

# **FSMK INTERVIEW ASSIGNMENT**

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# **PROBLEM STATEMENT**

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How do we increase our  
**customers' LTV** by targeting  
**different segments of customers**  
to cross sell the new **Credit Line**  
product to



# DATA PREPROCESSING

# ABOUT THE DATA

## **Data contains**

Customer-specific data

- Customer ID
- Join date
- Age
- Source of acquisition

Company-specific data

- Company location
- Company size
- Company industry
- Company revenue

Loan-specific data

- Loan ID
- Loan amount
- Loan disbursal date
- Loan default count

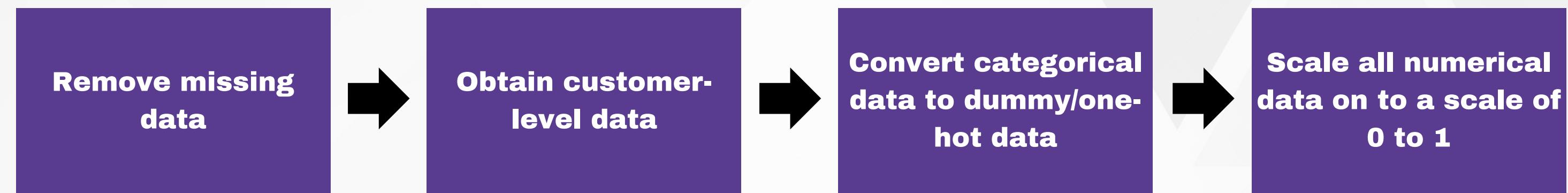
## **Dimensions**

6,880 entries

3,960 unique customers

# PREPROCESSING

**What is done on preprocessing stage?**



**How to aggregate  
loan-level data?**

Loan value: **AVERAGE**  
Credit line taken: **SUM**  
Term loan taken: **SUM**

**Example**

Convert 4 different company sizes into 4 separate variables for each size, with values 1 or 0

**Why?**

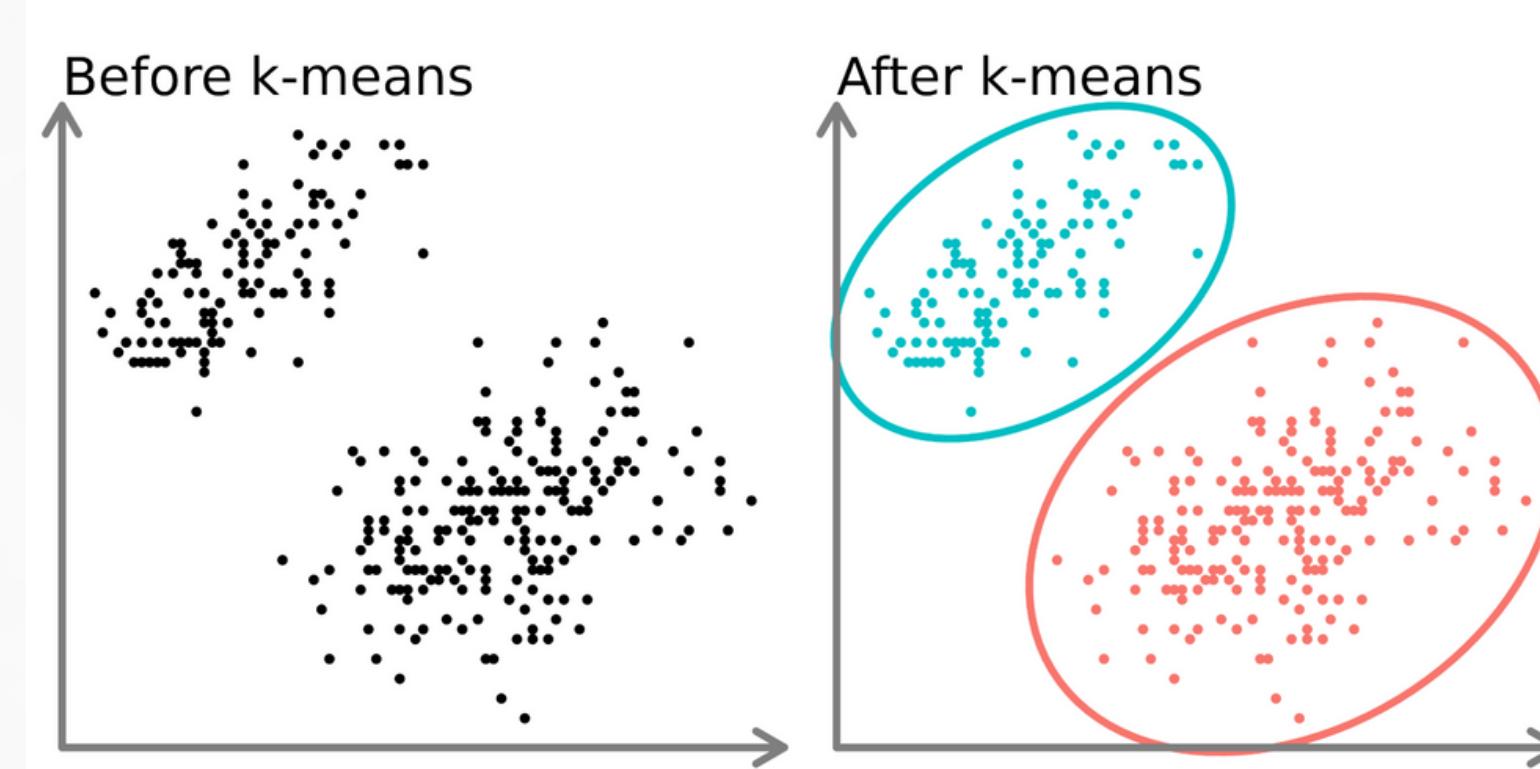
So that segmentation will treat all variables as equally important

**Post Pre-processing**

**3,604 customers**

# METHODOLOGY

## K-MEANS

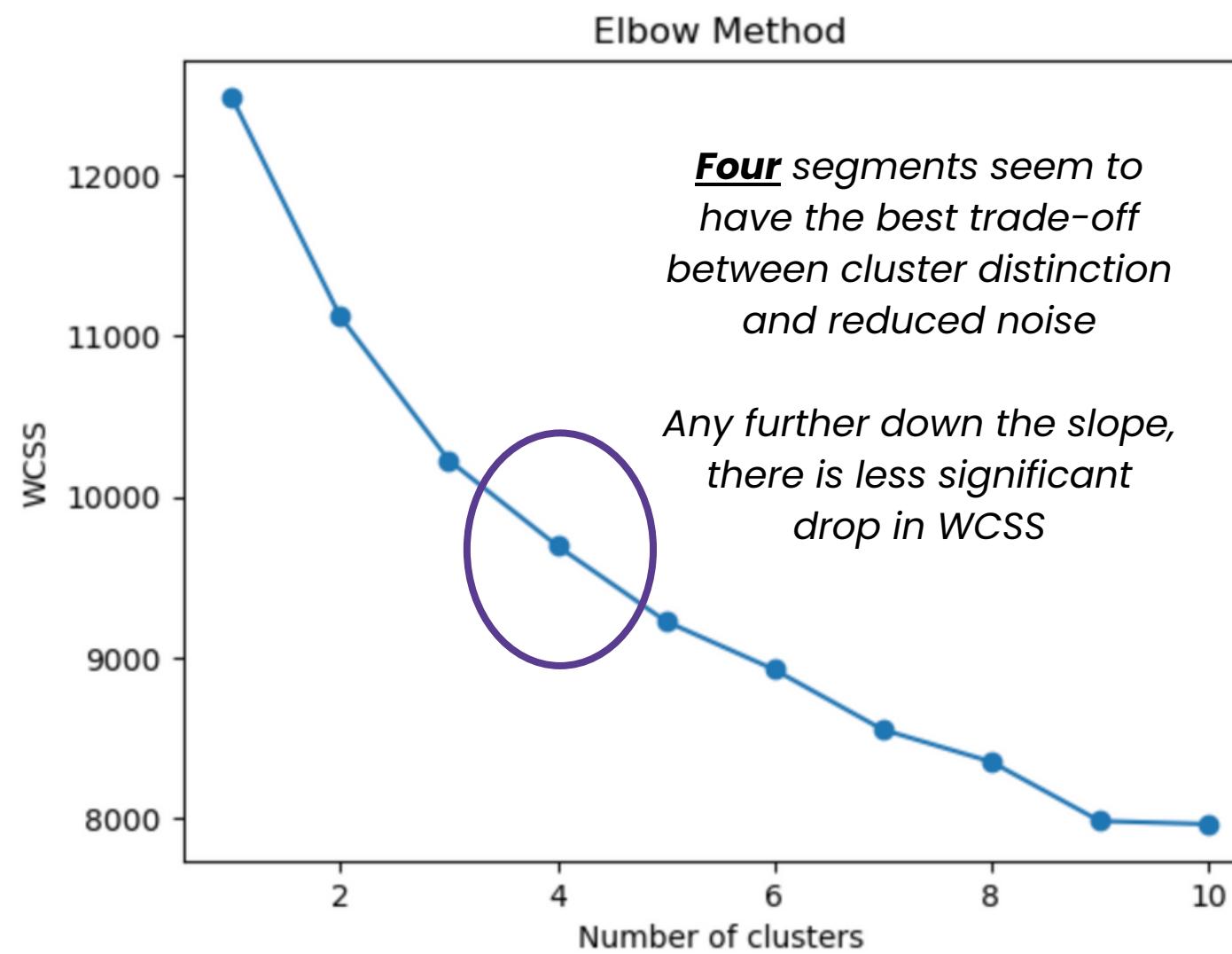


*K-means is a centroid-based clustering algorithm, where we **calculate the distance between each data point and a centroid to assign it to a cluster***

*The goal is to identify **which cluster each customers belong to***

# ELBOW METHOD

WCSS: Within cluster sum-of-squares  
In other words, it is the total distance of each point in cluster to its centres  
The lower the WCSS, the better the model is



The elbow method helps you find the **sweet spot** for k-means clustering, that is, the optimal number of clusters where you strike a balance between **(1) having enough clusters to capture the underlying structure of your data** and **(2) not creating too many clusters that you're just fitting noise**

# FINDINGS

# THE FOUR SEGMENTS

	High-risk Vehicle Repair Businesses	Young, Micro Entrepreneurs	Safe, High-value Recent Joiners	Core Constituents
<b>Segment size</b>	945	873	623	1,163
<b>Joined</b>	Joined relatively earlier	Joined more recently	All joined in 2023	Joined relatively earlier
<b>Age group</b>	35-44 y.o. majority	Higher proportion of 25-34 year olds	35-44 y.o. majority	Slightly higher proportion of older age groups
<b>Company size</b>	Small is majority, but higher proportion of large and medium	All micro	Small is majority, but higher proportion of large and medium	Almost all are small businesses
<b>Industry</b>	All are vehicle repairs	Higher proportion of F&B and vehicle repairs	Higher proportion of vehicle repairs	Higher proportion of F&B
<b>Acq. channel</b>	Higher % of employee referral	Higher % of digital marketing and platform partners	Higher % of brokers	Higher % of platform partners
<b>Average revenue</b>	\$13,467	\$2,903	\$9,191	\$10,997
<b>Average loan value</b>	\$12,266	\$3,486	\$15,916	\$9,978
<b>% who has defaulted</b>	35%	23%	16%	29%

# SEGMENT 1

High-risk Vehicle Repair Businesses		Comments
Segment size	945	
Joined	Joined relatively earlier	High loan value and high revenue tells us that these <b>vehicle repair customers</b> are <b>higher value</b> compared to others
Age group	35-44 y.o. majority	But the <b>high % of those who have defaulted</b> at some point in the past means that there is higher risk tagged to these customers
Company size	Small is majority, but higher proportion of large and medium	<b>Recommendations</b>
Industry	All are vehicle repairs	Workshops for employee referral programs to increase awareness on high-risk customers
Acq. channel	Higher % of employee referral	Workshops for existing customers and new customers with similar profiles on debt management
Average revenue	\$13,467	Credit line products with flexible repayment terms tailored to vehicle repairs' cash flow patterns and business cycles
Average loan value	\$12,266	
% who has defaulted	35%	

## SEGMENT 2

	Young, Micro Entrepreneurs	Comments
Segment size	873	This segment contains businesses that are <b>much smaller (micro)</b> , and <b>managed by younger customers</b>
Joined	Joined more recently	<b>Digital marketing acquisition</b> is higher for this segment, while join date-wise they are <b>relatively new</b> . Most came from <b>F&amp;B and vehicle repairs industry</b> .
Age group	Higher proportion of 25-34 year olds	
Company size	All micro	<b>Recommendations</b>
Industry	Higher proportion of F&B and vehicle repairs	Continued efforts for digital marketing through social media and other digital channels, making use of various tools such as cookies to identify similar customer profiles
Acq. channel	Higher % of digital marketing and platform partners	Collaborations with influencers or industry experts in the auto/F&B space (e.g. seminars, campaigns, and content marketing) who have a strong following among younger audiences
Average revenue	\$2,903	
Average loan value	\$3,486	
% who has defaulted	23%	

# SEGMENT 3

	Safe, High-value Recent Joiners	Comments
Segment size	623	This segment contains newer customers, with <b>all of them joining in 2023</b> . Percentage of default is lower compared to other segments, despite <b>difference between average loan value and average revenue being the biggest</b> .
Joined	All joined in 2023	
Age group	35-44 y.o. majority	<b>Broker-assisted channel</b> is somewhat quite successful for this segment, while industry-wise <b>majority are vehicle repairs</b> .
Company size	Small is majority, but higher proportion of large and medium	
Industry	Higher proportion of vehicle repairs	With newer customers, both success stories/testimonials and referral programs would be good ways to tap on to their relatively higher interest and excitement
Acq. channel	Higher % of brokers	Solicit feedback from newer customers to identify areas for improvement and enhance the credit line product offering. Actively listen to their suggestions, address their concerns, and incorporate their input into future product development and marketing strategies
Average revenue	\$9,191	
Average loan value	\$15,916	
% who has defaulted	16%	

# SEGMENT 4

	Core Constituents	Comments
Segment size	1,163	This segment contains the highest proportion of customers which makes up the overall customer base. More small F&B businesses can be found in this segment, while percentage of default is second highest. Platform partners channel is quite successful with these customers.
Joined	Joined relatively earlier	
Age group	Slightly higher proportion of older age groups	
Company size	Almost all are small businesses	<b>Recommendations</b>  Collaborate closely with platform partners, such as food delivery services or restaurant management platforms, to promote the credit line product to F&B businesses. Offer exclusive promotions, discounts, or incentives for businesses that apply for credit through partner channels
Industry	Higher proportion of F&B	
Acq. channel	Higher % of platform partners	Maintain ongoing communication and engagement with platform partners to identify new opportunities, address challenges, and optimize the partnership for mutual benefit. Provide regular updates, training sessions, and marketing support to ensure the success of the partnership
Average revenue	\$10,997	
Average loan value	\$9,978	
% who has defaulted	29%	

# WORKINGS

## **Google Sheet - Worksheet**

[https://docs.google.com/spreadsheets/d/  
1atKWj22KKO2GRZI\\_EK0pzhjBuHft-  
\\_EPv5Hjw0KcVb0/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1atKWj22KKO2GRZI_EK0pzhjBuHft-_EPv5Hjw0KcVb0/edit?usp=sharing)

## **Jupyter Notebook**

[https://github.com/shiltonjsalindeho/FSMK  
-Case-Study/blob/main/FSMK%20-  
%20Segmentation%20Analysis.ipynb](https://github.com/shiltonjsalindeho/FSMK-Case-Study/blob/main/FSMK%20-%20Segmentation%20Analysis.ipynb)