E-Commerce Customers Churn Analysis and Prediction

DUA LIMA SEMBILAN ANALYTICS

Our Client

tokopaedi

E-Commerce #1 Indonesia menurut
Majalah Bobo

Our Team

DUA LIMA SEMBILAN ANALYTICS


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Outline

Step 1 **Business Understanding**

Background, Problem Statement, Objective, Goals, Metrics

Step 2 **Data Understanding**

Data Overview

Step 3 **Preprocessing**

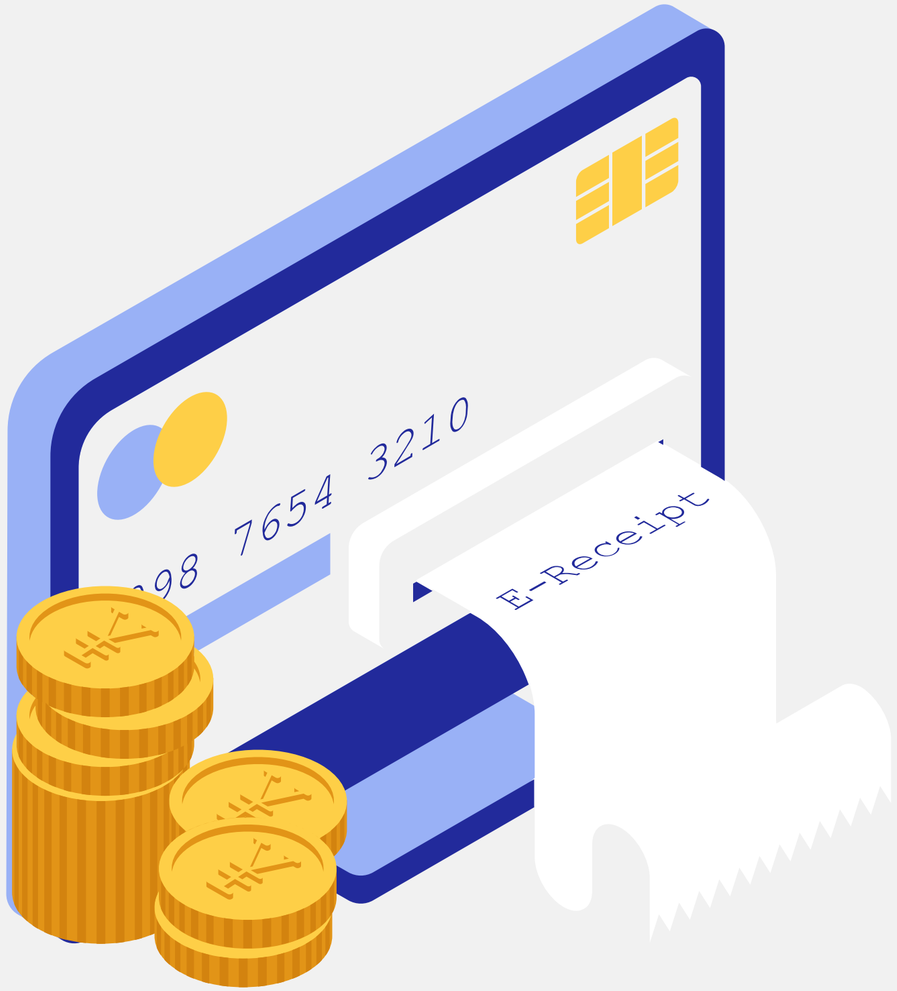
Duplicate & Missing Values, Encoding, Outliers, Split Data

Step 4 **Modelling & Evaluation**

Menentukan model yang "Best Fit"

Step 5 **Business Recommendations**

Recommendations, Impact



Business Understanding

Business Understanding

Background Client

Tokopaedi adalah E-Commerce dengan perkembangan Nomor 1 di Indonesia (Berdasarkan Majalah Bobo) yang menjual berbagai macam jenis produk mulai dari Grocery, Electronic, Fashion, Laptop & Accessory dan lain-lain.

Terlepas dari perkembangan yang terjadi Tokopaedi mengalami masalah serius yaitu **Customer Churn**

Apa itu Churn?

Customer Churn didefinisikan sebagai kecenderungan pelanggan untuk berhenti melakukan bisnis dengan sebuah perusahaan (Yu dkk. dalam Arifin, 2014).

Menurut Khakabi dkk., (dalam Arifin, 2014) untuk memperoleh pelanggan baru itu memerlukan biaya hingga 10 kali lipat lebih mahal dari biaya untuk mempertahankan pelanggan yang ada.

Source : https://jurnal.umk.ac.id/index.php/SNA/article/viewFile/156/158

Business Understanding

Problem Statement

Churn Rate

16.8% Churn

Total Customers

83.2% Not Churn

Lost Opportunity

Rp473jt/Bulan

Lost Opportunity = Total Churn Customers x Average Monthly Spending User*

Source : https://dataindonesia.id/digital/detail/berapa-pengeluaran-masyarakat-indonesia-untuk-belanja-online

Business Understanding

Goals

Mengurangi tingkat churn customer dengan target churn rate dari 16,8% menjadi 5%

Objective

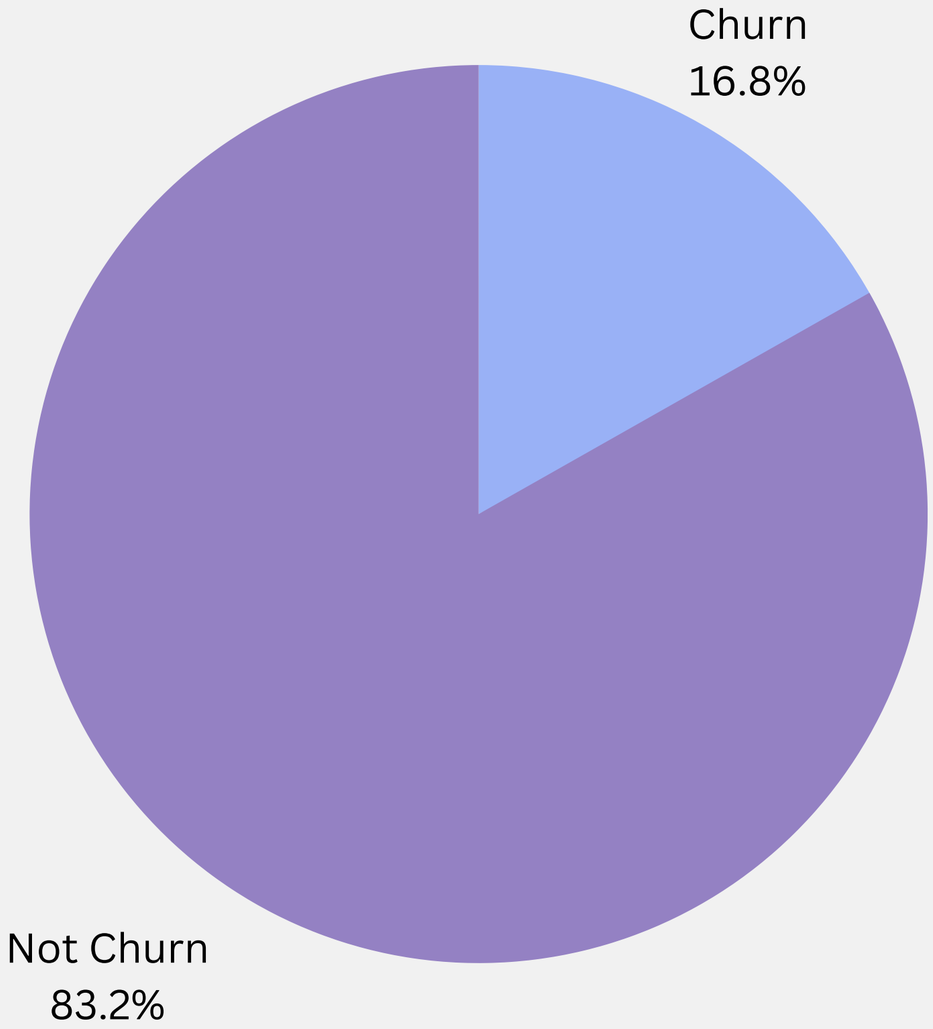
Membuat machine learning model yang dapat memprediksi churn dari perilaku atau ciri-ciri customer dan rekomendasi untuk dapat mengantisipasi perilaku churn customer berdasarkan insight.

Metrics

$$\text{Churn Rate} = \frac{\text{Total Customers Churn}}{\text{Total Customers}}$$

Data Understanding

Data Understanding



About Dataset

Dataset berisi data penjualan Tokopaedi selama satu tahun

Shape

5630 Rows, 20 Columns

Data Overview

Variable	Discerption
Churn	Churn Flag
CityTier	City tier
SatisfactionScore	Satisfactory score of customer on service
Complain	Any complaint has been raised in last month
PreferredLoginDevice	Preferred login device of customer
PreferredPaymentMode	Preferred payment method of customer
Gender	Gender of customer
PreferedOrderCat	Preferred order category of customer in last month
MaritalStatus	Marital status of customer
CustomerID	Unique customer ID
Tenure	Tenure of customer in organization
WarehouseToHome	Distance in between warehouse to home of customer
HourSpendOnApp	Number of hours spend on mobile application or website
NumberOfDeviceRegistered	Total number of deceives is registered on particular customer
NumberOfAddress	Total number of added added on particular customer
OrderAmountHikeFromlastYear	Percentage increases in order from last year
CouponUsed	Total number of coupon has been used in last month
OrderCount	Total number of orders has been places in last month
DaySinceLastOrder	Day Since last order by customer
CashbackAmount	Average cashback in last month

Target

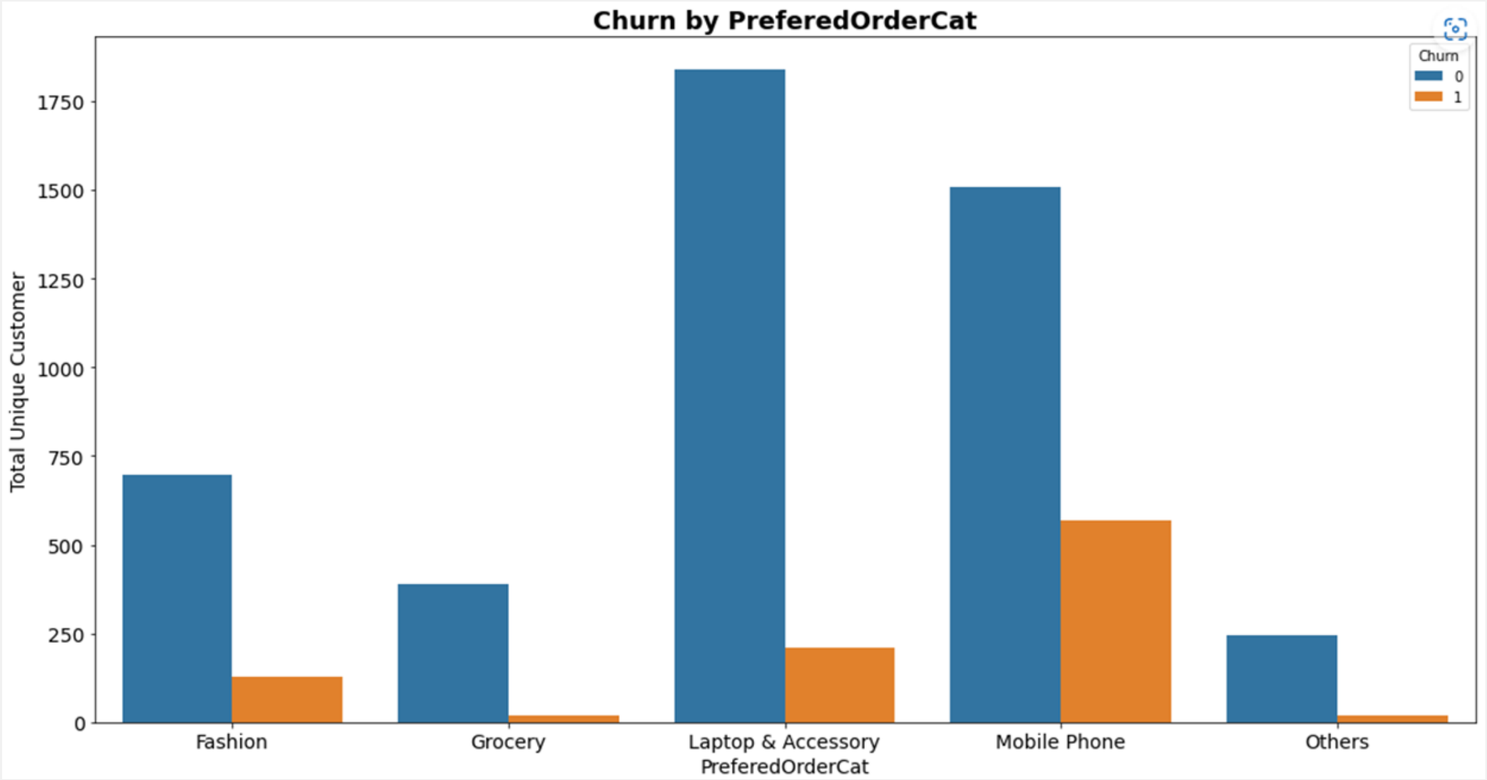
Nominal

Ordinal

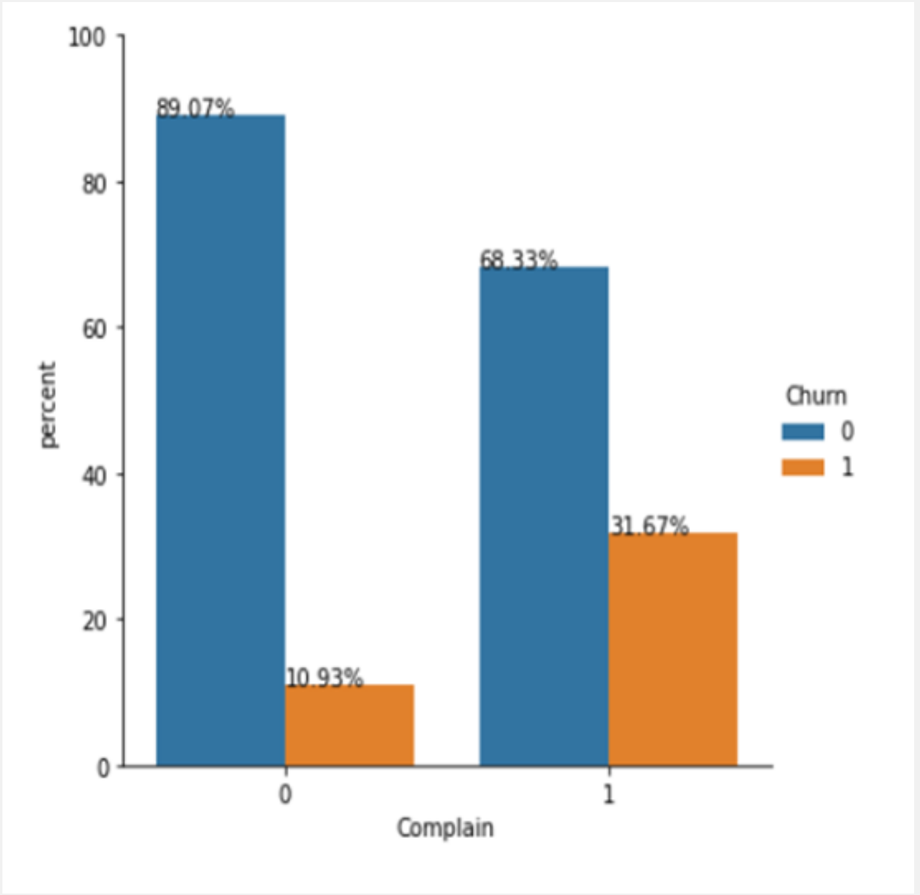
Interval

Data Understanding

Churn By Order Category

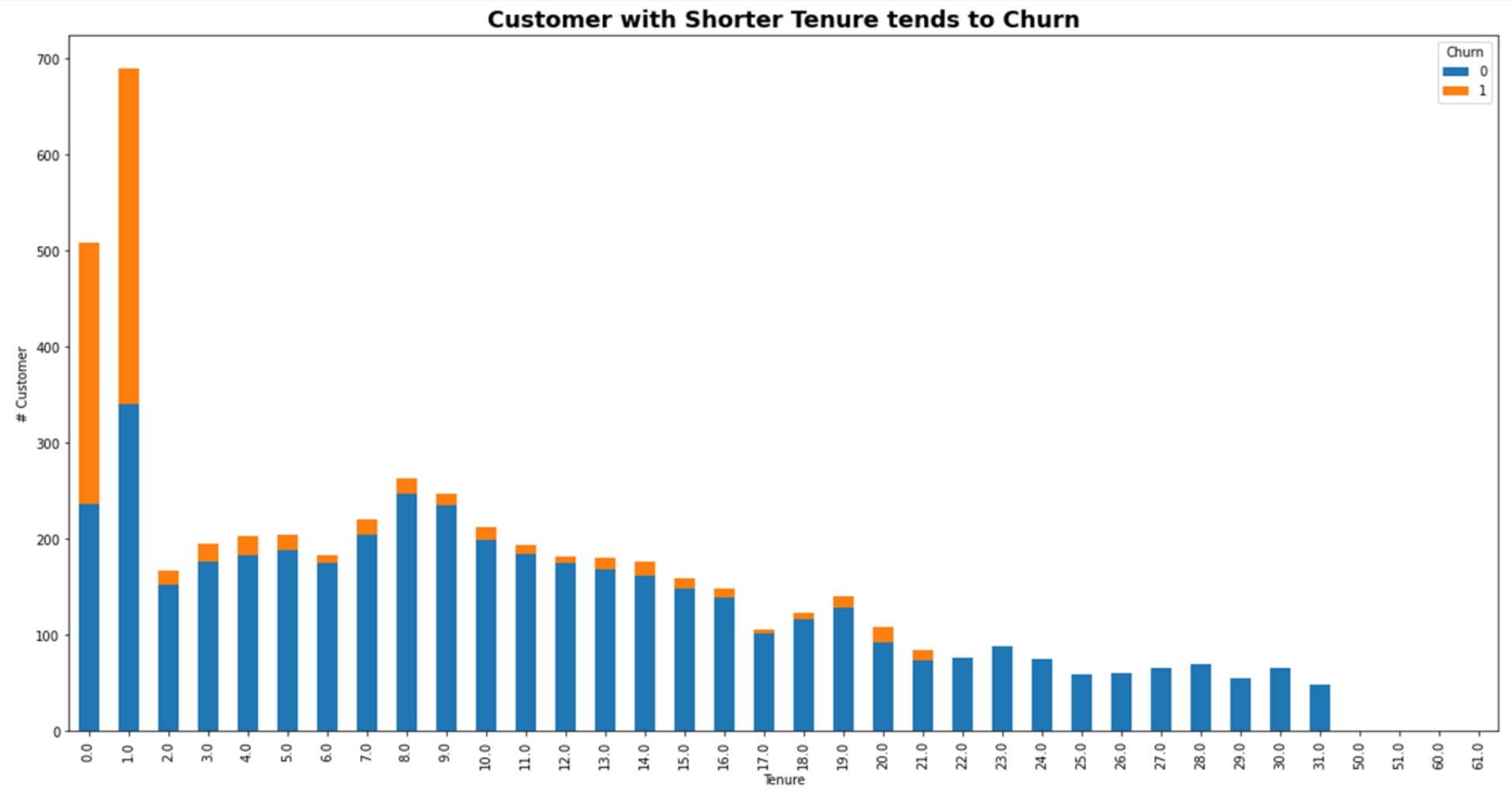


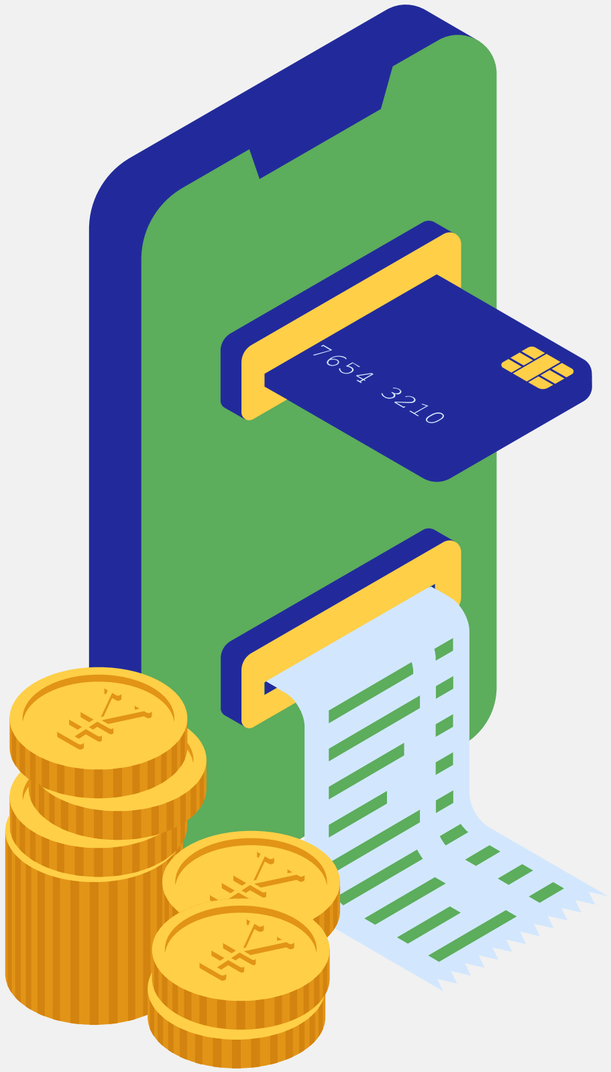
Churn By Complains



Data Understanding

Churn By Tenure





Data Preprocessing

Encoding

One-Hot Encoding:

- PreferredPaymentMode
- PreferedOrderCat
- MaritalStatus

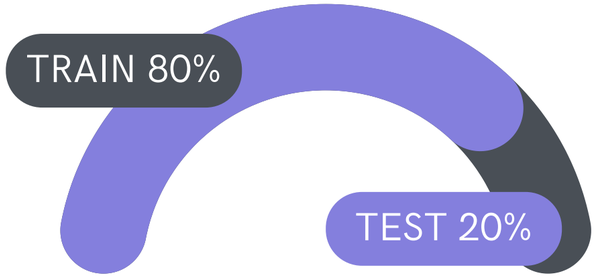
Label Encoding

- Gender
- PreferredLoginDevice

Missing Values

Treatment: Imputasi Median

Split Data



Outliers

Outliers di keep karena masih menjadi bagian dari populasi

Modelling & Evaluation

Modelling & Evaluation

Train

model_name	recall	precision	roc_auc	f1	accuracy
logistic regression	0.501966	0.750980	0.734009	0.601728	0.734009
random forest	1.000000	1.000000	1.000000	1.000000	1.000000
kNN	0.553080	0.791745	0.761704	0.651235	0.761704
decision tree	1.000000	1.000000	1.000000	1.000000	1.000000
adaboost	0.579292	0.772727	0.772271	0.662172	0.772271
xgboost	1.000000	1.000000	1.000000	1.000000	1.000000
catboost	0.956750	0.997268	0.978108	0.976589	0.978108

Test

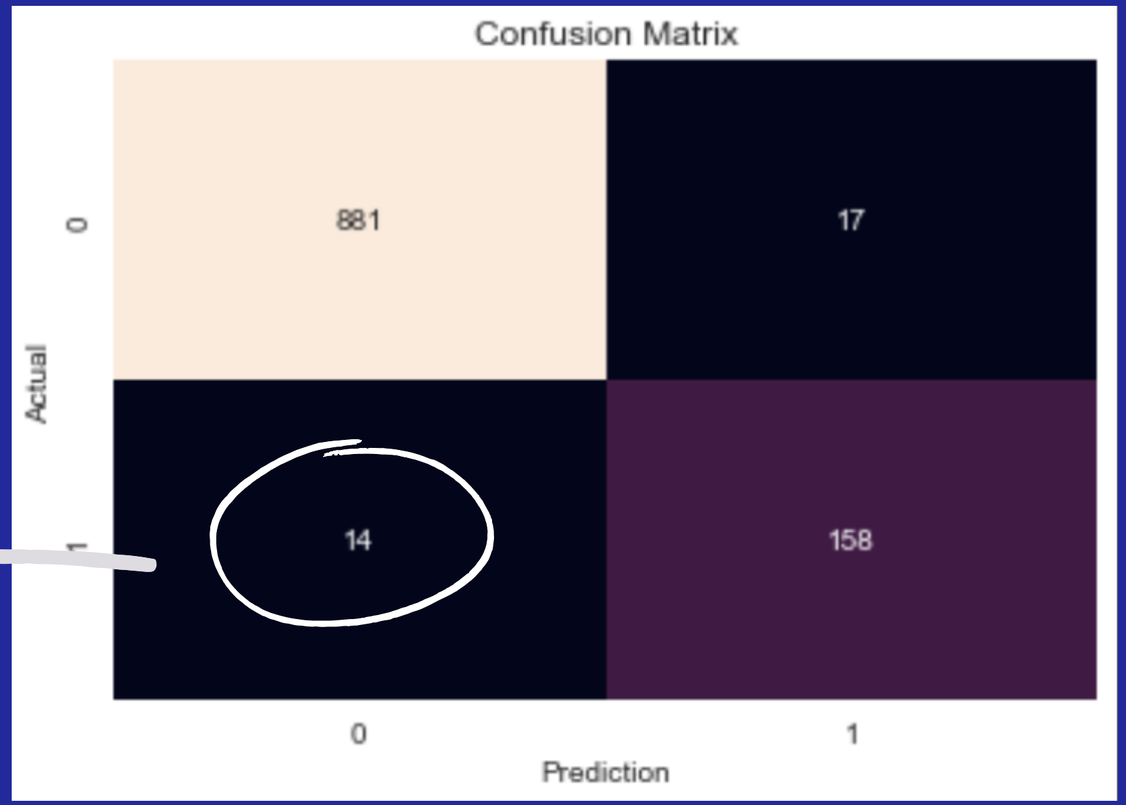
model_name	recall	precision	roc_auc	f1	accuracy
logistic regression	0.524324	0.815126	0.750472	0.638158	0.750472
random forest	0.859459	1.000000	0.929730	0.924419	0.929730
kNN	0.421622	0.634146	0.686900	0.506494	0.686900
decision tree	0.924324	0.890625	0.951004	0.907162	0.951004
adaboost	0.567568	0.833333	0.772625	0.675241	0.772625
xgboost	0.886486	0.976190	0.941118	0.929178	0.941118
catboost	0.821622	0.987013	0.909748	0.896755	0.909748

Model Decision Tree dengan recall 92%

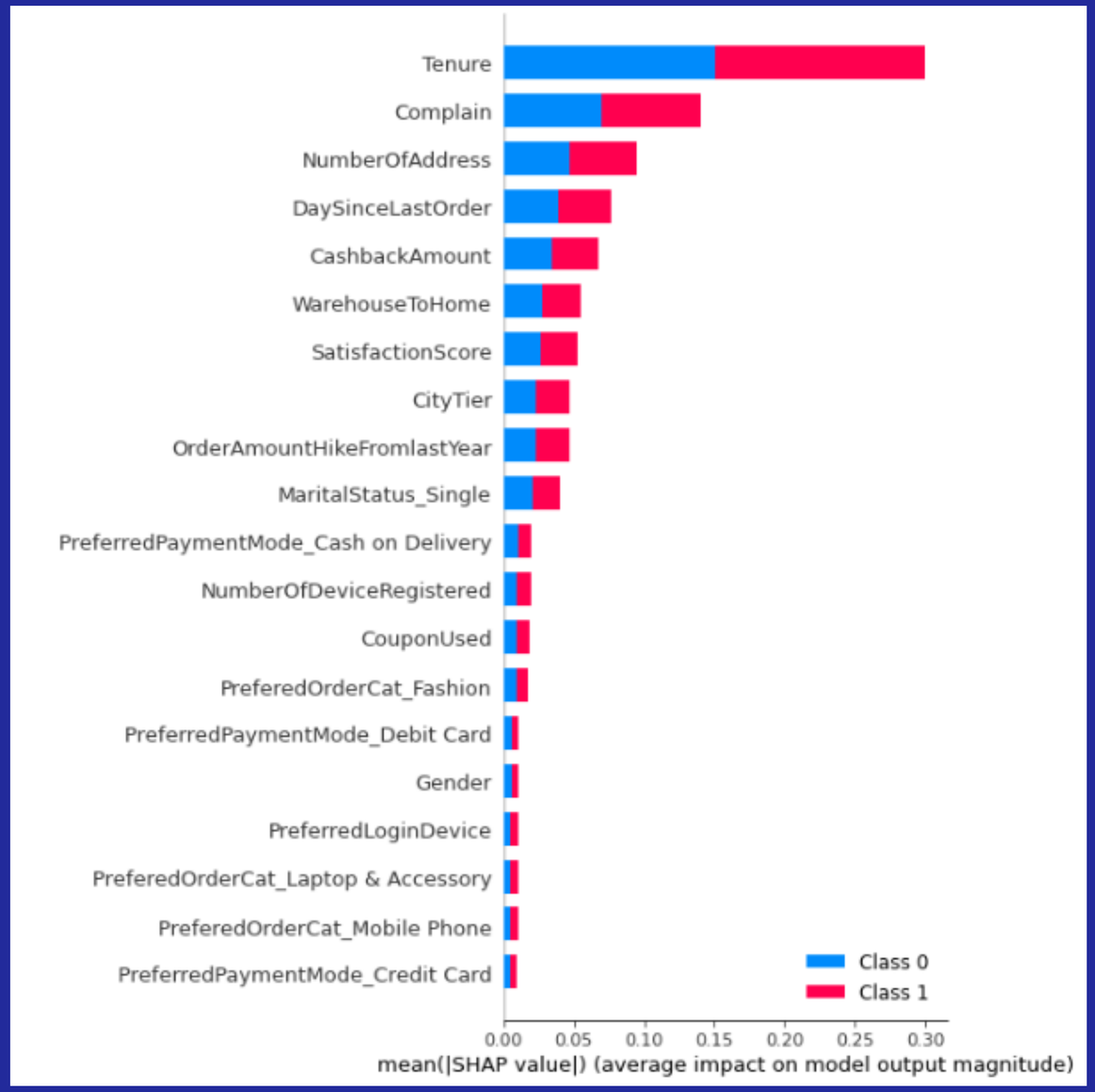
Confusion Matrix

Mengapa Recall?

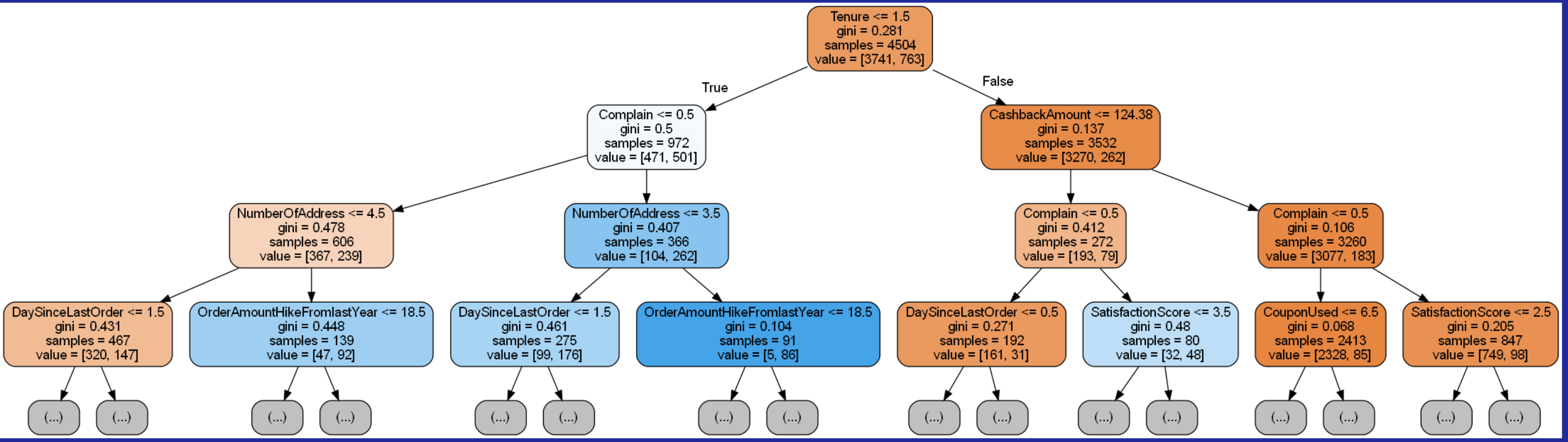
Tujuannya untuk mengetahui sebanyak mungkin customer yang actual Churn



Features Importance

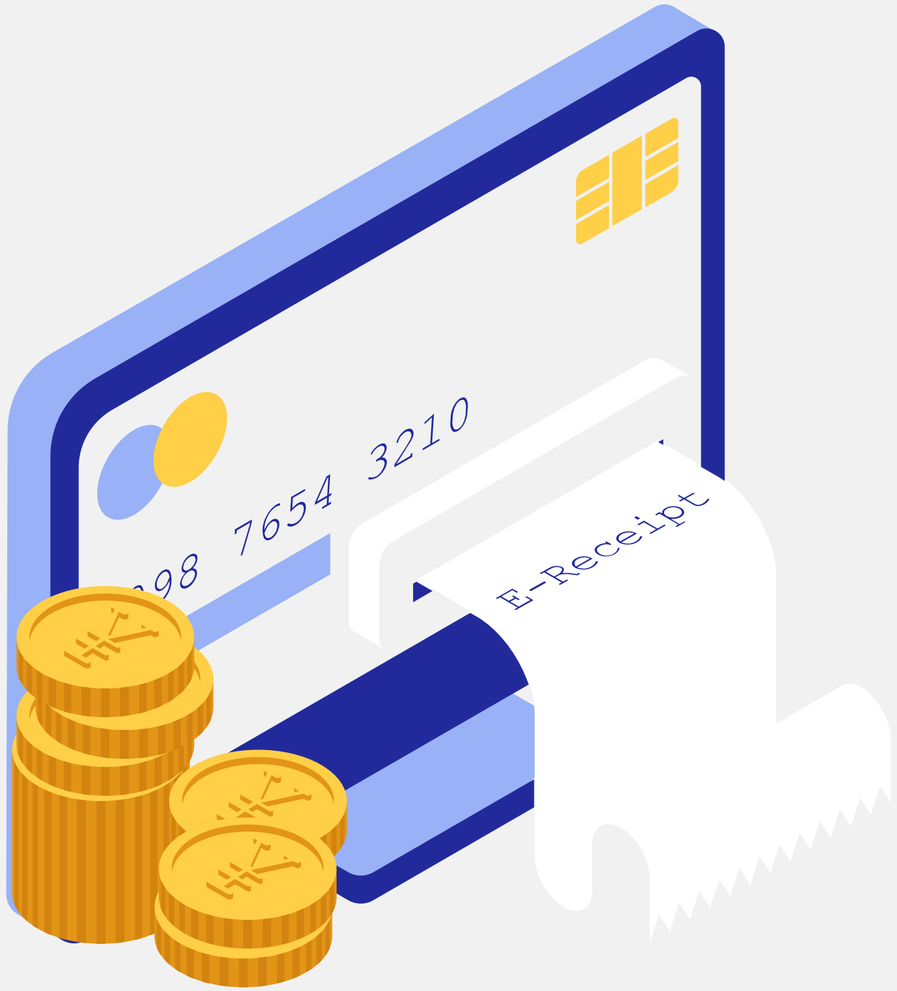


Decision Tree Visualization



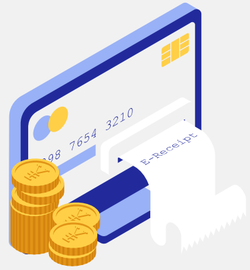
Ditampilkan potongan decision tree sampai 3 level percabangan, dimana pada tiap node menampilkan 4 informasi :

1. Nama kolom beserta treshold decision-nya
2. Nilai gini impurity fitur
3. Jumlah total sample yang diproses
4. Value = proporsi split data dalam node

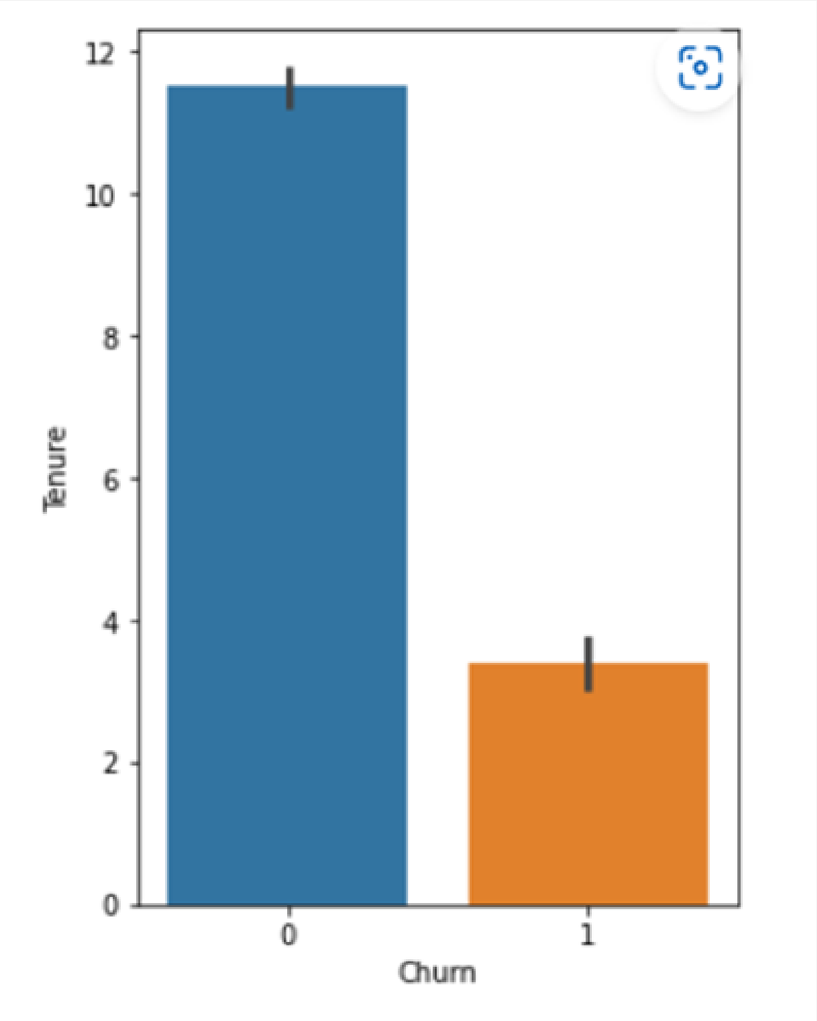


Business Recommendations

Benefit Recomendation



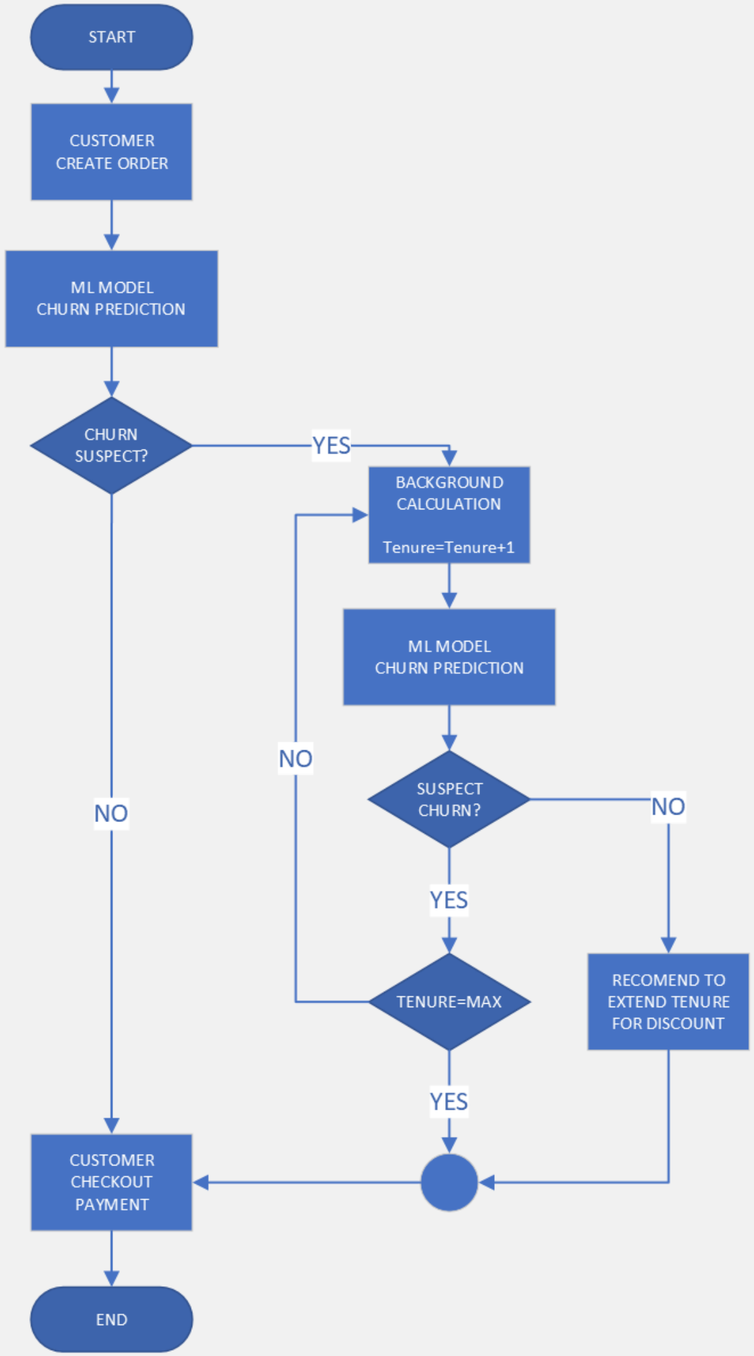
Churn By Tenure



Saat ini pelanggan yang churn terdistribusi pada tenor pembayaran di bawah 4 bulan

Mitigasi:
Tingkatkan program marketing (discount/coupon) pada pelanggan terduga churn yang memiliki tenor pembayaran kurang dari 4 bulan. Berikan penawaran benefit yang lebih untuk perpanjangan tenor pembayaran

Pencehagan:
Perbanyak kerjasama dengan penyedia layanan kredit dengan tenor panjang yang memiliki bunga rendah



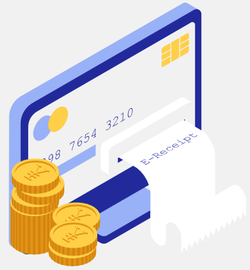
Benefit Recomendation Business Process

Controlled Variable: Tenure

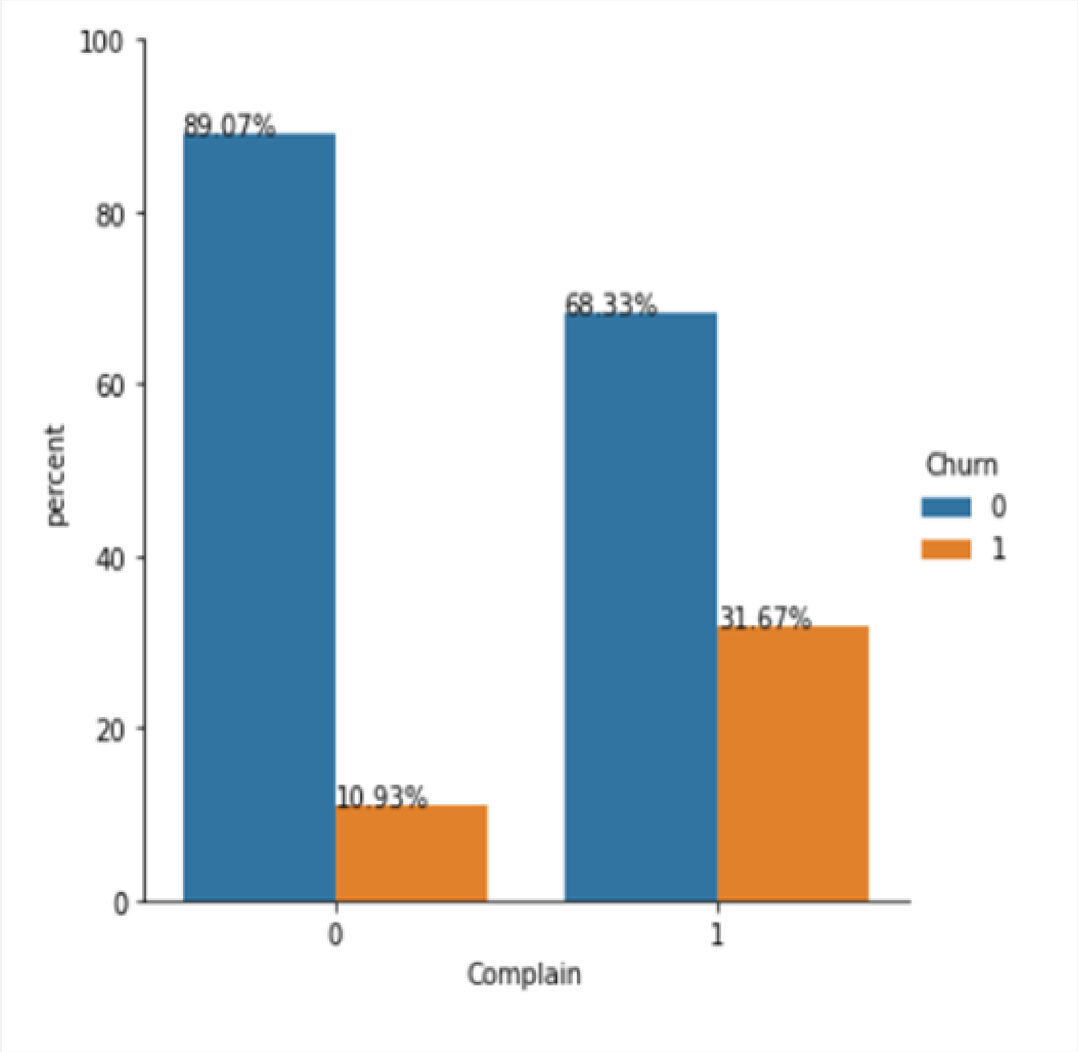
Pada saat proses transaksi platform e-commerce, customer akan diberi penawaran diskon/cashback apabila:

1. Di awal transaksi diprediksi churn
2. Tenure belum mencapai batas maksimal yang diperkenankan
3. Penambahan tenure dapat membuat hasil prediksi menjadi non-churn

Complaint Handling



Churn By Complain

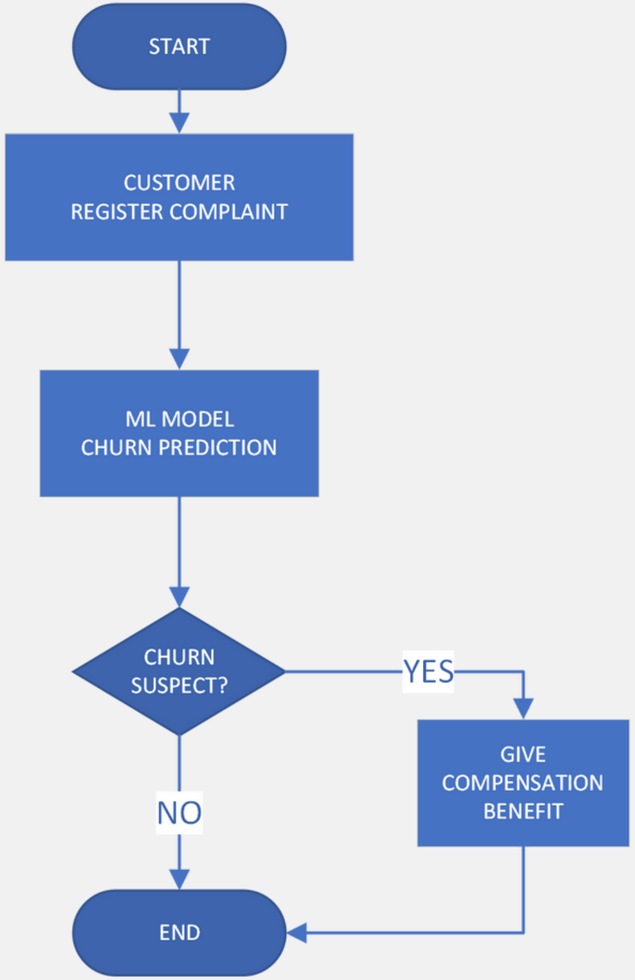


31% customer yang pernah memiliki komplain, melakukan churn

Rencana Mitigasi:
Penanganan komplain yang lebih baik pada customer terduga churn. Non-Aktifkan chat bot dan berikan kompensasi

Rencana Pencegahan
Tingkatkan standar layanan e-commerce untuk menghindari komplain

Complaint Handling Business Process



Pada saat customer melakukan complaint dan diprediksi akan churn pada sebuah transaksi maka perlakukan customer dengan value lebih:

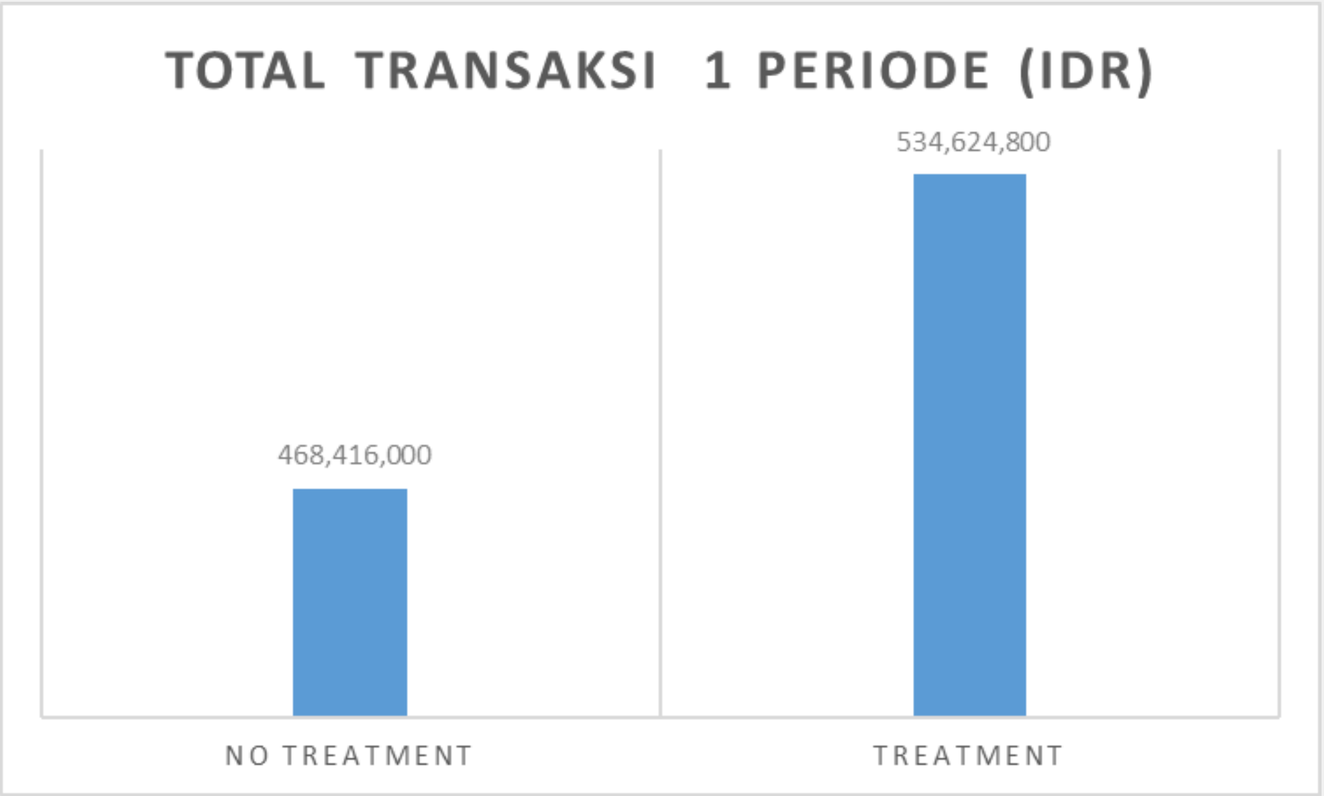
1. Mematikan chatbot, handle dengan customer service
2. Memberikan kompensasi berupa voucher discount

Impact Analysis

Asumsi Dasar:

1. Nilai transaksi per user rata-rata IDR 100.000
2. Success Ratio churn treatment 70%

Increase Revenue by 14,3%



Parameter	No Treatment	Treatment
Jumlah user	5,630	5,630
Jumlah user churn	946	284
Nilai transaksi @ user	100,000	100,000
Total Transaksi dalam 1 periode	468,416,000	534,624,800
Churn rate	16.8%	5.0%

Terima Kasih

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