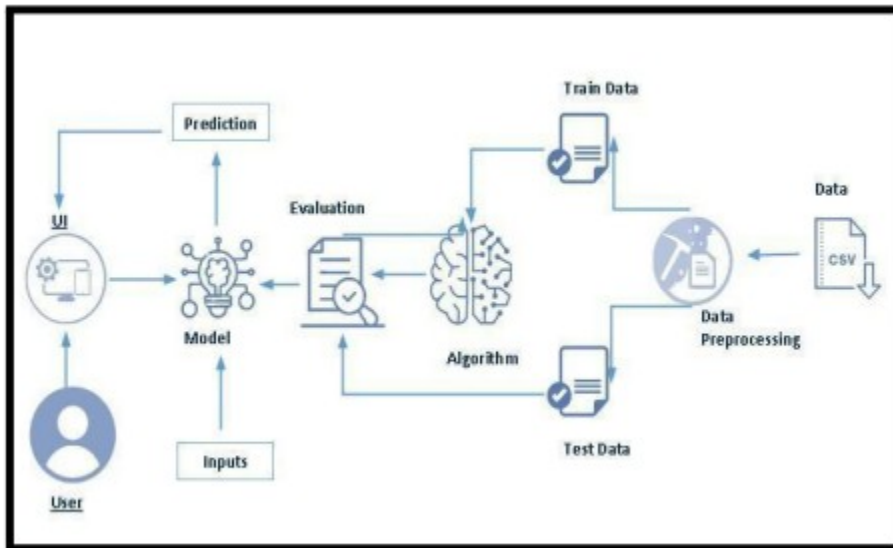
PROJECT FLOW:

- ❖ User interacts with the UI(user interface)to upload the input features.
- ❖ Upload featuers/input is analysed by the model which is integrated.
- ❖ Once a model analyses the uploaded inputs,the prediction is showcased on the UI
- ❖ Define Problem / Problem Understanding ◯ Specify the business problem ◯ Business requirements ◯ Literature Survey ◯ Social or Business Impact.

● Data Collection & Preparation ◯ Collect the dataset ◯ Data Preparation

● Exploratory Data Analysis ◯ Descriptive statistical ◯ Visual Analysis

● Model Building ◯ Training the model in multiple algorithms ◯ Testing the model

● Performance Testing & Hyperparameter Tuning ◯ Testing model with multiple evaluation metrics ◯ Comparing model accuracy before & after applying hyperparameter tuning

● Model Deployment ◯ Save the best model ◯ Integrate with Web Framework

● Project Demonstration & Documentation ◯ Record explanation Video for project end to end solution ◯ Project Documentation-Step by step project development procedure

ADVANTAGES

As you increase retention, your customer acquisition cost decreases because you see more long-term sales to each customer.

- ✓ Getting your entire organization on board with customer retention helps
- ✓ increase profits without changing anything in your sales or marketing funnel.

DISADVANTAGES

- ✓ businesses trying to achieve an efficient customer retention rate may not focus on the needs of new customers.
- ✓ There may be chances of new customers being overlooked by brands in a hoard to satisfy their existing customers.

8.APPLICATION

- ❖ Customer Relationship Management (CRM) has been an im-portant to companies willing to improve their customer experiences.

- ❖ Machine Learning (ML) and its techniques have been transforming the way companies interact with their customers through data analysis.

- ❖ This paper reviews the litera-ture on the application of ML techniques to improve CRM processes and provides an overview of used techniques and their application to each CRM dimension and element.

9.CONCULATION

This paper proposes an intelligent system for handling the customer retention task, which is getting important due to keen competition among companies in many modern industries. Taking wireless

telecommunication industry as a target of research, our system first learns an optimized churn predictive model from a historical services database by the decision tree-based technique to support the prediction of defection probability of customers. We then construct a retention policy model which maps clusters of churn attributes to retention policies structured in a retention ontology. The retention policy model supports automatic proposing of suitable retention policies to retain a possible churner provided that he or she is a valuable subscriber. Our experiment shows the learned churn predictive model has around 85% of correctness in tenfold cross-validation. And a preliminary test on proposing suitable package plans shows the retention policy model works equally well as a commercial website. The fact that our system can automatically propose proper retention policies for possible churners according to their specific characteristics is new and important in customer retention study.

10. futurescope

- Research your customers to find out what they need most.
- Develop the product, site, and offers based on existing customer feedback.
- Evaluate whether a loyalty or rewards program will drive repeat business.
- Make your retention strategy personal.

11. BIBILOGRAPY

References/ Bibliography.

1) Ali Haj Khalifa,(2014), "Customer-Oriented-Marketing Approaches: Similarities and Divergences" International Journal of Advanced Research (2014), Volume 2, Issue 1, 943-951. ISSN: 2320-5407.

2) Nastaran Mohammadhossein, Dr. Nor Hidayati Zakaria,(2012), "Crm Benefits for customers: Literature review (2005-2012)", International Journal of Engineering research and applications (IJERA), Vol.2, Issue 6, (November- December 2012), pp. 1578-1586. ISSN: 2248-9622

3) Mohammad Mizenur Rahaman, Mohammad Imtiaz Ferdous, Md. Zillur Rahman,(2011),"Role of CRM in Profitability of Service Organizations:A Case of a Leading Telecommunication Company in Bangladesh" Journal of Economics and Sustainable Development (2011)Vol.2, No.4. ISSN 2222-1700 (Paper) ISSN 2222- 2855(Online).

4) Rukhsana Gul Gilal, Dr Rehman Gul Gilal, Dr Niaz Ahmed Bhutto,"Determinants of customer satisfaction and retention in commercial bank of pakisthan"Asian Journal of Business and Management Sciences Vol. 1 No. 12 [107-112] ISSN: 2047-2528.

```
From flask import flask, render_template,request

Import keras

From keras.models import load_model

App – flask(_name_)

Model – load_model("telcom_churn.hs")

@app.route(%)#rendering the html template

Def home():

Return render_template("home.html")
```

```
@app.route('/')
Def helloworld():
Return render_template("base.html")
@app.route('/assesment')
Def prediction():
Return render_template("index.html")
@app.route('/predict', methods= ['post'])
Def admin():
    A= request.form["gender"]
   If (a== 'f'):
  A=0
   If (a == 'm'):
   A=1
    B=request.form["srcitizen"]
   If (b == 'n' ):
   B=0
   If (b =='y' ):
    B=1


If (c == 'n' ):
C=0
If ( c == 'y' ):
C=1
```

```
D=request.form["dependents"]

If (d == 'n' ):

D=0

If ( d == 'y'):

D=1

E=request.form["tenure"]

F=request.form["phservices"]

If (f ==  'n' ):

F=0

If (f == 'y' ):

F=1

G= request.form["multi"]

If (g == 'n'):

g1,g2,g3 -1,0,0

if (g –- 'nps'):

g1,g2,g3=0,0,1

h= request.form[ "is"]

if (h == 'dsl'):

h1,h2,h3-1,0,0

if(h  -- 'fo' ):

h1,h2,h3=0,0,1

i= request.form["os"]

if (I == 'n'):

i1,i2,i3=1,0,0

if ( i—'nis'):

i1,i2,i3-0,1,0
```

```python
if (i—'y'):
i1,i2,i3-0,0,1
j= request.form["ob"]
if (j == 'n' ):
j1,j2,j3=1,0,0
if (j == 'nis' ):
j1,j2,j3-0,1,0
if (j – 'y' ):
j1,j2,j3-0,0,1
k- request .form["dp"]
if (k == 'n' ):
k1,k2,k3=1,0,0
if (k == 'nis' ):
k1,k2,k3=0,1,0
if (k—'y'):
k1,k2,k3-0,0,1
l- request.form["ts"]
if (l – 'n'):
l1,l2,l3=1,0,0
if (l – 'nis'):
l1,l2,l3=0,1,0
if  (l – 'y'):
l1,l2,l3-0,0,1
m= request.form["stv"]
if (m—'n'):
    m1,m2,m3=1,0,0
```

```
if (m == 'nis'):

   m1,m2,,m3-0,1,0

if (m == 'y'):

   m1,m2,m3-0,0,1

n- request.form["smv"]

if (n == 'n'):

   n1,n2,n3-1,0,0

if(n—'nis'):

   n1,n2,n3-0,1,0

if (n – 'y'):

   n1,n2,n3-0,0,1

o= request.form["contract"]

if (o=='mtm'):

 o1,o2,o3-1,0,0

if(o=='oyr'):

o1,o2,o3-0,1,0

if (o—'tyrs'):

o1,o2,o3=0,0,1

p- request.form["pmt"]

if(p=='ec'):

p1,p2,p3,p4=1,0,0,0

if(p—'mail'):

p1,p2,p3,p4=0,1,0,0

if(p—'bt'):

p1,p2,p3,p4-0,0,1,0

if(p—'cc'):
```

```
p1,p2,p3,p4-0,0,0,1

q-request.form["plb"]

if(q—'n'):41

q=request.form["plb"]

if (q ==  'n'):

q=0

if (q == 'y'):

q=1

r= request.form["mcharges"]

s =request.form["tcharges"]

t-[[int (g1),int(g2),int(g3),int(h1),int(h2),int(h3),int(i1),int(i2),int(i3)

print(t)

x = model.predict(t)

print(x[0])6

if (x[[0]] <=0.5):

y ="no"

return render-predict("predno.html",z = y)

if (x[[0]] >= 0.5):

y="yes"

return render_template("predyes.html", z = y)
```