HAKUNA MATATA
TRAVEL INSURANCE

Customer Segmentation Report

TODAY'S AGENDA

BACKGROUND

Insurance company TravelGo plans to launch travel insurance packages that cover losses due to COVID-19 after the end of the pandemic lockdown. Currently, there is only one option of travel insurance package.

GOAL

Increase the percentage of customers purchasing the latest insurance to 40%.

BUSINESS METRICS

Conversion rate (percentage of customers who purchase insurance divided by the number of registered customers)

PROBLEM

64.3%
TravelGo customers did **not** purchase travel insurance in 2019.

19.6%
increase in marketing expense annually but **flat ROI** growth.

SCOPE OF PROJECT

Objectives:
- ★ Create customer profiles.
- ★ Develop more relevant products.
- ★ Recommend a more effective and personalized marketing strategy.

Solution:
Build an unsupervised machine learning model that is capable of automatically classifying customers based on customer characteristics & provide appropriate marketing strategy recommendations according to customer segmentation.
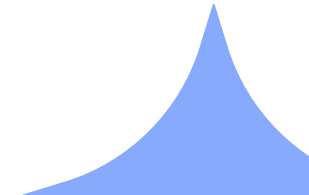
OUR DATA TEAM

—Ana

— ATHIYA

—FAQIH

—JERIO

—MUTIARA

—NICKEN

—RISA

our stages

stage 0

Planning

Determining the objectives, preparing the steps that will be carried out

stage 1

EDA

Exploratory Data Analysis: Descriptive statistics, univariate analysis, multivariate analysis

stage 2

Pre-Processing

Handling data

our STAGES

STAGE 3

STAGE 4

Modeling

Testing models to find
the suitable one

Insight

Generating insight
from the model output

Final
Recommendation!
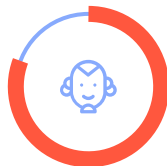
ABOUT DATASET

Content

- Age
- Employment Type
- Graduate Or Not
- Annual Income
- Family Members
- Chronic Disease
- Frequent Flyer
- Ever Travelled Abroad
- Travel Insurance

Summary Value

Dominated by private employees and entrepreneurs, university graduates, do not suffer from chronic diseases, do not often travel by plane and have never traveled abroad.

AGE

25–35

Productive age

The highest frequency is 28 years old, with an annual income of 800,000, and has 4 family members.

35.73%

Customers bought travel insurance

Pre-ProcessinG WorKFLOW

Data cleansing

- Handling missing value
- Handling duplicate data
- Handling outliers
- Drop unnecessary columns 'unnamed : 0'

Feature encoding

Label encoding ›››

from No & Yes to 0 & 1

Handle class imbalance

Data has class imbalance ››› SMOTE

Feature Engineering

1. **Feature Selection (RFE)** ››› Age, EmploymentType, GraduateorNot, AnnualIncome, FamilyMembers, EverTravelledAbroad, FrequentFlyer
2. **Feature Extraction** ››› TravelExperience

Standardization

Standardize all numerical features

Modeling

DATA CLEANSING

MISSING VALUES

DUPLICATE VALUES

OUTLIERS

FEATURE ENCODING

Method: Label Encoding

BEFORE

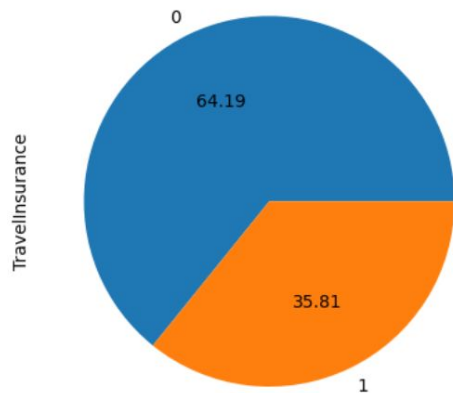|	Age	Employment Type	GraduateOrNot	AnnualIncome	FamilyMembers	ChronicDiseases	FrequentFlyer	EverTravelledAbroad	TravelInsurance
0	31	Government Sector	Yes	400000	6	1	No	No	0
1	31	Private Sector/Self Employed	Yes	1250000	7	0	No	No	0
2	34	Private Sector/Self Employed	Yes	500000	4	1	No	No	1

AFTER

	Age	Employment Type	GraduateOrNot	AnnualIncome	FamilyMembers	ChronicDiseases	FrequentFlyer	EverTravelledAbroad	TravelInsurance
0	31	1	1	400000	6	1	0	0	0
1	31	0	1	1250000	7	0	0	0	0
2	34	0	1	500000	4	1	0	0	1

Class Imbalance

Method: SMOTE
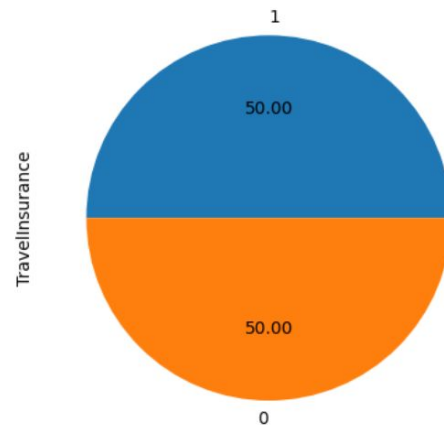
Feature Extraction

TravelExperience

EverTravelledAbroad	FrequentFlyer	TravelExperience
0	0	0
0	1	1
1	0	2
1	1	3

Feature Selection

Age

GraduateOrNot

EmploymentType

ChronicDiseases

AnnualIncome

TravelExperience

FamilyMembers

STANDARDIZATION

Method: StandardScaler

✦ BEFORE

	Age	Employment Type	GraduateOrNot	AnnualIncome	FamilyMembers	ChronicDiseases	TravelInsurance	TravelExperience
0	31	1	1	400000	6	1	0	0
1	31	0	1	1250000	7	0	0	0
2	34	0	1	500000	4	1	1	0
3	28	0	1	700000	3	1	0	0

✦ AFTER

	Age	Employment Type	GraduateOrNot	AnnualIncome	ChronicDiseases	TravelExperience	FamilyMembers
0	0.463430	1.576694	0.417552	-1.414061	1.612339	-0.603887	0.774964
1	0.463430	-0.634238	0.417552	0.842012	-0.620217	-0.603887	1.396373
2	1.493446	-0.634238	0.417552	-1.148641	1.612339	-0.603887	-0.467855
3	-0.566587	-0.634238	0.417552	-0.617800	1.612339	-0.603887	-1.089265

K-means clustering

Elbow Method
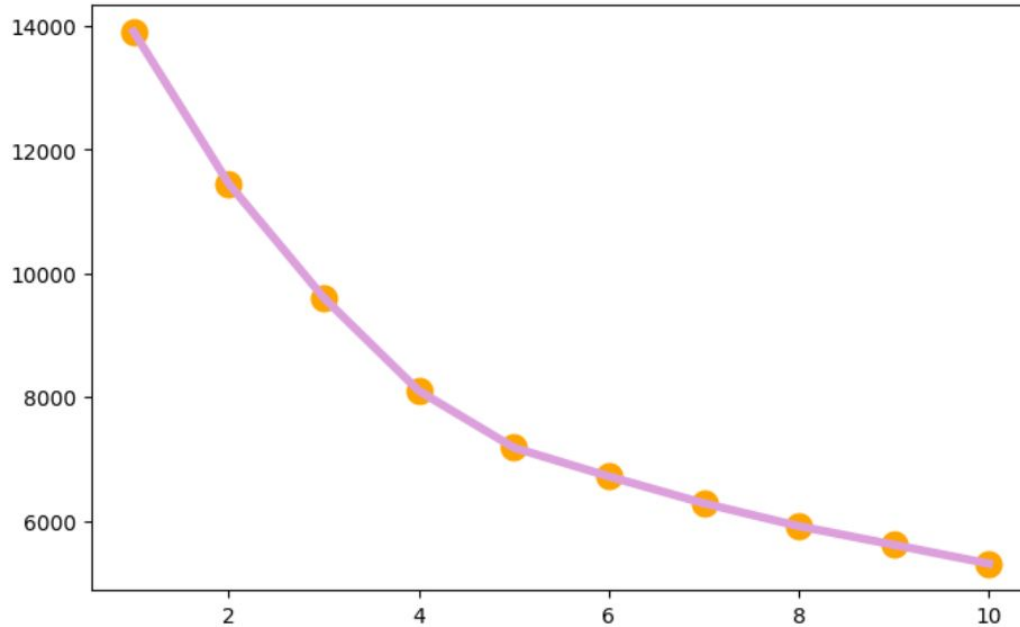
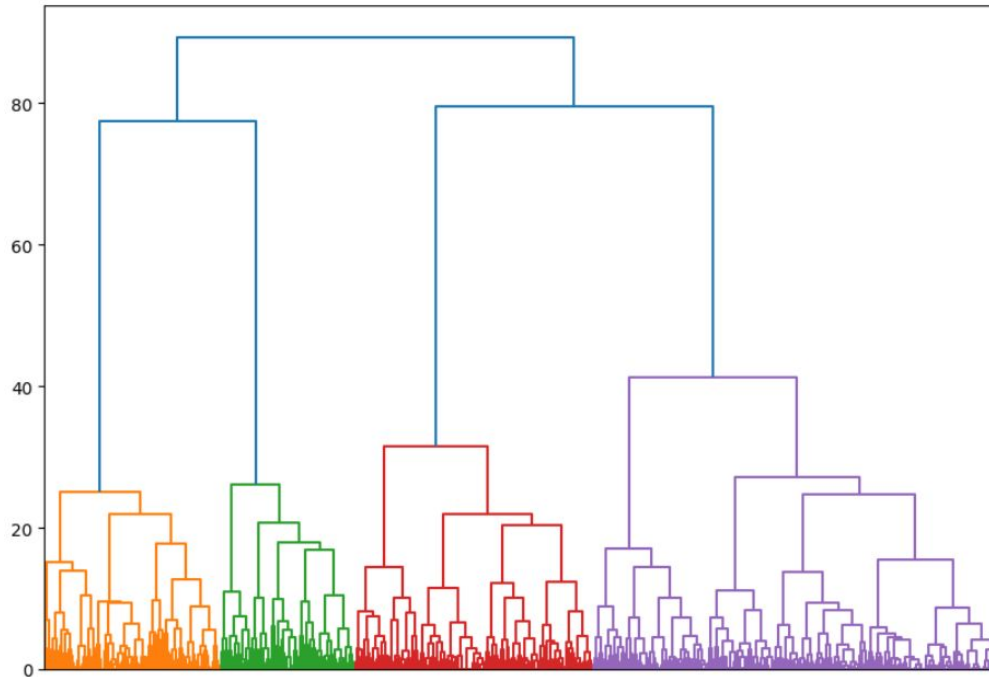Optimum number of cluster: 4

K-Means CLUSTERING

Average feature values for each cluster

Cluster	Age	Employment Type	GraduateOrNot	AnnualIncome	Family Members	Chronic Diseases	Travel Experience	Travel Insurance
0	30	0	0	800,000	4	0	0	0
1	29	0	1	900,000	5	0	0	0
2	29	0	1	1,400,000	4	0	2	1
3	31	1	1	750,000	5	0	0	0

Cluster	Jumlah Pelanggan
0	845
1	502
2	360
3	280

AGGLOMERATIVE CLUSTERING

Average feature values for each cluster

Cluster	Age	Employment Type	GraduateOrNot	AnnualIncome	Family Members	Chronic Diseases	Travel Experience	Travel Insurance
0	29	0	1	900,000	5	0	0	0
1	31	1	1	700,000	5	0	0	0
2	29	0	1	1,400,000	5	0	2	1
3	30	0	0	800,000	4	0	0	0

Cluster	Jumlah Pelanggan
0	844
1	495
2	367
3	281

AGGLOMERATIVE CLUSTERING

Dendrogram

Optimum number of cluster: 4

MODEL
EVALUATION

Adjusted Rand Score for K-Means & Agglomerative Clustering:

0.9846
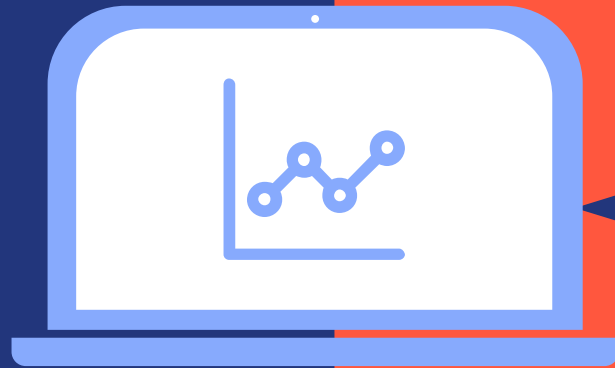
Hyperparameter Tuning

K-means clustering

parameter	description	values
n_clusters	The number of clusters to form	2, 3, 4, 5, **6**
init	Method for initialization of cluster centroids	**'K-means++'**, 'random'
max_iter	Maximum number of iterations of the k-means algorithm	**300**, 500, 1000
tol	Relative tolerance of the difference in the cluster centers to declare convergence.	**1e-4**, 1e-5, 1e-6

Hyperparameter Tuning

Agglomerative Clustering

parameter	description	values
n_clusters	The number of clusters to form	2, 3, **4**, 5, 6
linkage	The linkage criterion determines which distance to use between sets of observation. The algorithm will merge the pairs of cluster that minimize this criterion.	**'ward'**, 'complete', 'average', 'single'

Feature Importance | ANOVA

AGE
P-value: 9.5495e-06

EMPLOYMENT TYPE
P-value: 0.0

GRADUATE OR NOT
P-value: 0.0

ANNUAL INCOME
P-value: 2.9732e-200

CHRONIC DISEASES
P-value: 0.4915

TRAVEL EXPERIENCE
P-value: 0.0

FAMILY MEMBERS
P-value: 0.5066

CLUSTER
P-value: 0.0

customer segmentation

RINA

- Works in the private sector/self-employed.
- Not a university graduate.
- Has below average income.
- Rarely travels domestically and internationally.

BUDI

- Works in the private sector/self-employed.
- Graduated from university.
- Has an average income.
- Rarely travels domestically and internationally.

JHOE

- Works in the private sector/self-employed.
- Graduated from university.
- Has above average income.
- Frequently travels domestically and internationally.

DEWI

- Works in government.
- Graduated from university.
- Have below average income.
- Rarely travels domestically and internationally.

BUSINESS RECOMMENDATION

RINA

Low Income with Low Mobility

- Affordable price
- Offer attractive discount
- Domestic coverage
- Basic benefits: reimbursement for medical expenses and personal accidents during the trip.
- Emphasize ads for family
- Collaborate with online booking platforms and tour & travel companies
- Educate via email, social media, and travel fairs

BUDI

Medium Income with Low Mobility

- Higher price than Rina
- Offer attractive discount
- Domestic & international coverage
- Added benefits: trip delay/cancellation, baggage delay/loss, and damage/loss of valuables.
- Emphasize ads for family
- Collaborate with online booking platforms and tour & travel companies
- Educate via email, social media, and travel fairs
- This segment is our main focus due to high total customer, low conversion rate and potential spending power

BUSINESS RECOMMENDATION

JHOE
High Income with High Mobility

- Suitable price
- Domestic and international coverage
- Premium benefits: gadget and home protection, as well as legal assistance at destination.
- Special offers for business trips or exclusive vacations
- Offer loyalty programs. Include long-term benefits and renewal discounts.
- Collaborate with airlines and hotels
- Emphasize ads for family
- Collaborate with online booking platforms and tour & travel companies
- Educate via email, social media, and travel fairs

DEWI
Civil Servants with Low Mobility

No special packages are provided.

PACKAGE RECOMMENDATION

	Rina	Budi	Jhoe
Product Name	TravelEasy Domestic	TravelGuard Standard	EliteTravel Premium
Benefits	• Reimbursement for medical expenses due to disease, pandemic, and accident during the trip. • Cost of body repatriation • Protection against flight delays. • Protection against loss or damage to baggage.	• All the benefits of "TravelEasy Basic". • Domestic & international • Protection against trip delays and cancellations with higher reimbursement. • Coverage against delayed, damaged and lost baggage with higher reimbursement. • Protection against loss or damage to valuables (incl. gadgets and electronic equipment).	• All the benefits of "TravelGuard Standard". • Protection for insurer's house during travel. • Legal assistance at travel destination. • Canceling or rescheduling a trip due to rejected visa. • Financial losses & costs due to cancellation of business trips.

- All packages have 2 options of trip frequency: Single trip and annual multi-trip
- All packages have 2 options of people coverage: Individual and Family (no limit on number of member)
- International coverage options: Asia Pacific, Europe, Worldwide excluding North America, Worldwide

conversion Rate Projection

Cluster	Name	Customers who buy travel insurance		Total customers	Conversion Rate	
		Current	Expected		Current	Expected
0	Rina	86	100	280	30.71	35.71
1	Budi	199	300	845	23.55	35.30
2	Jhoe	304	320	360	84.44	88.89
3	Dewi	121	121	502	24.10	24.10
Total		710	710	1987	**35.73**	**42.33**

References

- https://www.businessinsider.com/personal-finance/travel-insurance-statistics-winter-2023-1
- Travel Insurance Purchase Intention: An Integrated Model of Risk Perception, Trust, and Value (2018) by Wenbo Wu, Jie Wu, and Yining Zhang
- https://www.zurich.co.id/id-id/produk-asuransi/untuk-hidup/zurich-travel-insurance
- https://www.allianz.co.id/produk/asuransi-umum/asuransi-perjalanan.html
- https://www.bni-life.co.id/id/lifeblog/Ketahui-6-Jenis-dan-Manfaat-Asuransi-Perjalanan-saat-Liburan

THANK YOU!

ANY QUESTIONS?

More about our project: