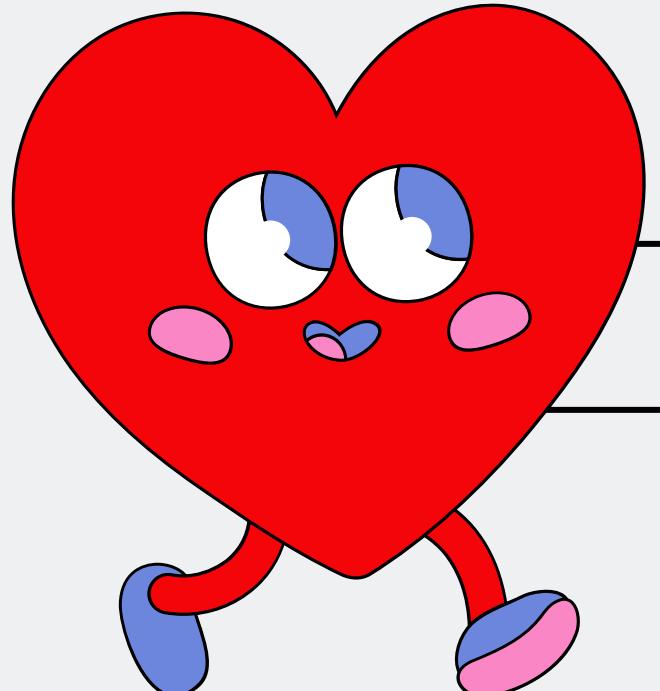


Final Project: Marketing Campaign



Bulletproof Scouts (Group 5)

Welcome

Hello!



← → Q Team Members

Group 5



Radifan



Afrian



Naufal



Humairah



April



Hesti



Adam

Mentor



Welcome

Hello!

X +

← → Q Q Table of Contents

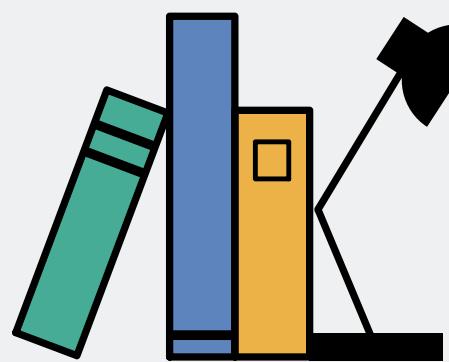


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Background

EDA (Exploratory Data Analysis)

Data Pre-Processing

Modelling and Evaluation

Business Recommendation

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← → Q External Resources

Background

- Rata-rata perusahaan menghabiskan 4 - 11,2% dari *revenue* untuk marketing.
- Marketing yang tidak efektif dapat menyebabkan kerugian bagi perusahaan.

(Source: Hook Agency; Brafton/Gardner CMO)

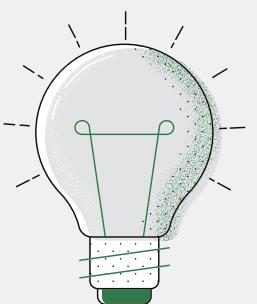
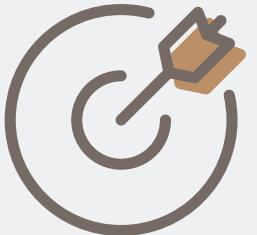


← → G Q Goal, Objective, & Metrics

Background

Goal

Meningkatkan *revenue* perusahaan melalui peningkatan jumlah respon pada campaign.



Objective

- Memprediksi respon customer terhadap campaign selanjutnya.
- Mencari faktor yang berkaitan dengan kesuksesan campaign.

Business Metrics

ROI



Welcome

Hello!

Background

EDA

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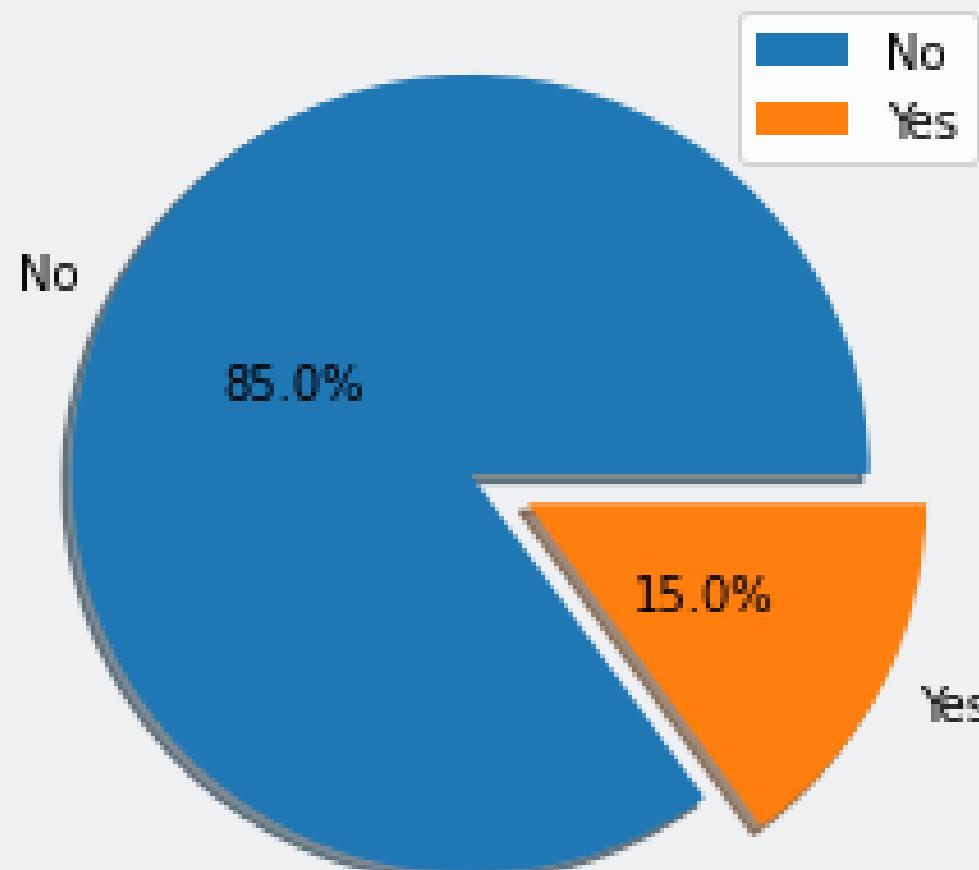
+

← → Q Data Understanding

Exploratory Data Analysis

An illustration of two diverse individuals, a man and a woman, standing side-by-side and looking at a screen. The man on the left has short brown hair, wears glasses, and is dressed in a yellow hoodie over a pink shirt, paired with red pants featuring white stripes. The woman on the right has dark curly hair and is wearing a blue coat over a red and white striped sweater, along with dark blue pants and yellow shoes. They appear to be engaged in a collaborative activity, possibly related to data analysis.

EDA (Exploratory Data Analysis)

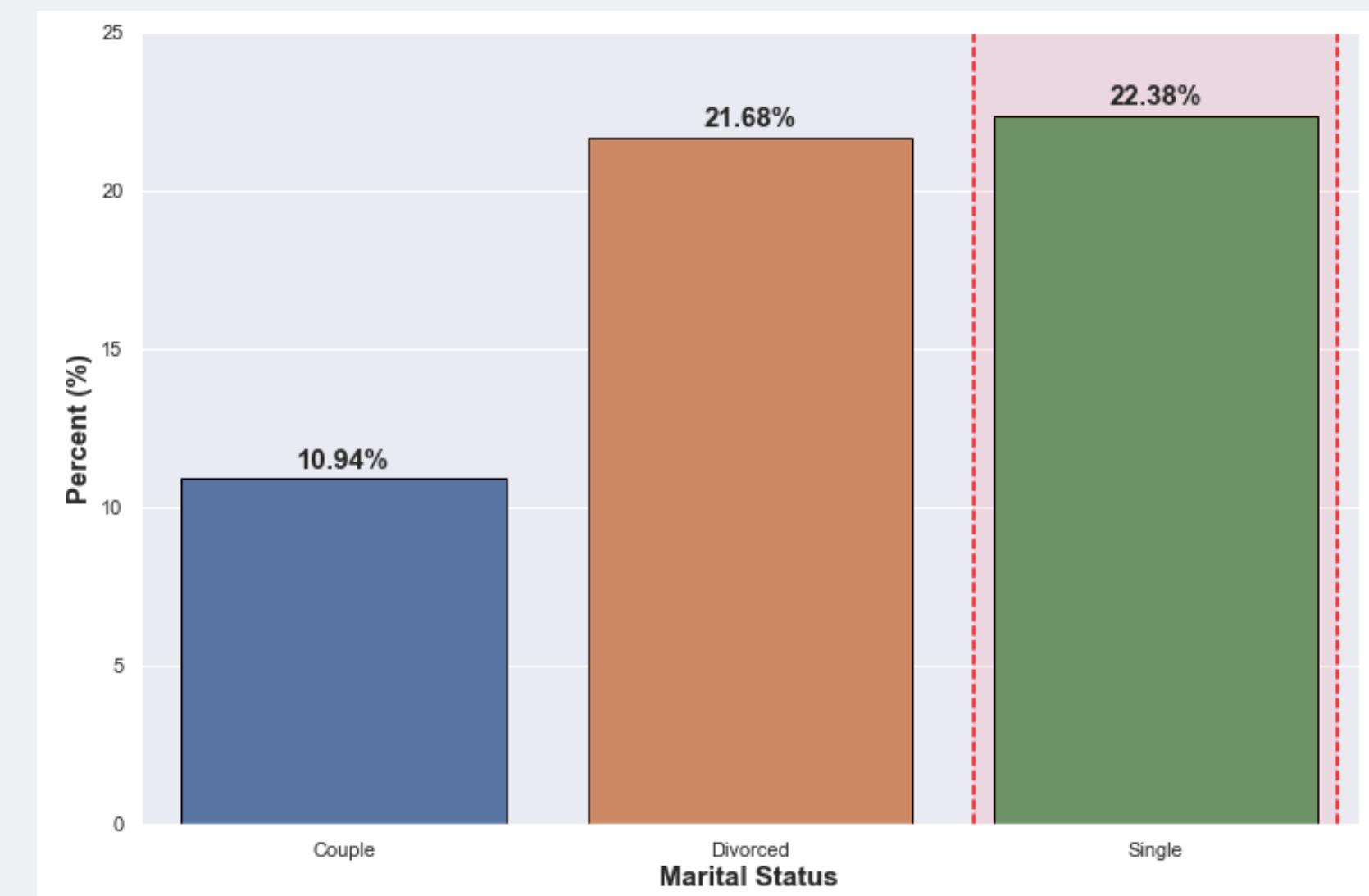
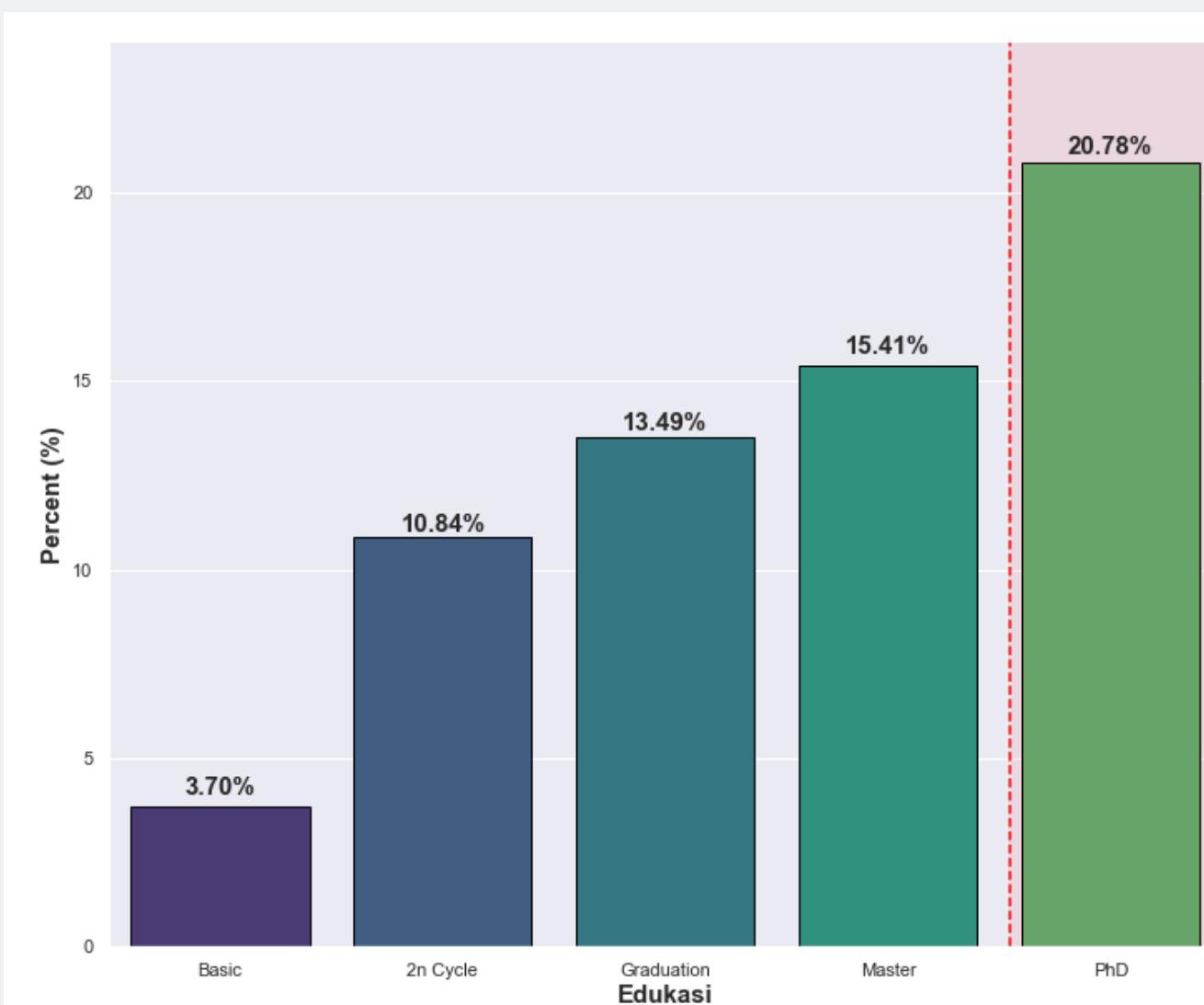


Data Understanding

- Sebaran data target 'Response', 85% yang 'No' dan hanya 15% untuk 'Yes'.
- Akan dilakukan *handling class imbalance* ketika *split data train* dan *test*.

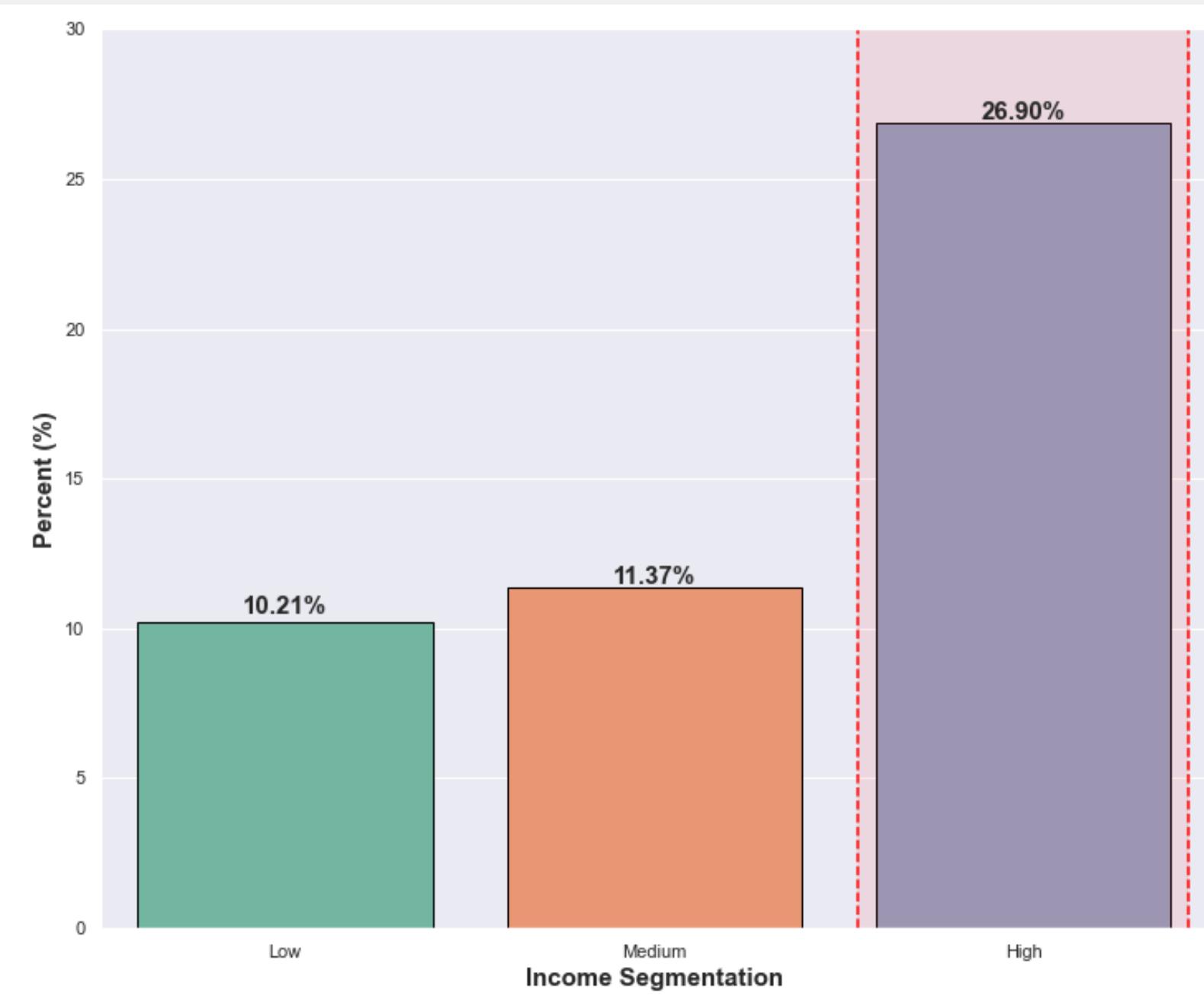


EDA (Exploratory Data Analysis)



Rasio customer yang merespon terhadap
campaign berdasarkan kategori
'Education` dan 'Marital_Status`

EDA (Exploratory Data Analysis)



- Pembagian segmentasi income berdasarkan Q3, apabila lebih dari Q3 maka dia 'High', dan kurang dari Q1 maka dia 'Low'



[Welcome](#)[Hello!](#)[Background](#)[EDA](#)

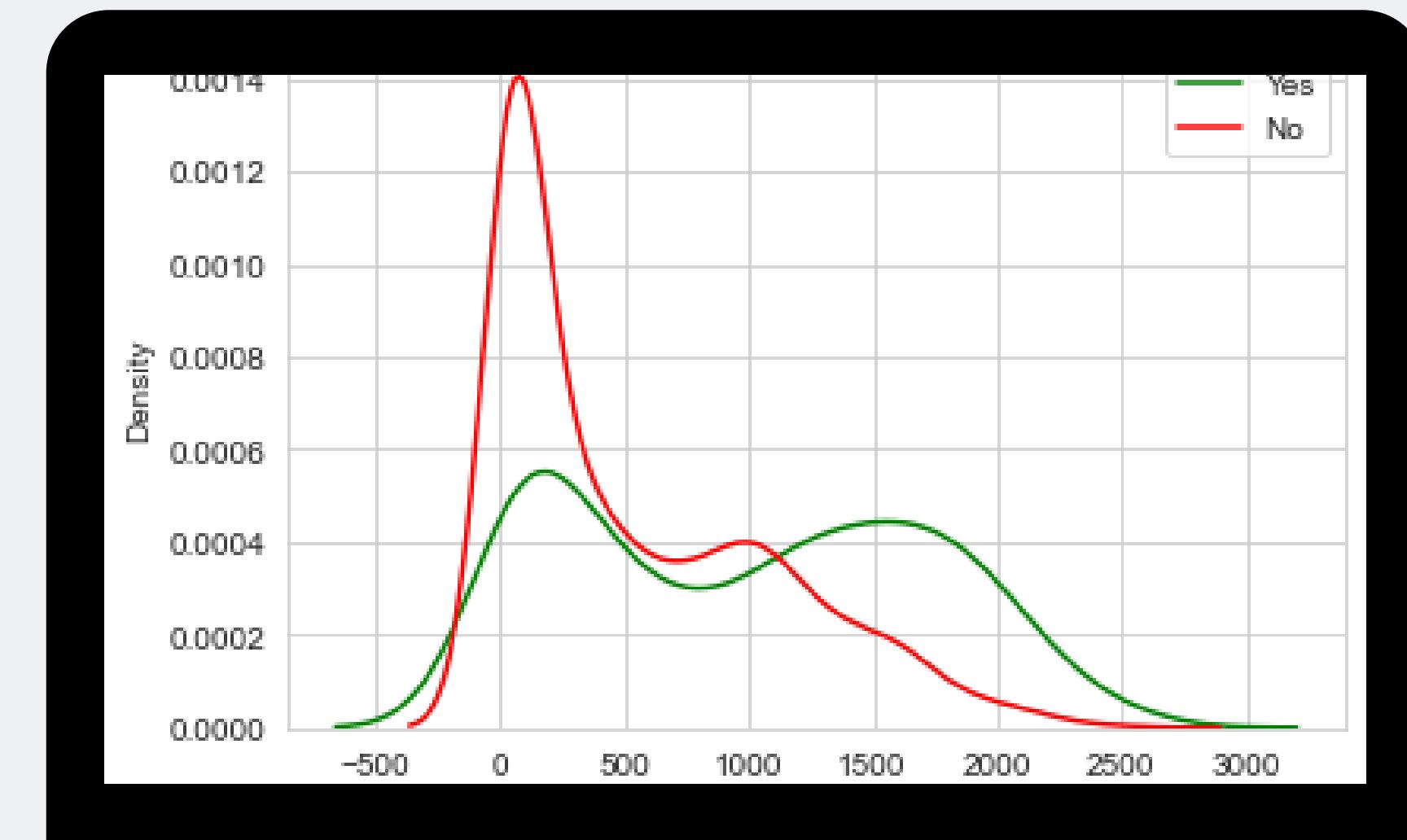
X

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[← → Q Data Understanding](#)

EDA (Exploratory Data Analysis)

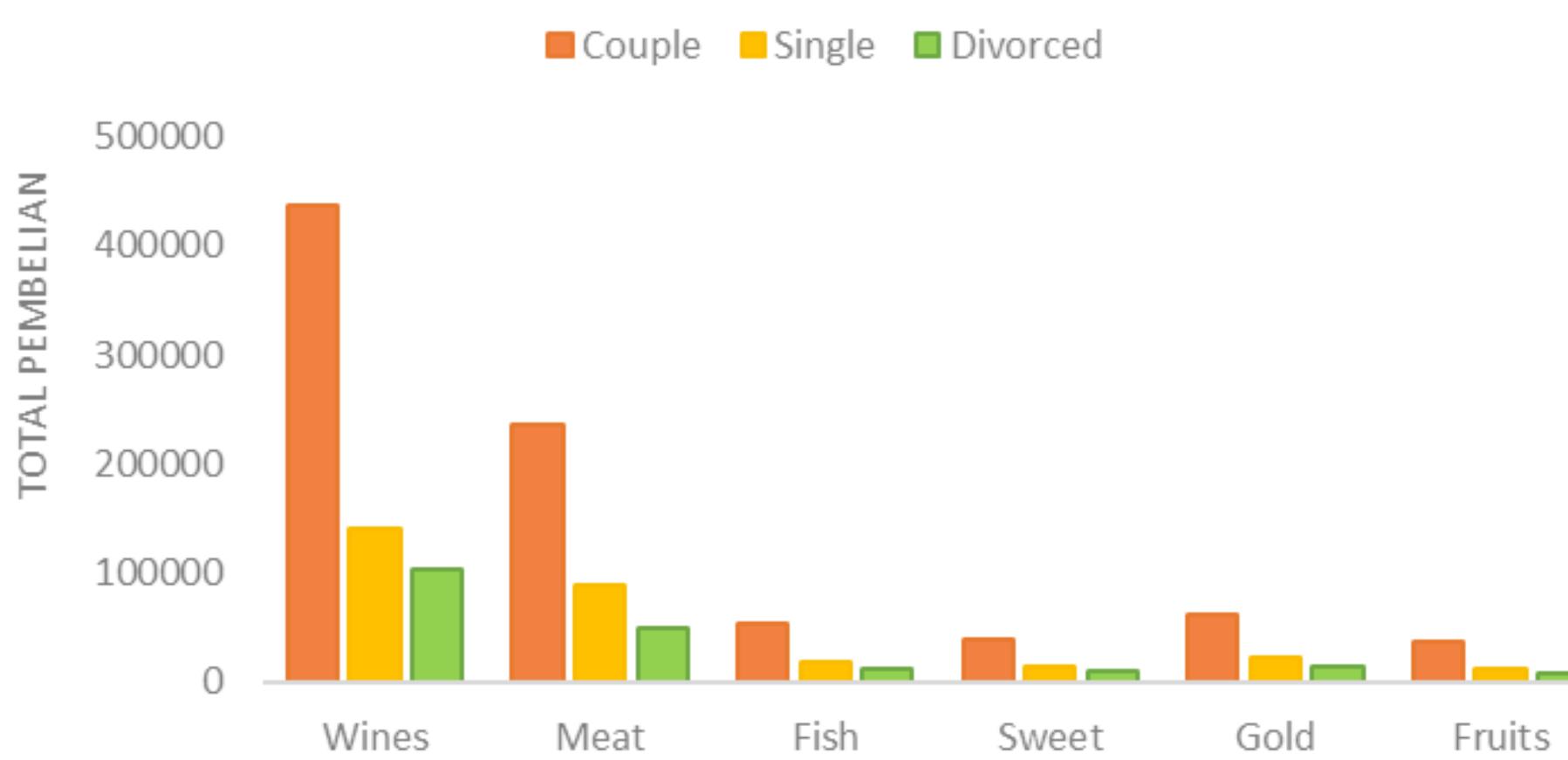
Total spent yang customer keluarkan untuk pembelian semua produk.



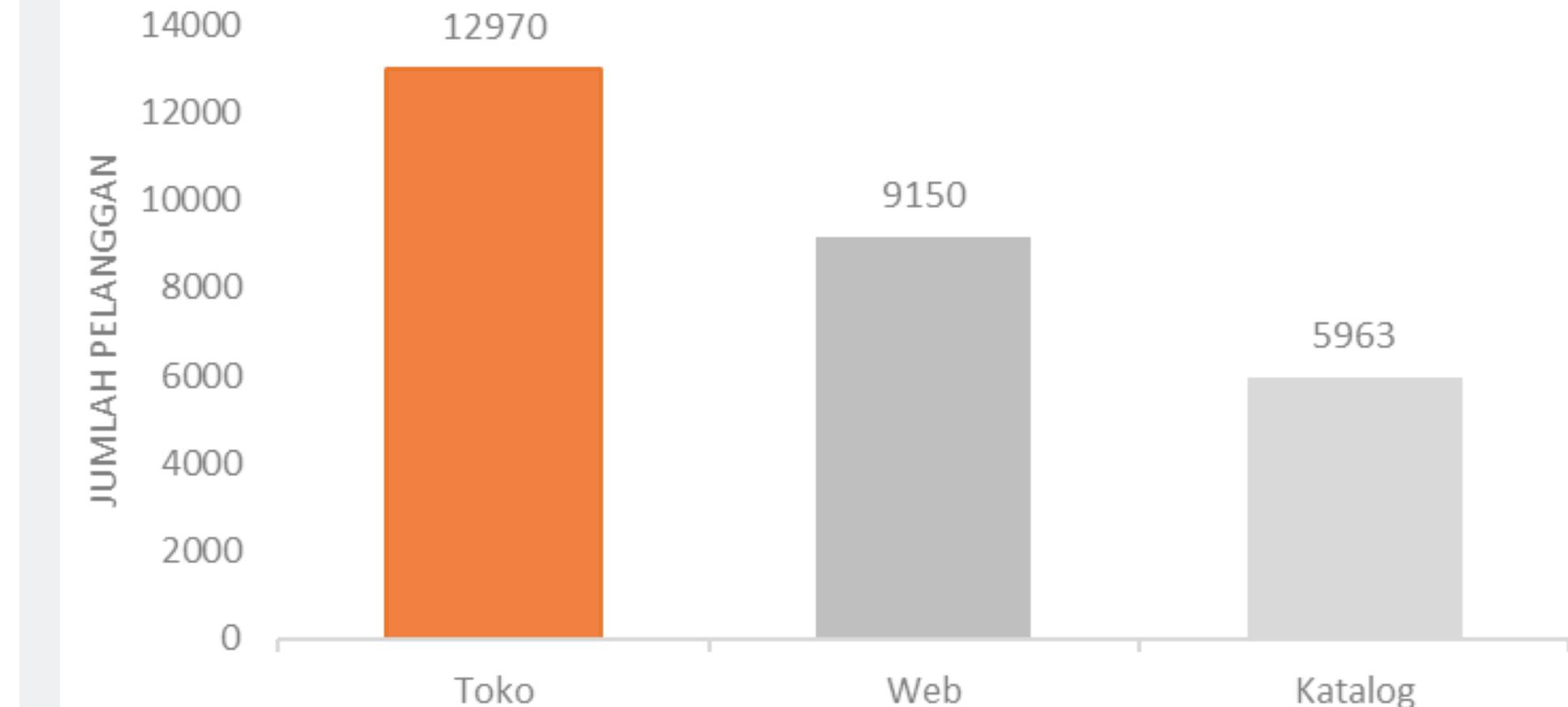
← → Q Data Understanding

EDA (Exploratory Data Analysis)

TOTAL PEMBELIAN PRODUK
BERDASARKAN STATUS PERNIKAHAN



JUMLAH PELANGGAN
BERDASARKAN TEMPAT PEMBELIAN



Welcome

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Background

EDA

Pre-Processing

X +

← → Q Data Pre-Processing

Data Pre-Processing





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← → Q Data Pre-Processing

Data Pre-Processing

1. ID	: int64	11. MntFruits	: int64	21. AcceptedCmp1	: int64
2. Year_Birth	: int64	12. MntMeatProducts	: int64	22. AcceptedCmp2	: int64
3. Education	: object	13. MntFishProducts	: int64	23. Accepted Cmp3	: int64
4. Marital_Status	: object	14. MntSweetProducts	: int64	24. AcceptedCmp4	: int64
5. Income	: float64	15. MntGoldProds	: int64	25. AcceptedCmp5	: int64
6. Kidhome	: int64	16. NumDealPurchases	: int64	26. Complain	: int64
7. Teenhome	: int64	17. NumWebPurchases	: int64	27. Z_CostContact	: int64
8. Dt_Customer	: object	18. NumCatalogPurchases	: int64	28. Z_Revenue	: int64
9. Recency	: int64	19. NumStorePurchases	: int64	29. Response	: int64
10. MntWines	: int64	20. NumWebVisitsMonth	: int64		

Total Columns : 29

Total Rows : 2240



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EDA

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← → Q Data Pre-Processing

Data Pre-Processing



**HANDLING MISSING
VALUE**

Drop 26 Rows

**HANDLING
DUPLICATE**

0 Duplicated Data

FEATURE ENCODING

- a. Label Encoding : [Education], [Has Child], [Segmentasi]
- b. One Hot Encoding : [Marital Status]

TRAIN-TEST SPLIT

Data train : 70% (1551 rows)
Data test : 30% (665 rows)

FEATURE SELECTION

- a. Drop Irrelevant Features
- b. Feature Importances

**HANDLING
IMBALANCE TARGET**

SMOTE 50%

Welcome

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EDA

Pre-
Processing

Modelling

X +

← → Q Modelling & Evaluation



Modelling and Evaluation



← → Q Feature & Model

Feature

- Education
- Marital_Status
- Income
- Recency
- MntWines
- MntFruits
- MntMeatProducts
- MntFishProducts
- MntGoldProds
- NumDealsPurchases
- NumCatalogPurchases
- NumStorePurchases
- NumWebVisitsMonth

- AcceptedCmp1
- AcceptedCmp2
- AcceptedCmp3
- AcceptedCmp4
- AcceptedCmp5
- Complain
- month_Customer
- Spending
- Total_Cmp
- Has_child
- Segmentasi
- MS_couple
- MS_Divorced
- MS_single

Model

- KNN
- Logistic regression
- Decision Tree
- Rendom Forest
- AdaBoost
- XGBoost

Target

- Response





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Background

EDA

Pre-
Processing

Modelling

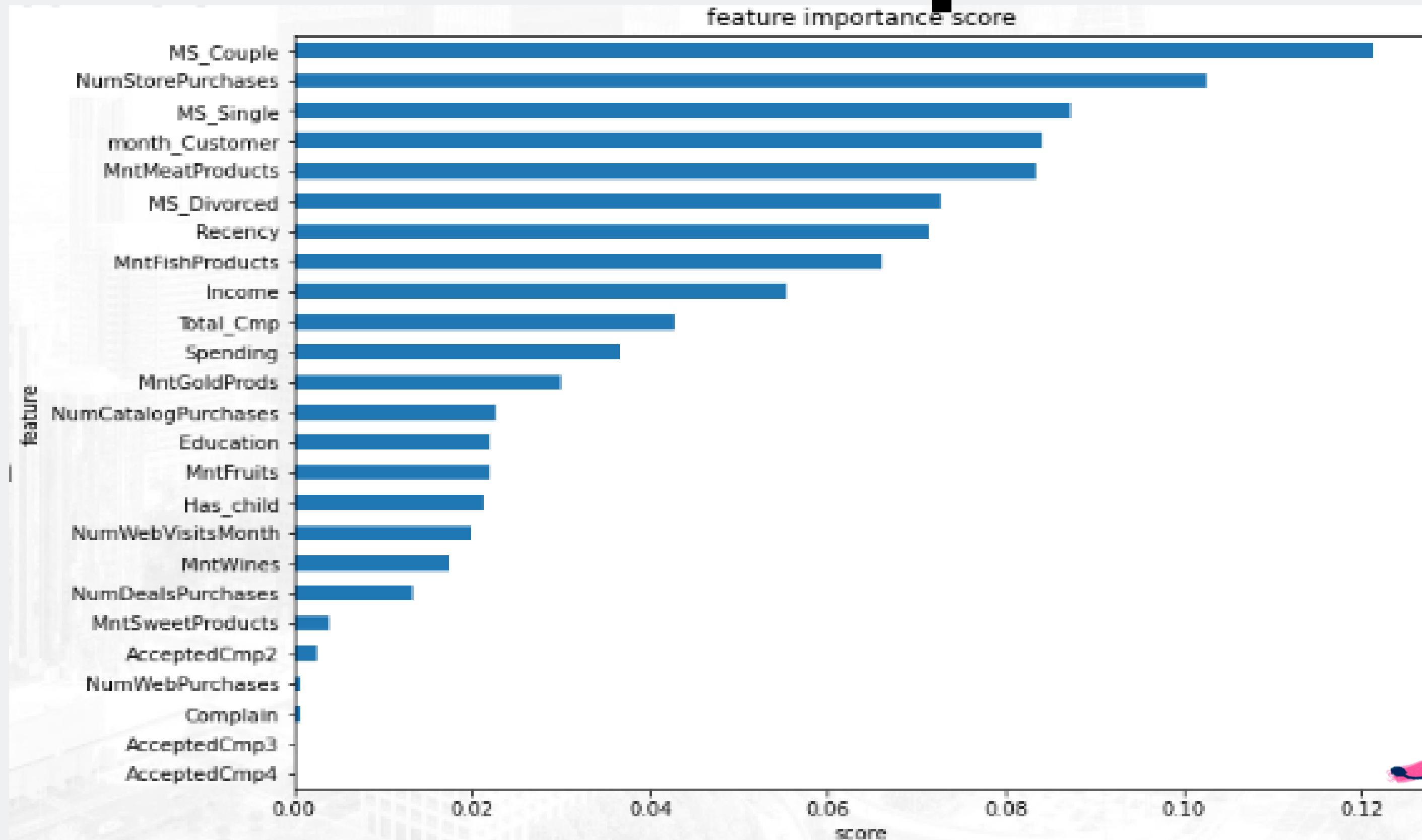
X +

70 %**Train Data****30 %****Test Data****Hyperparameter Tuning****Best n_estimators: 1500****Best learning_rate: 0.05831****Best algorithm: SAMME.R**

Modeling

JENIS MODEL	Accuracy	Precision	Recall	F1-Score	AUC
KNN	84%	43%	42%	43%	76%
LOGISTIC REGRESSION	83%	40%	36%	38%	77%
DECISION TREE	82%	42%	60%	50%	81%
RANDOM FOREST	90%	68%	59%	63%	92%
ADABOOST	91%	69%	65%	67%	94%
XGBOOST	88%	59%	55%	57%	92%

Feature Importance

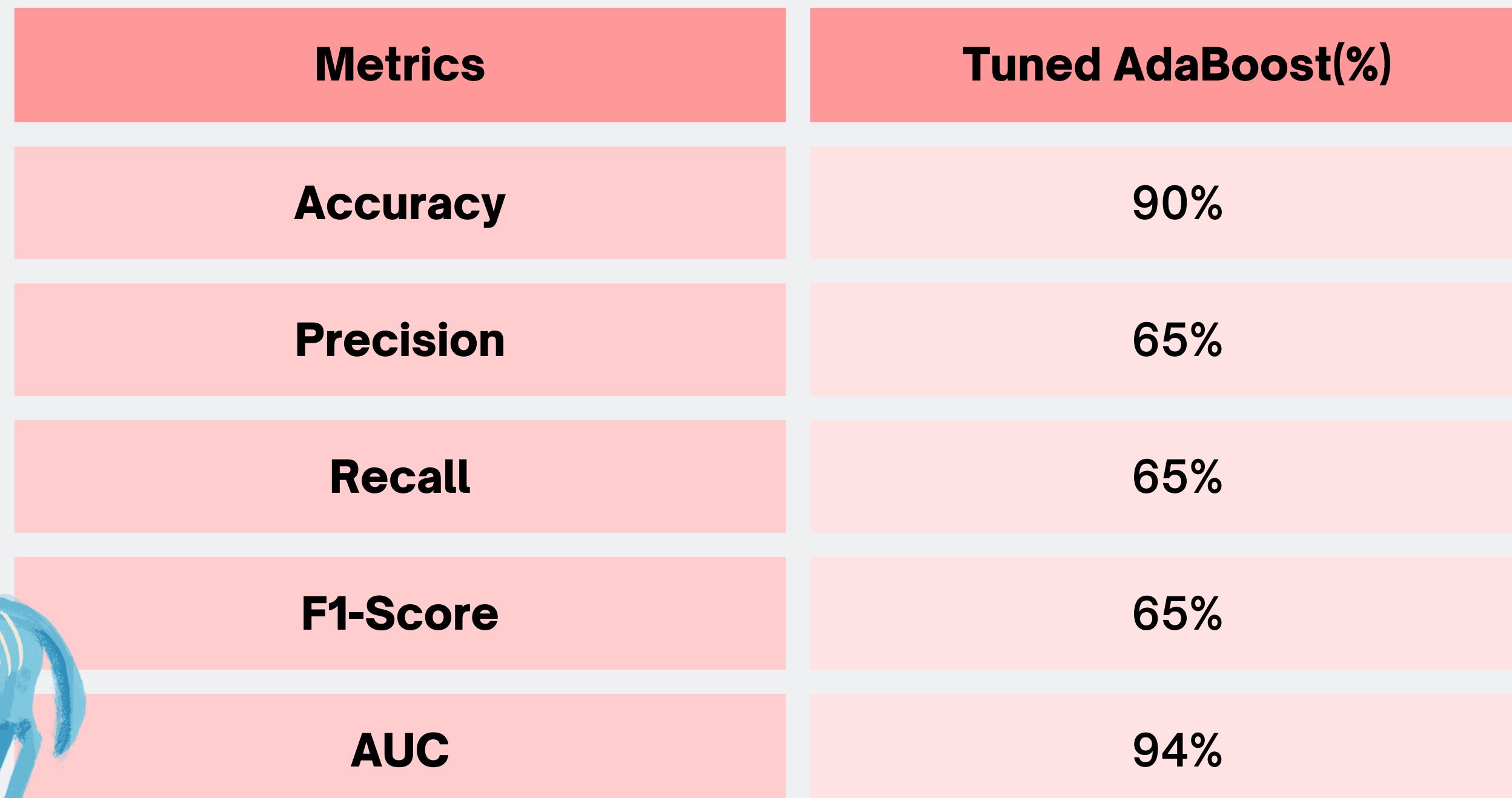


- Ms_Couple merupakan feature terpenting dalam model.
- NumDealsPurchases, MntSweetProducts, AcceptedCmp2, NumWebPurchases, Complain, AcceptedCmp3 & AcceptedCmp4 (memiliki pengaruh paling rendah -- tidak mencapai 0.01)



Feature Selection

Feature NumDealsPurchases, MntSweetProducts, AcceptedCmp2, NumWebPurchases, Complain, AcceptedCmp3 & AcceptedCmp4 di drop, kemudian iterasi model dengan best parameter model.



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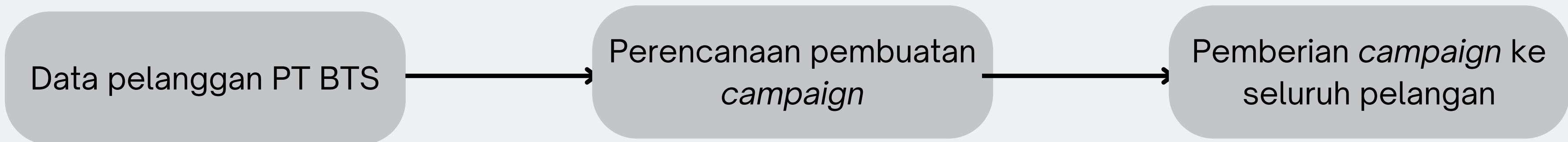
← → Q Business Insight & Reccomendations

Bussiness Insight and Recommendation

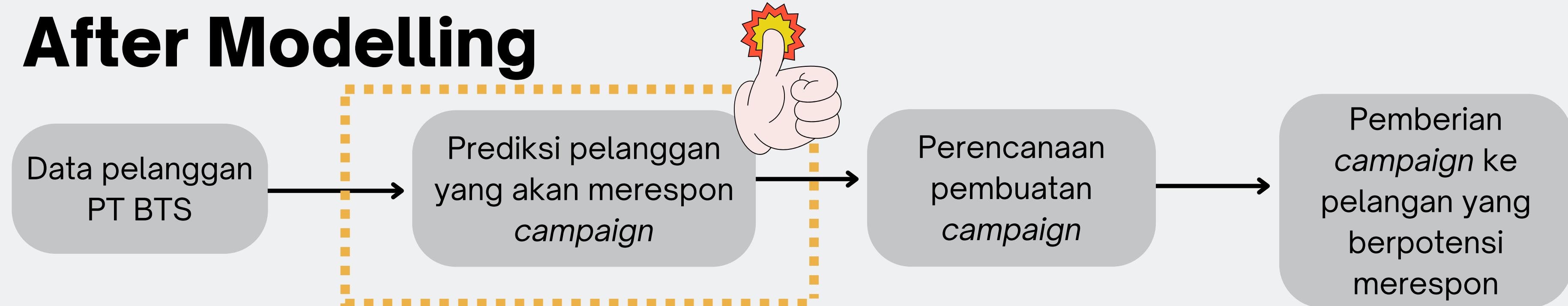


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Before Modelling



After Modelling



Machine Learning

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Processing](#)[Modelling](#)[Insight](#)[X](#) [+](#)[← → Q](#) Business Recommendation

Business Recommendation:



Memberikan diskon wine



ps id A

Memberikan flyer berisi penawaran diskon special wine kepada pelanggan yang datang ke store.

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Processing](#)[Modelling](#)[Insight](#)[X](#) [+](#)[← → Q Business Recommendation](#)

Business Recomendation



Penawaran paket bundling daging dengan produk lain



Pembuatan program 'loyalty reward' berdasarkan lama keanggotaan dan total belanja



Welcome

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EDA

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X +

← → Q Marketing Cost

Marketing Cost

Total Pendapatan secara Keseluruhan
Total penjualan produk

\$1.356.988,00

Rata-rata Pendapatan per *Campaign*
Total pendapatan / Jumlah campaign (=6)

\$226.164,67

Rata-rata Pendapatan per *Customer*
Total pendapatan / Jumlah customer (=2240)

\$100,97

Marketing Cost per Customer

Asumsi 10% dari Rata-rata Pendapatan per *Customer*

\$10,09

Marketing Cost per Campaign

Marketing Cost per Customer * Jumlah Customer (=2240)

\$22.601,60



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Model Impact

per Campaign

Before

15% Acceptance Rate

ROI

50%

((Revenue - Marketing Cost) / Marketing Cost) * 100



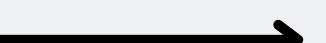
After

94% Acceptance Rate

Revenue

\$ 33,6K

Pendapatan per Customer * Total Customer



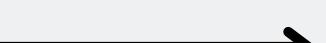
840%

+790%

Net Profit

\$ 11,2K

Pendapatan Campaign - Cost Campaign



\$ 210,8K

+526%

\$ 188,3K

+1580%



Welcome

Hello!

Background

EDA

Pre-
Processing

Model

Insight

End



← → Q Q Finish

Thank You!

