Intelligent Customer Retention:

Using Machine Learning for Enhanced Prediction of Telecom Customer Churn

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INTRODUCTION

Project Description

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.

Telecommunication industry always suffers from a very high churn rates when one industry offers a better plan than the previous there is a high possibility of the customer churning from the present due to a better plan in such a scenario it is very difficult to avoid losses but through prediction we can keep it to a minimal level.

Purpose

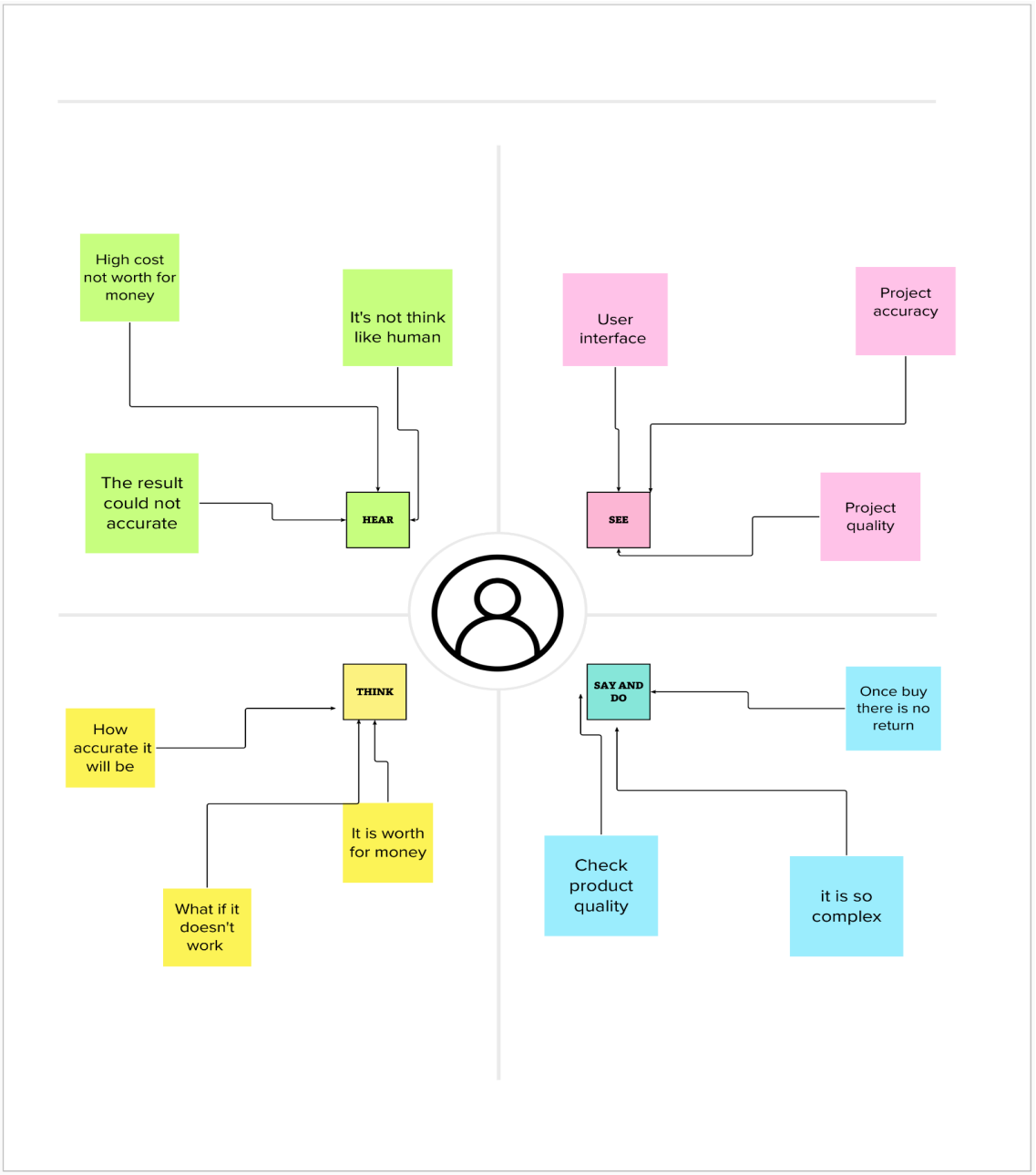
Telecom companies often use customer churn as a key business metrics to predict the number of customers that will leave a telecom service provider. A machine learning model can be used to identity the probable churn customers and then makes the necessary business decisions.

Some businesses determine machine learning as a ready-made technology, however, this is not correct. Although similarities between companies operating in the same niche can be easily found, it doesn't matter they have similar business processes, flows, pricing policies, marketing strategies, and designs.

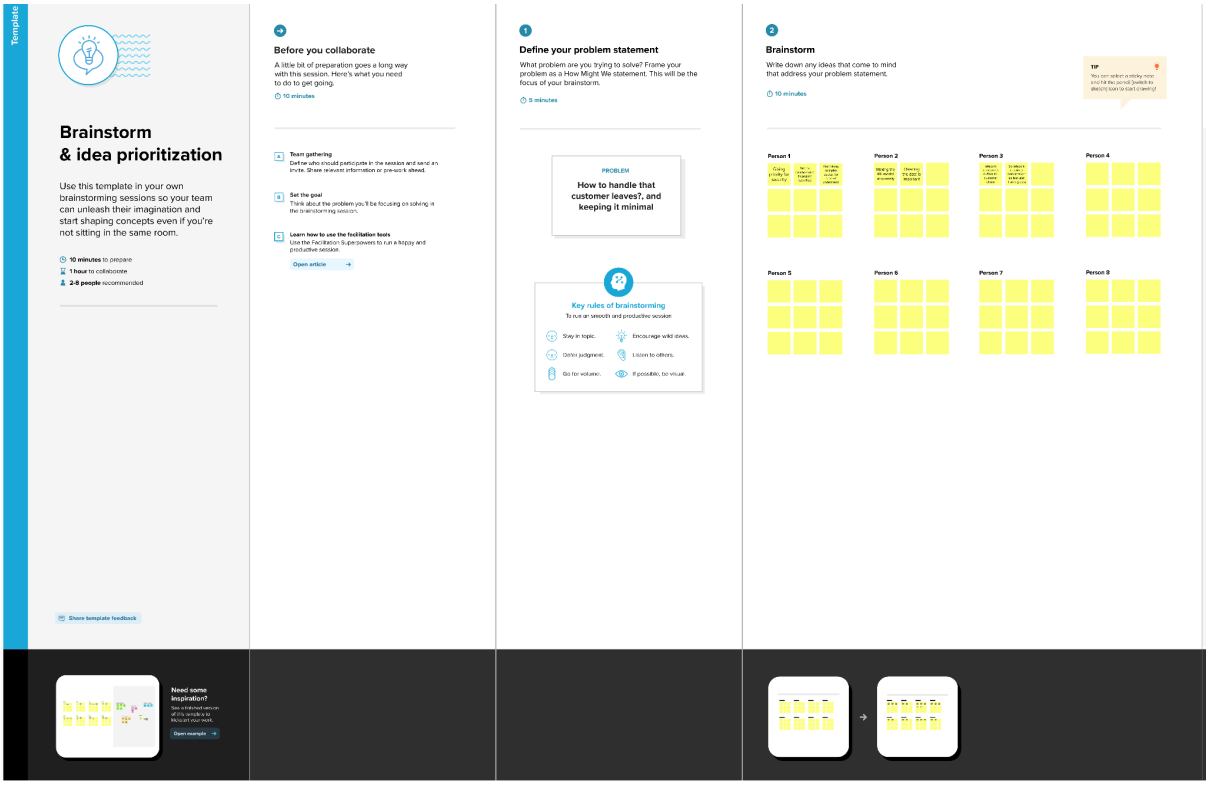
Normally, Machine Learning Algorthims are developed from scratch, specifically for each company's needs, goals, and expectation. However, there are universal principles to follow in each industry.

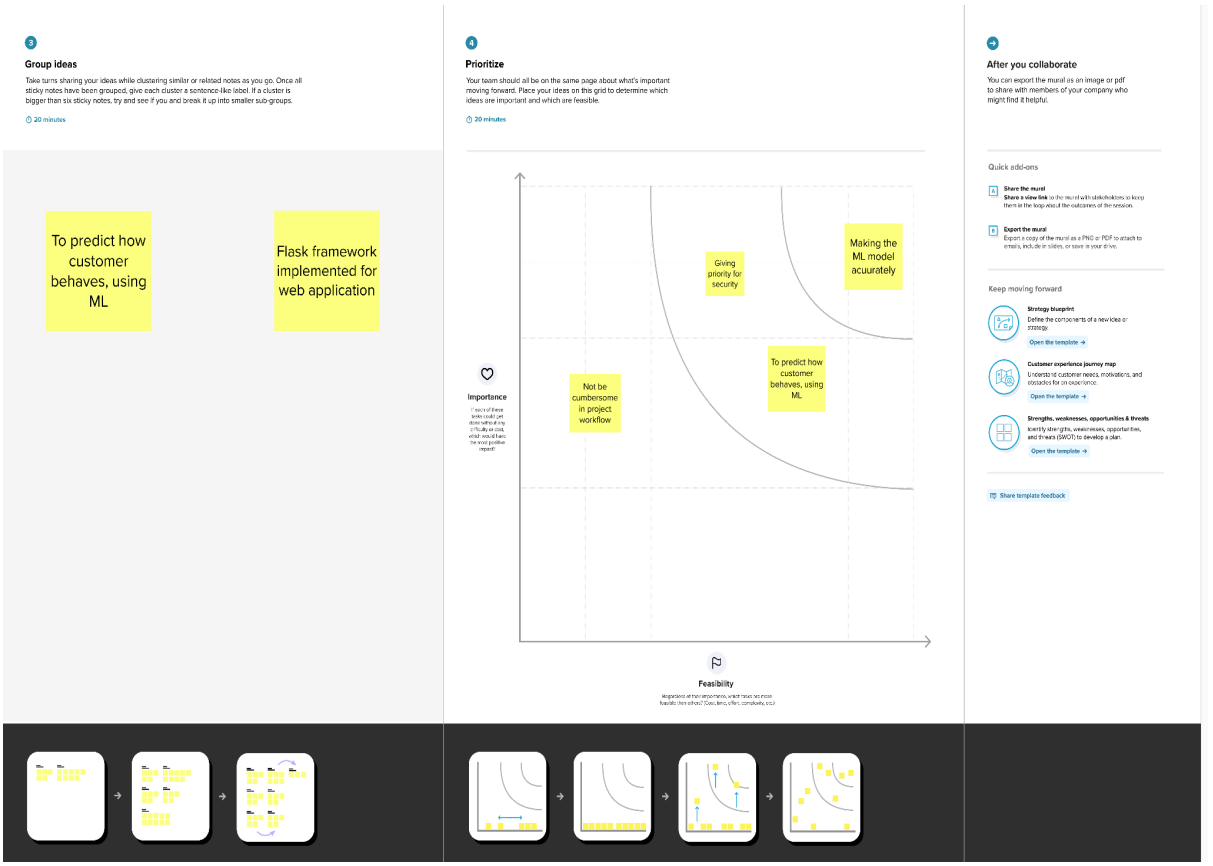
PROBLEM DEFINITION & DESIGN THINKING

Empathy map

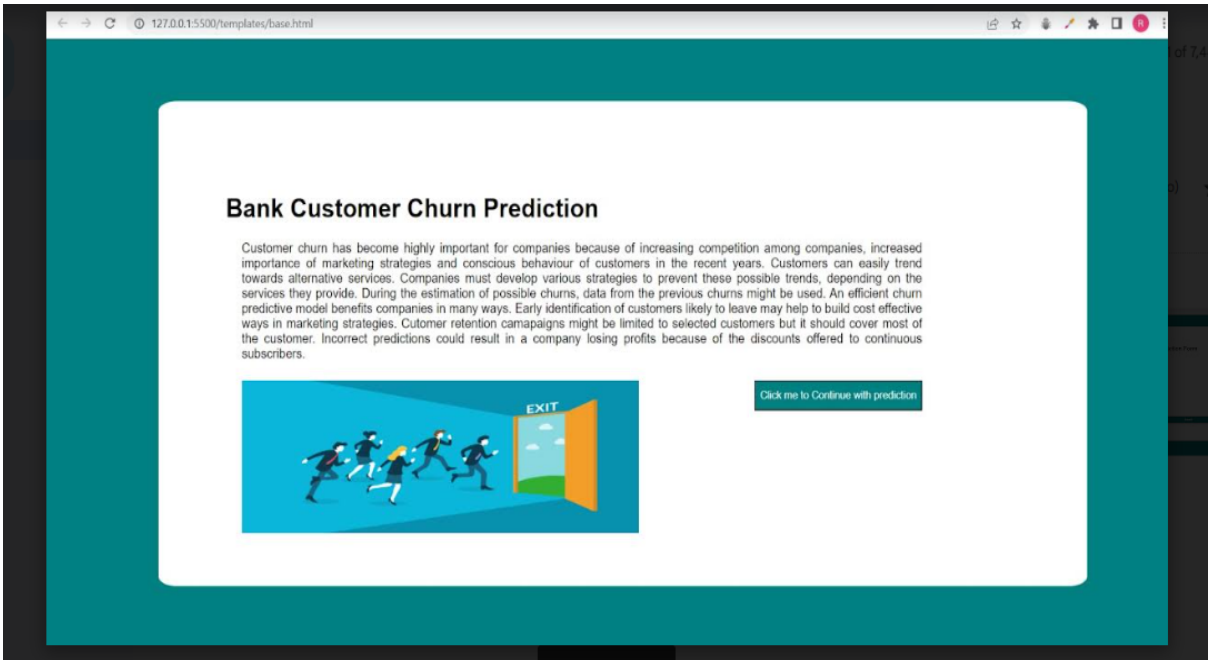


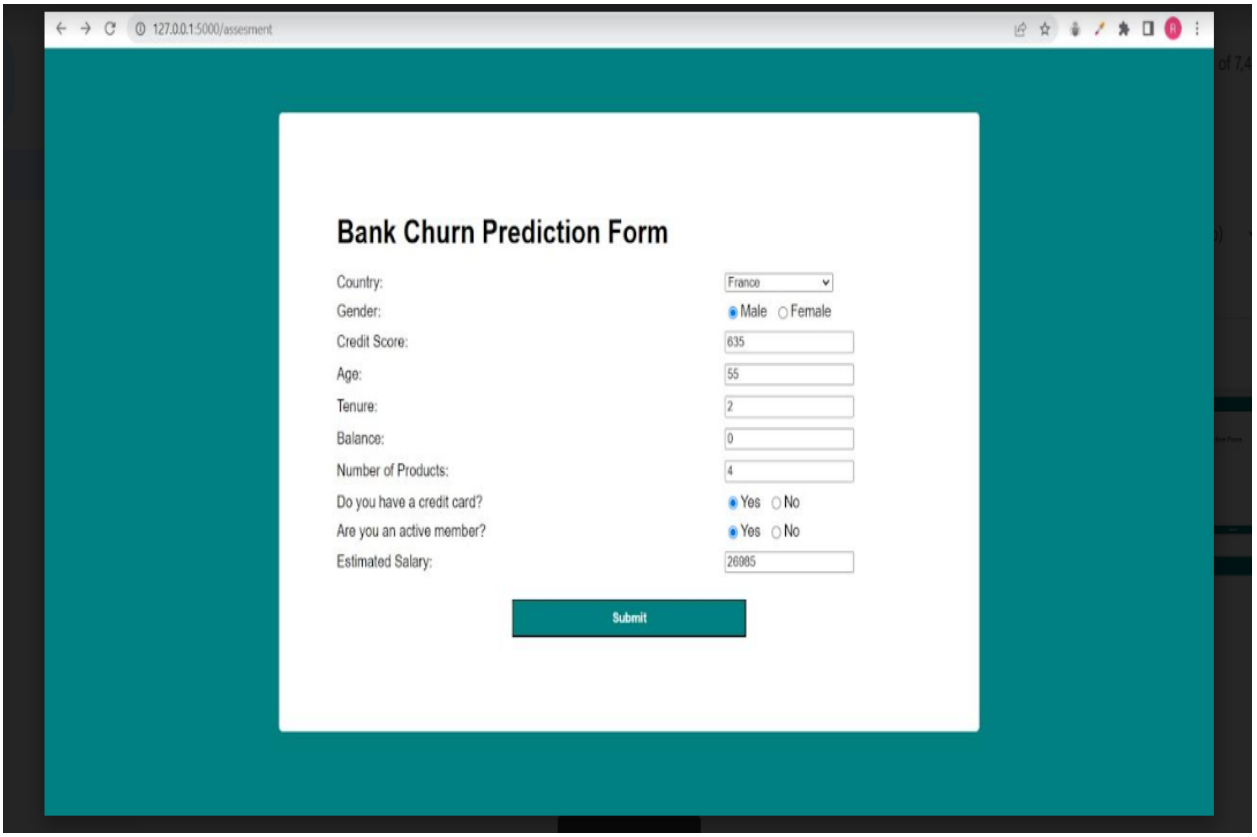
Ideation & Brainstorming Map

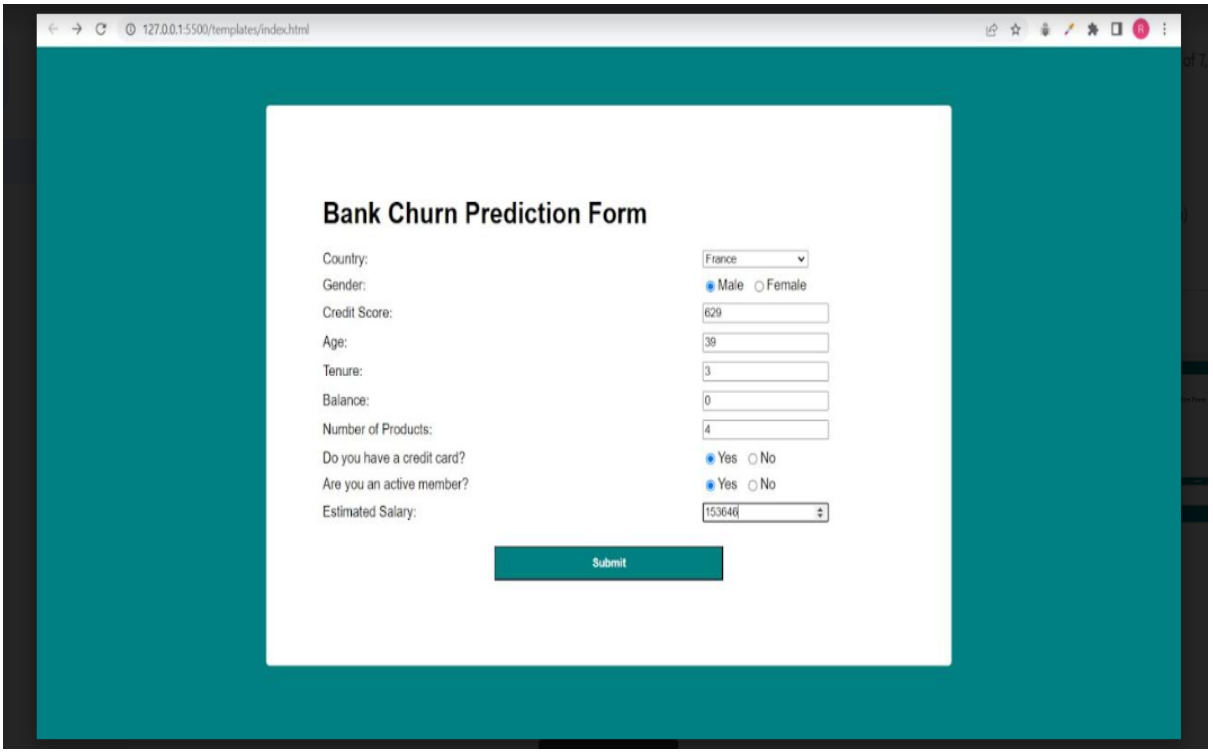


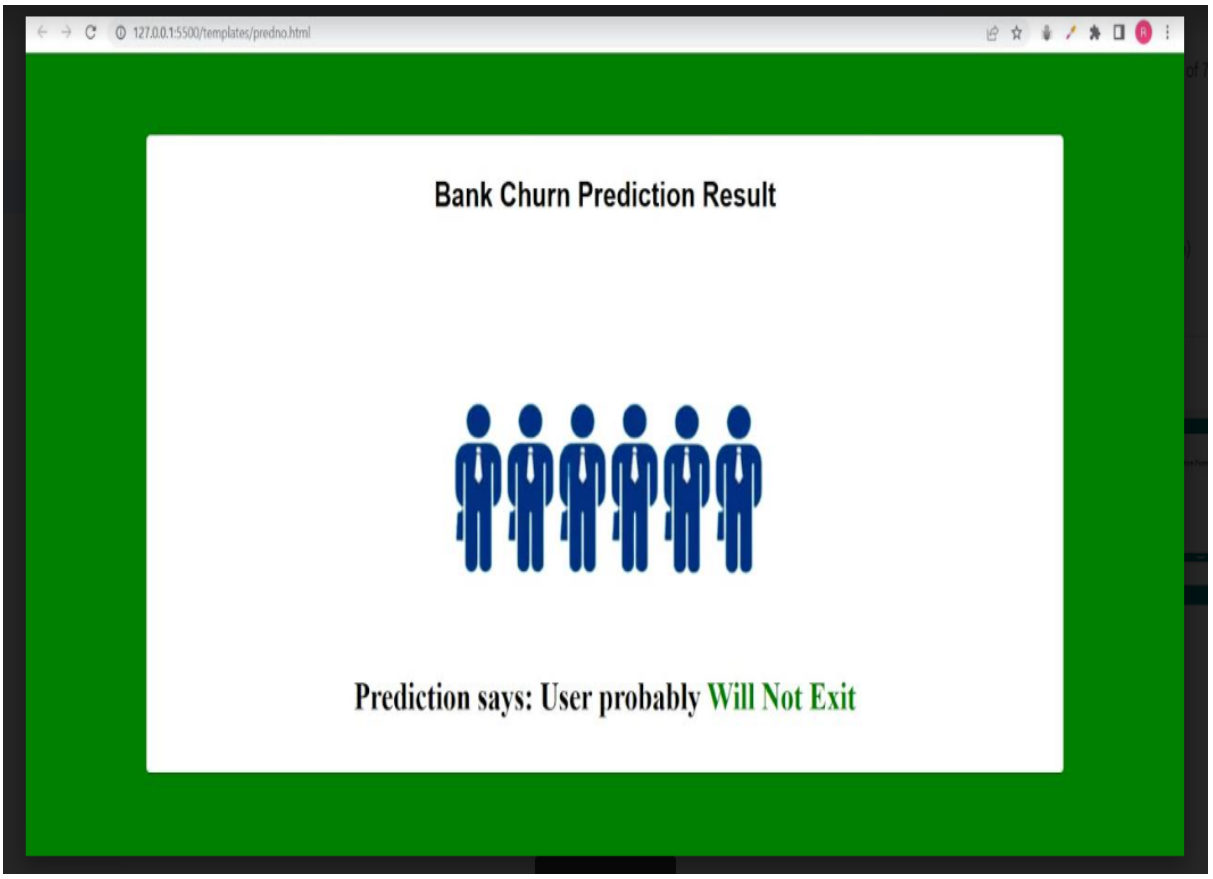


RESULT


127.0.0.1:5500/templates/base.html
Bank Customer Churn Prediction
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 towards 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. Cutomer retention camapaigns 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.
EXIT
Click me to Continue with prediction


127.0.0.1:5000/assesment
Bank Churn Prediction Form
Country:
France
Gender:
Male
Female
Credit Score:
635
Age:
55
Tenure:
2
Balance:
0
Number of Products:
4
Do you have a credit card?
Yes
No
Are you an active member?
Yes
No
Estimated Salary:
26985
Submit


127.0.0.1:5500/templates/index.html
Bank Churn Prediction Form
Country:
France
Gender:
Male
Female
Credit Score:
629
Age:
39
Tenure:
3
Balance:
0
Number of Products:
4
Do you have a credit card?
Yes
No
Are you an active member?
Yes
No
Estimated Salary:
153646
Submit


127.0.0.1:5500/templates/predno.html
Bank Churn Prediction Result
Prediction says: User probably Will Not Exit


127.0.0.1:5500/templates/predyes.html
Bank Churn Prediction Result
Prediction says: User probably Will Exit

ADVANTAGES

Increased Profits

- Upselling to existing customers is easier and more cost-effective rather than selling to new ones
- Keep your revenue stream on a stable level because the acquisition of a new customer is 10 times more expensive than retaining existing customers

Win Business Back

- An ability to analyze customers with 360 view and understand which factors impacted a particular customer to churn can help you to get them back
- Increase retention KPI

Retain More Customers

- Launch new loyalty campaigns and strategies to increase loyalty to your product or service
- Protect future retention by eliminating factors which lead to churn

Avoid Losses

- Retaining your existing customers means stopping customer churn, and can help you to prevent revenue decreases or opportunity for competition

DISADVANTAGES

- Data Acquisition

- Time and Resources

- Results Interpretation
- High error chances
- Social Changes
- Elimination of Human interface
- Changing Nature of jobs
- Highly Expensive
- Privacy concern
- Research and Innovations

APPLICATIONS

- Identify at-risk customers
- Identify pain points
- Identify methods to implement

CONCLUSION

The importance of this type of research in the telecom market is to help companies make more profit. It has become known that predicting churn is one of the most important sources of income to telecom companies. Hence, this research aimed to build a system that predicts the churn of customers in SyriaTel telecom company.ese prediction models need to achieve high AUC values. To test and train the model, the sample data is divided into 70% for training and 30% for testing. We chose to perform cross-validation with 10

folds for validation and hyperparameter optimization. We have applied feature engineering, effective feature transformation and selection approach to make the features ready for machine learning algorithms. In addition, we encountered another problem: the data was not balanced. Only about 5% of the entries represent customers' churn. is problem was solved by undersampling or using trees algorithms not affected by this problem. Four tree based algorithms were chosen because of their diversity and applicability in this type of prediction. These algorithms are Decision Tree, Random Forest, GBM tree algorithm, and XGBOOST algorithm. The method of preparation and selection of features and entering the mobile social network features had the biggest impact on the success of this model, since the value of AUC in SyriaTel reached 93.301%. XGBOOST tree model achieved the best results in all measurements. The AUC value was 93.301%. The GBM algorithm comes in the second place and the random forest and Decision Tree came third and fourth regarding AUC values. We have evaluated the models by fitting a new dataset related to different periods and without any proactive action from marketing, XGBOOST also gave the best result with 89% AUC. e decrease in result could be due to the non-stationary data model phenomenon, so the model needs training each period of time. The use of the Social Network Analysis features enhance the results of predicting the churn in telecom.

FUTURE SCOPE

- In robotics, the model will learn themselves with training data and predict the future outcome with customer data.

- In banking, predicting client future deposits and withdrawals.

- For future online gaming, number of players joined and left easily calculated using churn prediction.

- It is mostly used for future statisticians and mathematicians to analysis with costumes data.

- In eCommerce business world, the ML model predicts customers behaviour.

APPENDIX

```
from flask import Flask, render_template, request
import keras
from keras.models import load_model

app = Flask(__name__)
model = load_model("bank_churn.h5")


@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["Country"]
    if a == 'france':
        a1, a2, a3 = 1, 0, 0
    elif a == 'germany':
        a1, a2, a3 = 0, 1, 0
    elif a == 'spain':
        a1, a2, a3 = 0, 0, 1
    b = request.form["Gender"]
    if b == 'm':
        b1, b2 = 0, 1
    elif b == 'f':
        b1, b2 = 1, 0
    c = int(request.form["Credit_Score"])
    d = int(request.form["Age"])
    e = int(request.form["Tenure"])
    f = int(request.form["Balance"])
    g = int(request.form["NumOfProducts"])
    h = request.form["HasCreditCard"]
    if h == "y":
        h = 1
    if h == "n":
        h = 0
    i = request.form["IsActiveMember"]
    if (i == "y"):
```

```
        i = 1
    if (i == "n"):
        i = 0
    j = float(request.form['EstimatedSalary'])
    k = [[a1, a2, a3, b1, b2, c, d, e, f, g, h, i, j]]
    print(k)
    x = model.predict(k)
    print(x[0])
    if x[0] <= 0.5:
        y = "N0"
        return render_template("predno.html", z=y)
    elif x[0] >= 0.5:
        y = "Yes"
        return render_template("predyes.html", z=y)


if __name__ == '__main__':
    app.run(debug=True)
```