

Project Proposal DS 3002 Data Mining

Telecommunication Churn Prediction

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Problem Description:

In this project, we are working on binary classification Churn prediction project. Basically, Churn prediction model is used to determine which customers might stop using the service. This is important for businesses because attracting new customers can be more expensive than keeping existing ones happy.

Churn prediction and management is critical in the fast changing, strongly competitive and now broadly liberalized mobile communications market. To be able to improve customer retention, a mobile telecommunications service provider has to be able to predict at-risk subscribers on whom the subsequent customer retention effort is focused.

The aim of this project is that ,by identifying customers who are at risk of leaving, companies can take targeted actions to try and convince them to stay, so that companies can boost their revenue and increase customer collaboration.

Dataset Insights:

The dataset involves customer details of charges,customer id and various other features along with churn outcome.

Roadmap:

The project composes of following main stages:

1. DataSet Preprocessing:

The dataset will be preprocessed to gain data insights.Following will be done:

- **Missing Values:**
 - Handle missing data points using techniques like mean/median imputation or mode imputation for categorical features.
- **Outliers:**
 - Eliminating outliers through methods like z-score.
- **Scaling and Normalization:**

- Standardization
- Normalization
- **Discretization:**
 - If necessary, convert continuous features into discrete categories for some models.

2. Data Visualization:

- Customers clustering based on Phone Service
- Contracts and customers plot with churn

3. Feature Extraction:

- Correlation:
- Heatmap
- GridSearchCv

4. Feature Transformation Techniques:

- Hot encoding
- Label Encoder

5. Model Training and evaluation:

- Train Test Split

6. Machine Learning Models:

- Logistic Regression:
- Random Forest
- Decision Tree
- SVM

7. Evaluation Metrics:

- Accuracy, Precision, F1-score, recall will be computed based on the models testing data. Accuracy will be improved in further models.

8. Deep Learning Models:

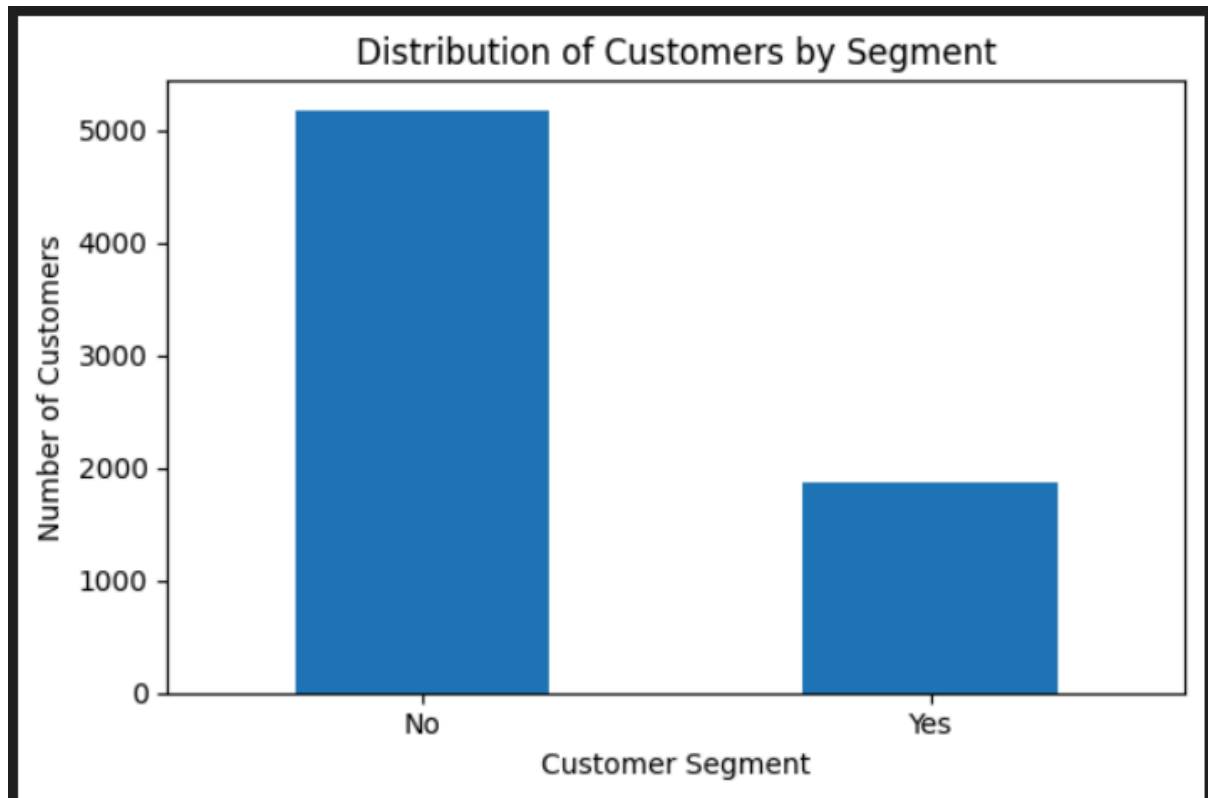
- Artificial Neural Network(ANN)

9. Improving Evaluation of Model:

- Tuning of parameters in models:
 - Tuning of parameters will be done to improve evaluation metric of the models.

10. Additional Considerations:

- Ensemble learning
- XG boosting
- Lime
- Shap



Dataset

source: <https://www.kaggle.com/datasets/blastchar/telco-customer-churn/data>

References:

- 1.Gerpott TJ, Rams W, Schindler A. Customer retention, loyalty, and satisfaction in the German mobile cellular telecommunications market. Telecommun Policy. 2001;25:249–69.
- 2.Wei CP, Chiu IT. Turning telecommunications call details to churn prediction: a data mining approach. Expert Syst Appl. 2002;23(2):103–12.
- 3.Qureshii SA, Rehman AS, Qamar AM, Kamal A, Rehman A. Telecommunication subscribers' churn prediction model using machine learning. In: Eighth international conference on digital information management. 2013. p. 131–6.
- 4.Ascarza E, Iyengar R, Schleicher M. The perils of proactive churn prevention using plan recommendations: evidence from a field experiment. J Market Res. 2016;53(1):46–60.

5.Bott. Predicting customer churn in telecom industry using multilayer preceptron neural networks: modeling and analysis. Igarss. 2014;11(1):1–5.

6.Umayaparvathi V, Iyakutti K. A survey on customer churn prediction in telecom industry: datasets, methods and metric. Int Res J Eng Technol. 2016;3(4):1065–70.

7.Yu W, Jutla DN, Sivakumar SC. A churn-strategy alignment model for managers in mobile telecom. In: Communication networks and services research conference, vol. 3. 2005. p. 48–53.

8.Burez D, den Poel V. Handling class imbalance in customer churn prediction. Expert Syst Appl. 2009;36(3):4626–36.the German mobile cellular telecommunications market. Telecommun Policy. 2001;25:249–69.
