LEVEL 1: Artificial Intelligence Literacy

Day 1

COURSE OUTLINE

- Introduction to Artificial Intelligence
- History of Artificial Intelligence
- Applications of Artificial Intelligence
- Prompting and Interaction with LLMs
- Regression Example: Predicting Home Prices
- Classification Example: Predicting Buyer Segments
- Unsupervised Learning Example: Understanding Energy Usage

Learning Objectives

- Recognize what Artificial Intelligence is and how it fits into modern technology.
- Understand the development and evolution of AI throughout history.
- Explore real-world applications of AI across various industries.
- Learn the concept of Machine Learning and how machines learn from data.
- Apply regression techniques to predict numerical values.
- Apply classification methods to categorize data into groups.
- Discover hidden patterns in data without labels using unsupervised learning.

Artificial Intelligence

Introduction

What is AI

→ model-based design ⇒ observe physical proces.

↳ potentials / capibit

→ Data-driven approach] =: AI

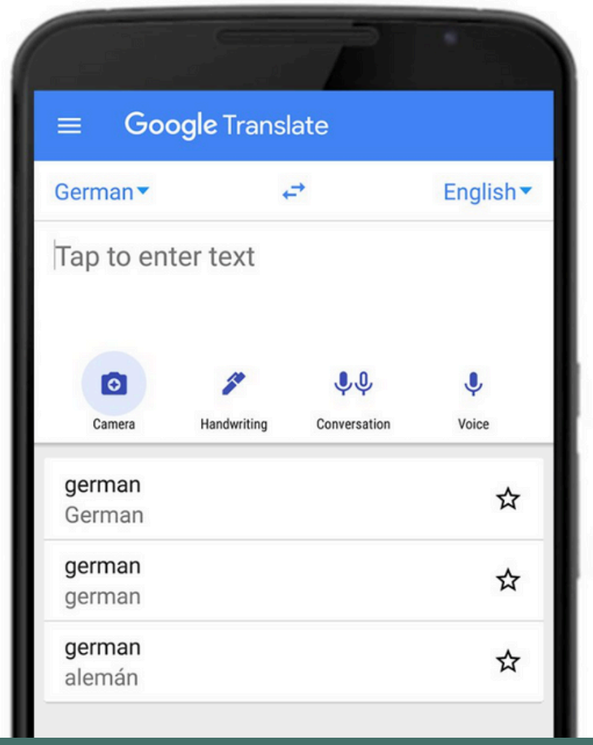
Artificial Intelligence (AI)

- Artificial Intelligence (AI) is a set of technologies that allows computers to learn, reason, and perform advanced tasks that once required human intelligence.

Artificial Intelligence (AI)

- AI enables machines to understand and generate human language

- Real-time translation



Artificial Intelligence (AI)

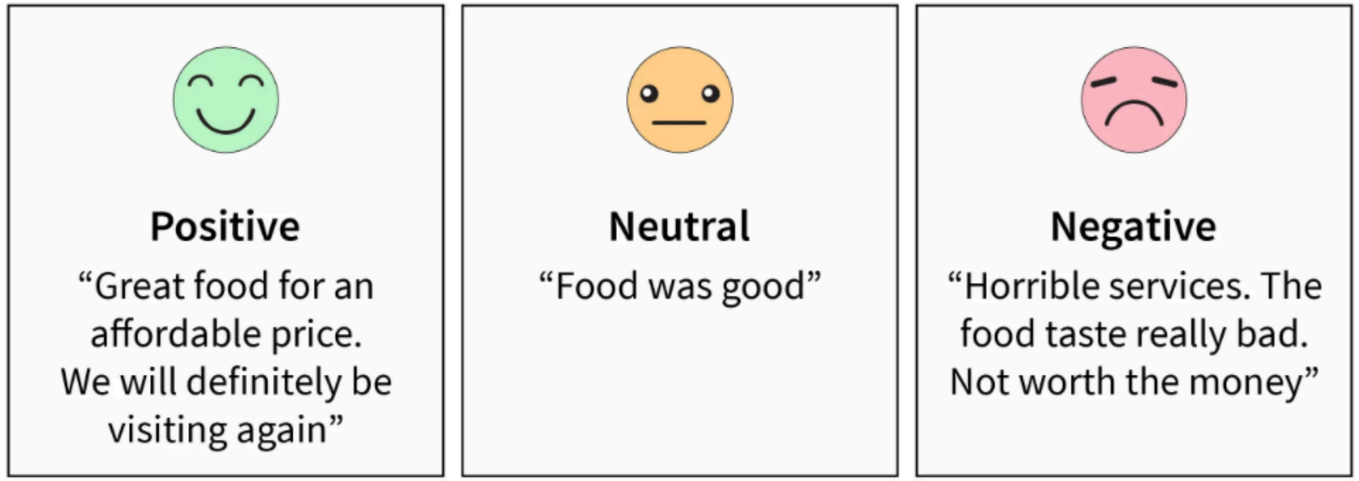
- AI enables machines to understand and generate human language

- Customer support chatbots & voice assistants

Artificial Intelligence (AI)

- AI enables machines to understand and generate human language

» Sentiment analysis for business & social media



Artificial Intelligence (AI)

- AI gives machines the ability to see and understand images, sometimes outperforming human vision.

SAHER

- Plate recognition

Artificial Intelligence (AI)

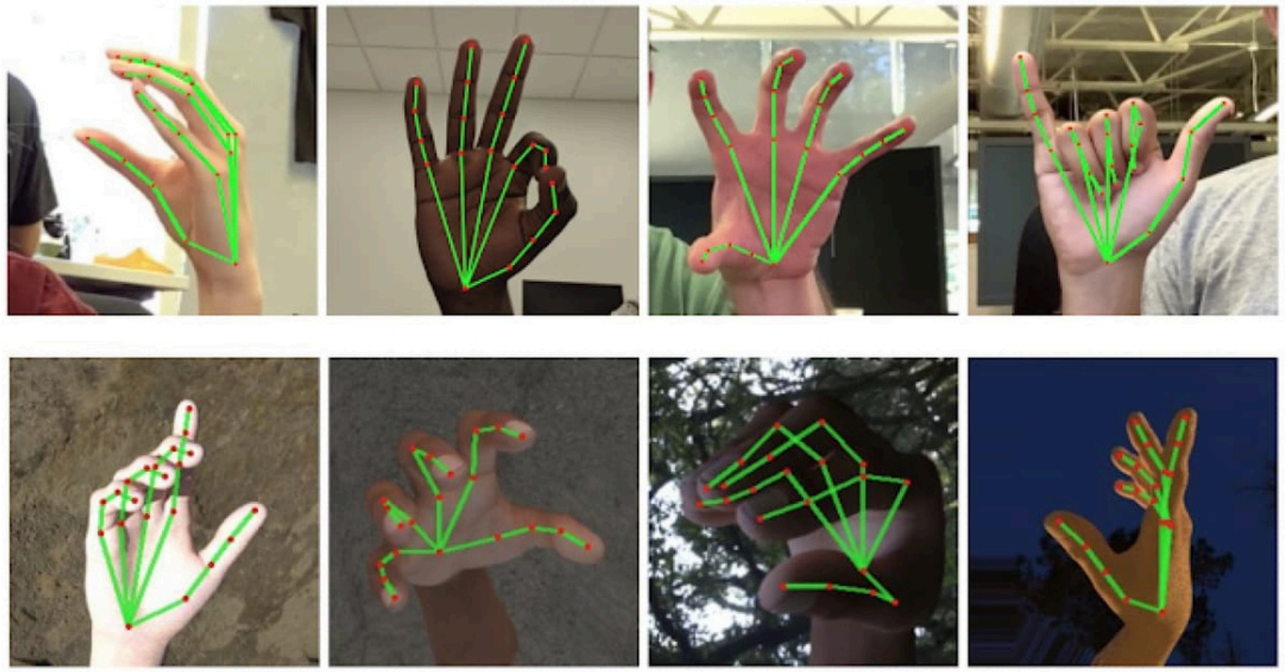
- AI gives machines the ability to see and understand images, sometimes outperforming human vision.

- Face recognition

Artificial Intelligence (AI)

- AI gives machines the ability to see and understand images, sometimes outperforming human vision.

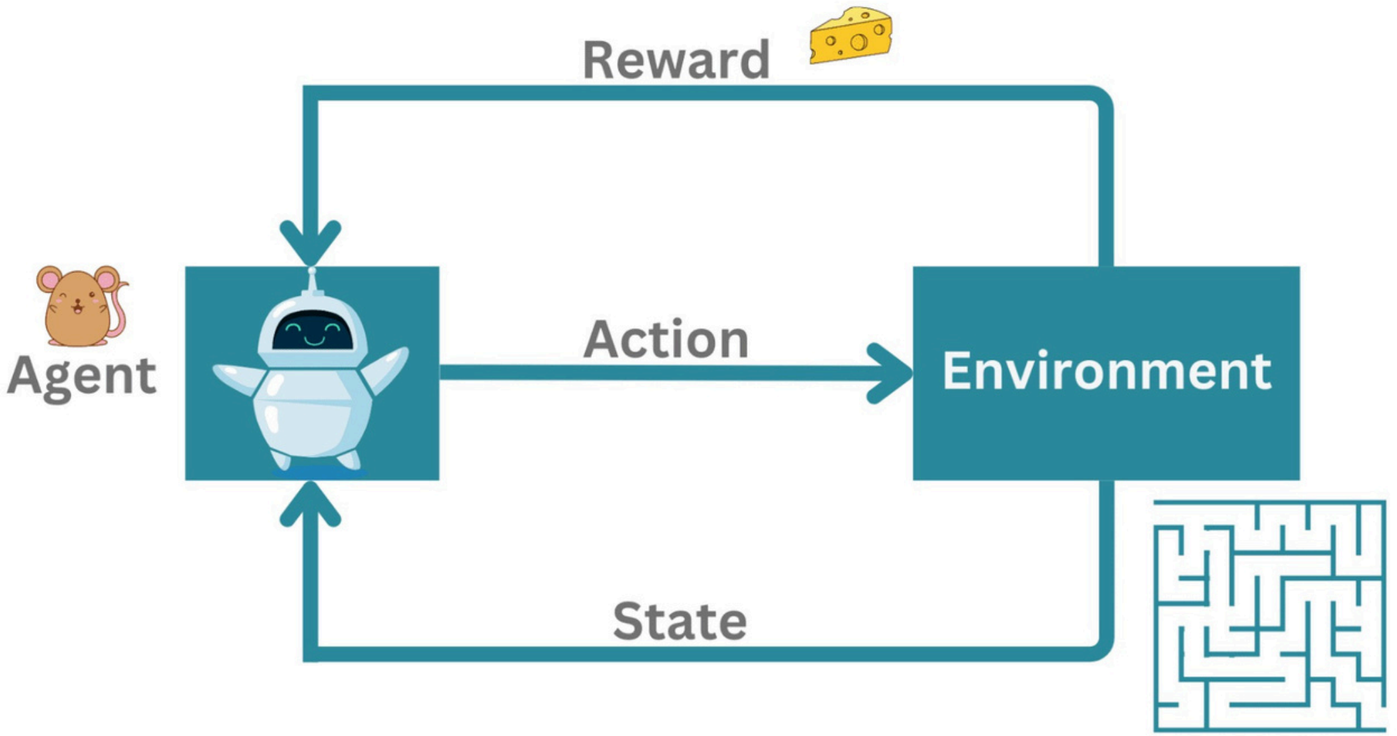
- Gesture recognition



Artificial Intelligence (AI)

- AI trains robots to learn how to walk by trying, making mistakes, and getting rewards when they do it right.

Robot in a Maze

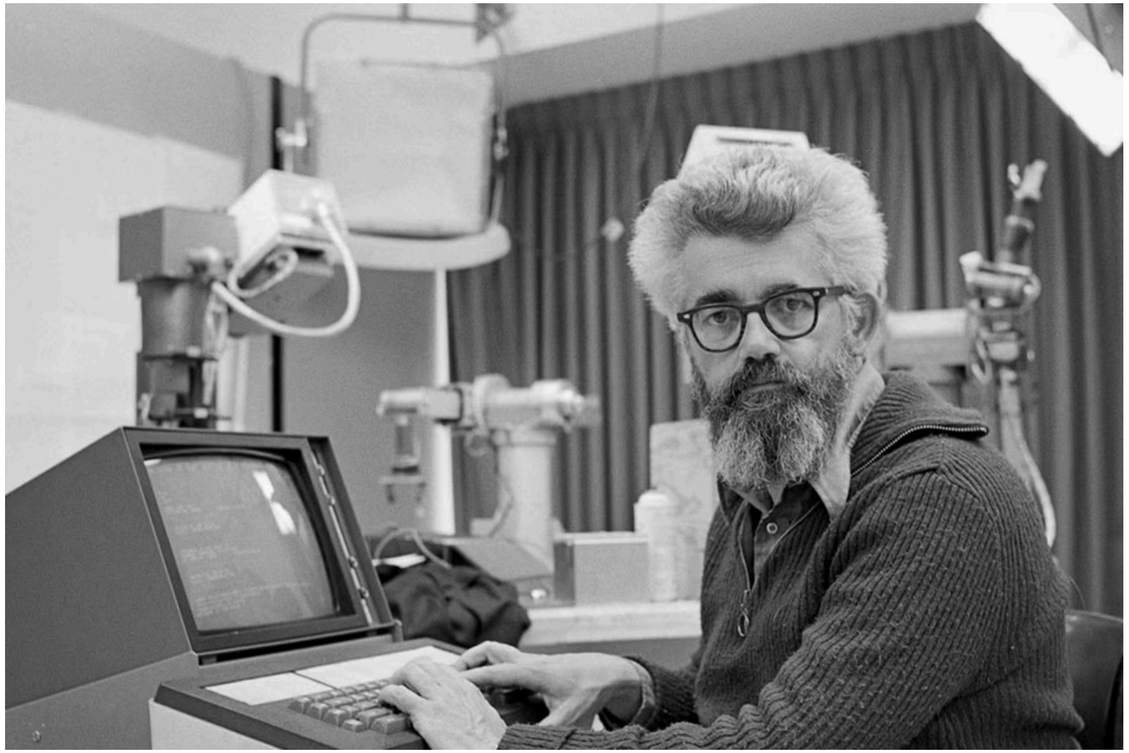


Artificial Intelligence

History

History of Artificial Intelligence

- **1956:** AI was established as a formal field during the Dartmouth Conference.

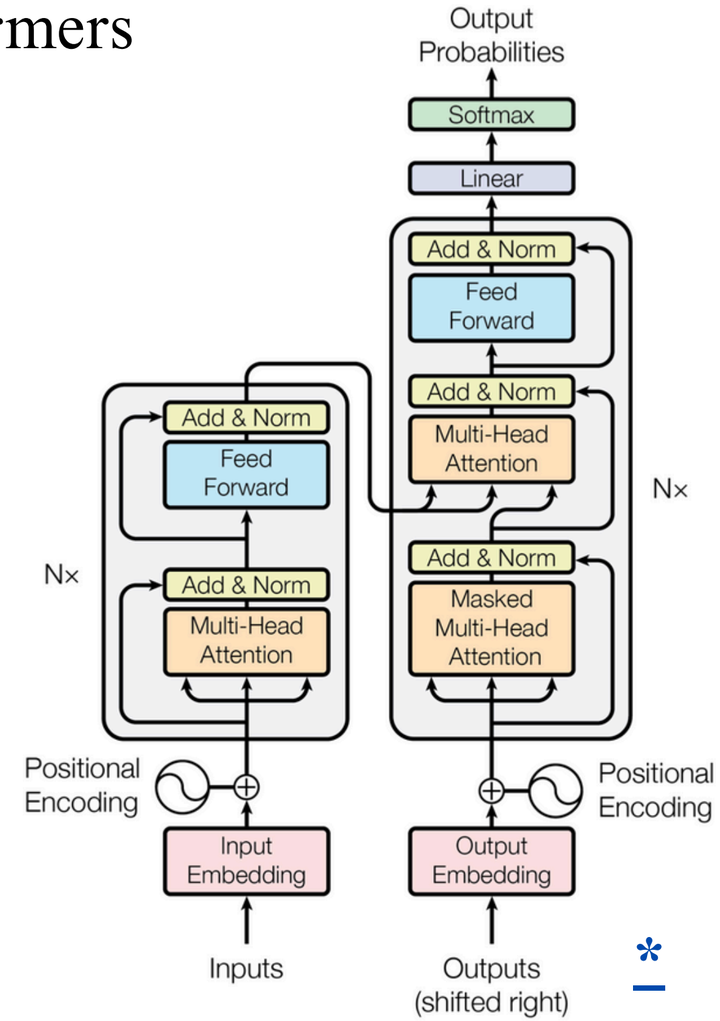


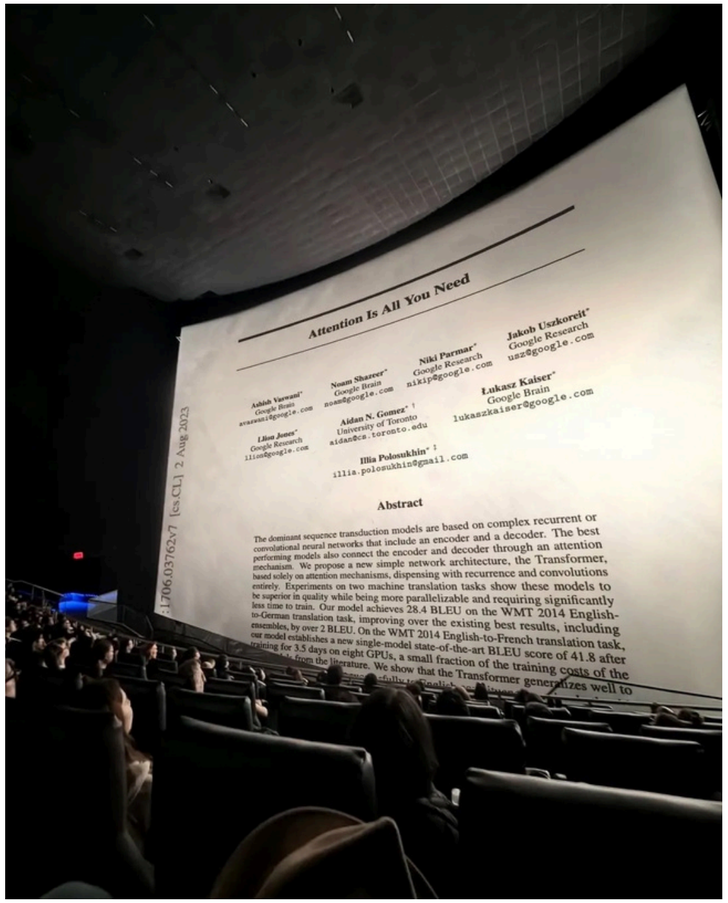
History of Artificial Intelligence

- **1997 :** IBM’s Deep Blue defeats the world chess champion.

History of Artificial Intelligence

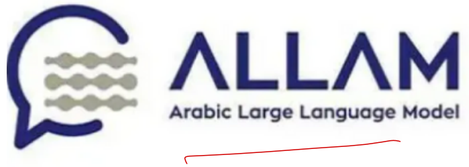
2017: Attention and Transformers

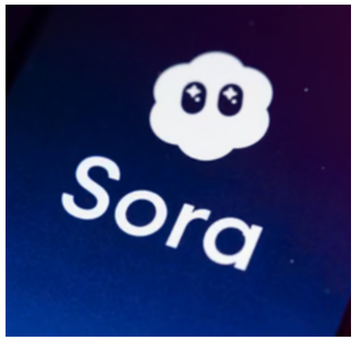




History of Artificial Intelligence

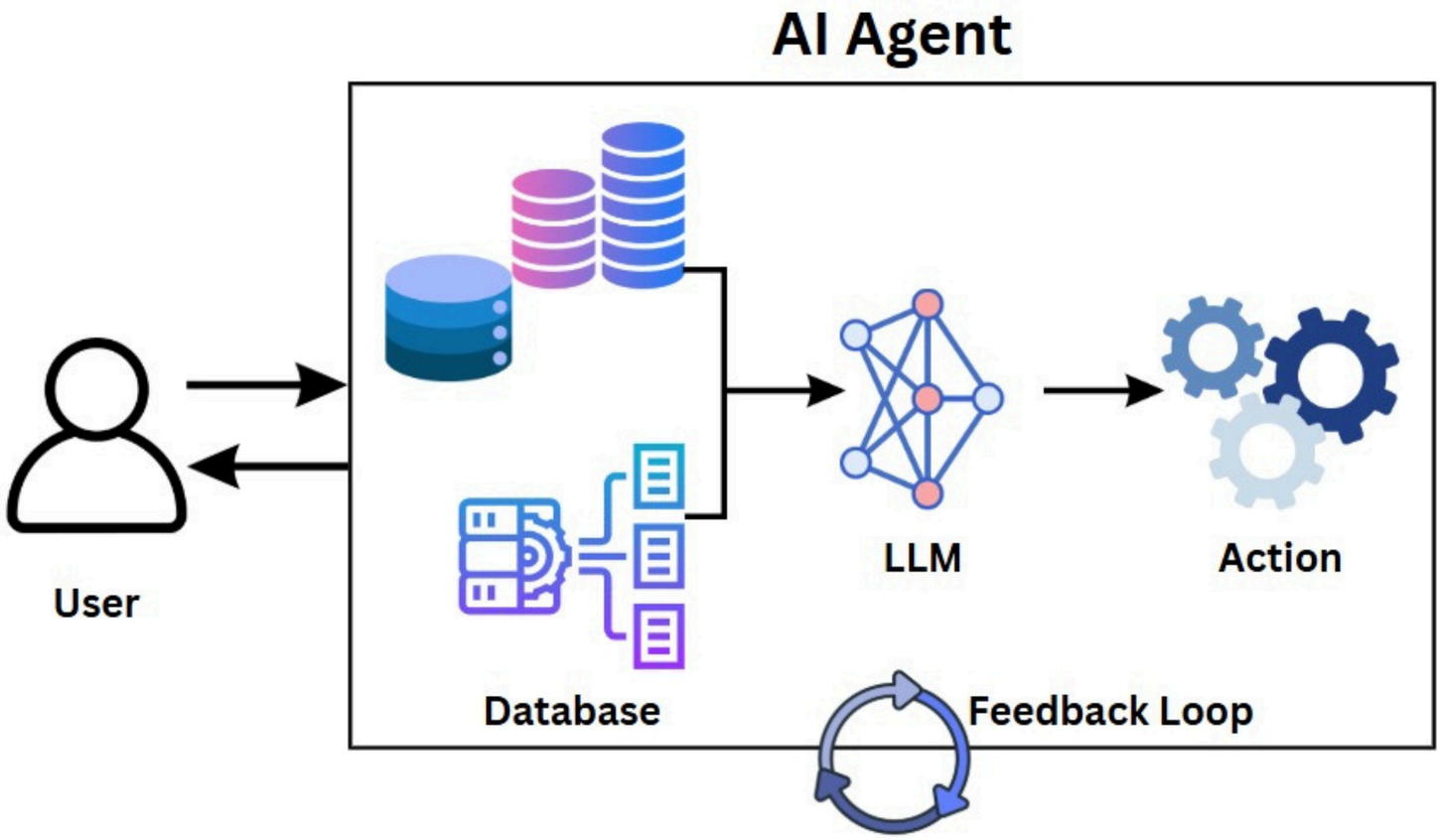
- **2020 to 2025:** LLMs and VLMs





History of Artificial Intelligence

- **2025+:** Agentic AI



What’s next for AI?

Artificial Intelligence

Machine Learning

How does the machine learn to do all of this

ROSHN, a mega-project by PIF building integrated, sustainable communities across Saudi Arabia.

مجموعة روشن
ROSHN GROUP

ROSHN, a mega-project by PIF building integrated, sustainable communities across Saudi Arabia.

مجموعة روشن
ROSHN GROUP

historical
↳ price
↳ location
↳ size

Problem 1:

ROSHN needs an accurate method to estimate home prices in advance.

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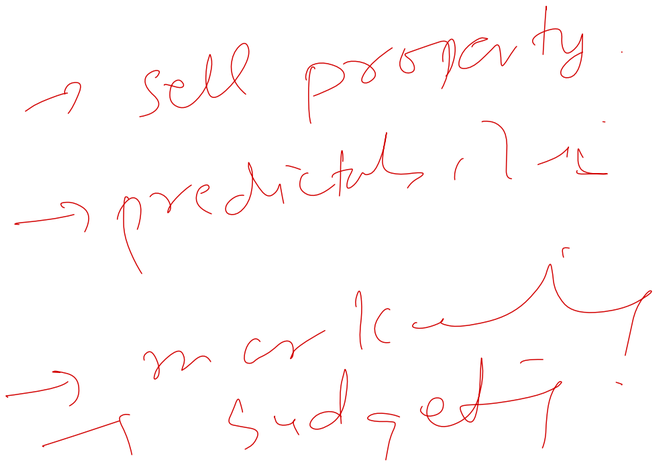

Why?

Problem 1:

ROSHN needs an accurate method to estimate home prices in advance.

Why?

- Too high = fewer sales

Problem 1:

ROSHN needs an accurate method to estimate home prices in advance.

Why?

- Too high = fewer sales,
- Too low = less revenue.

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Why?

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- Too low = less revenue.

Expected sales:

Reality:

 (sold)

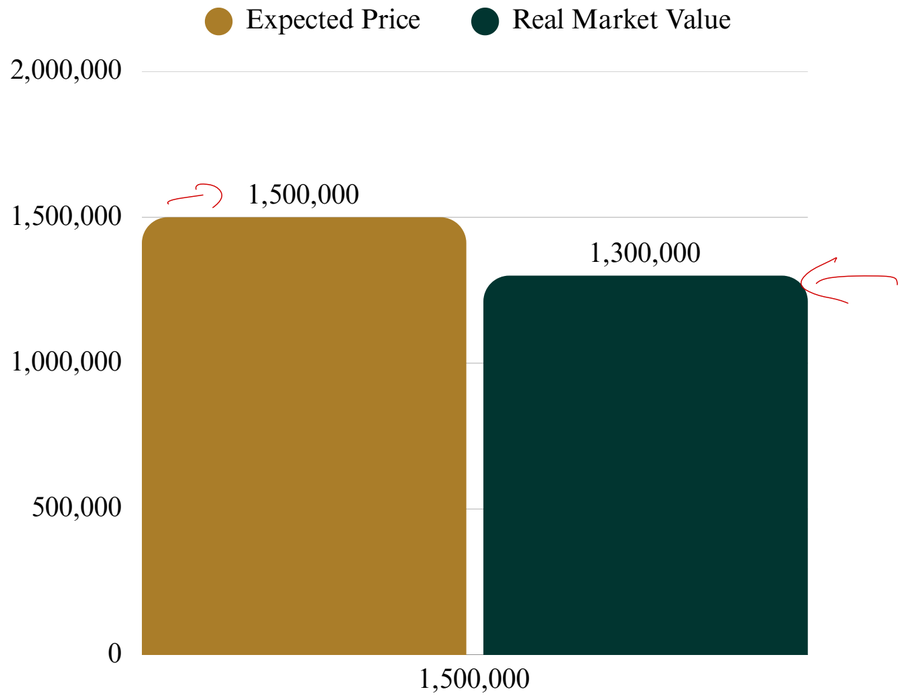
 (unsold due to high price)

Problem 1:

ROSHN needs an accurate method to estimate home prices in advance.

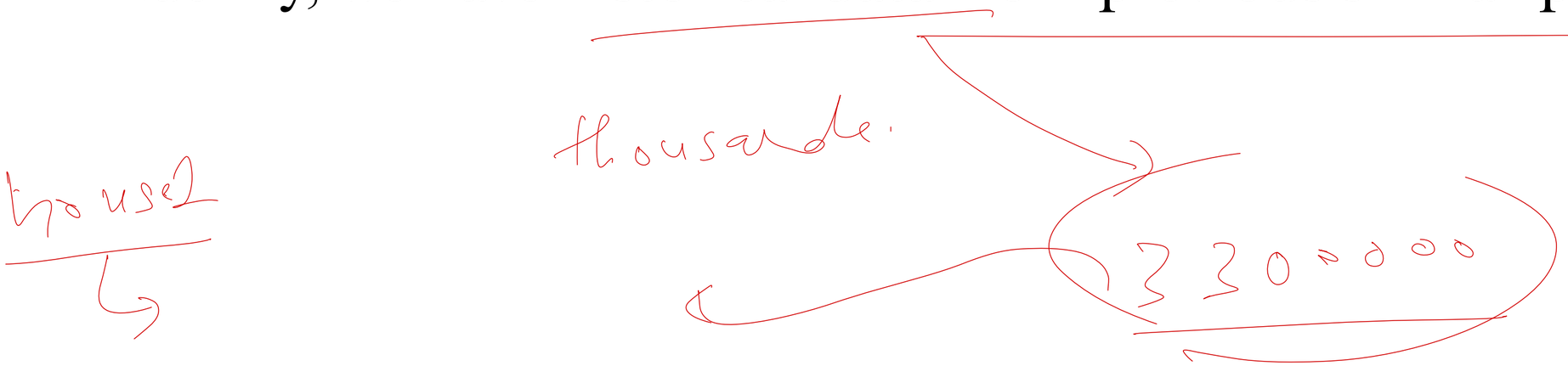
Why?

- Too high = fewer sales,
- Too low = less revenue.



Machine Learning

Luckily, we have historical data from previous similar projects.



Machine Learning

input parameters / features.

ID	Size (m²)	Rooms	Type	Parking	View	Distance to Masjed(km)	Year Built	Price (SAR)
1	120	3	Apartment	1	Street	1.2	2021	950,000
2	180	4	Villa	2	Park	0.8	2022	1,350,000
3	140	3	Apartment	1	City	2	2020	980,000
4	220	5	Villa	3	Garden	0.5	2023	1,850,000
5	160	4	Townhouse	2	Street	1.5	2021	1,200,000
6	200	5	Villa	2	Park	1	2024	1,700,000
7	95	2	Apartment	1	Street	1.8	2019	720,000
8	250	6	Villa	3	Lake	0.3	2023	2,300,000
9	130	3	Apartment	1	Garden	1.1	2022	1,020,000
10	175	4	Townhouse	2	Park	0.7	2023	1,450,000

Machine Learning

Features , Inputs, Predictors, Attributes

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Machine Learning

Label, Target, Output,Ground truth

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Machine Learning

- Let’s take one feature

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Machine Learning

- We want to predict the price of a new property.

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1	120	3	Apartment	1	Street	1.2	2021	950,000
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Machine Learning

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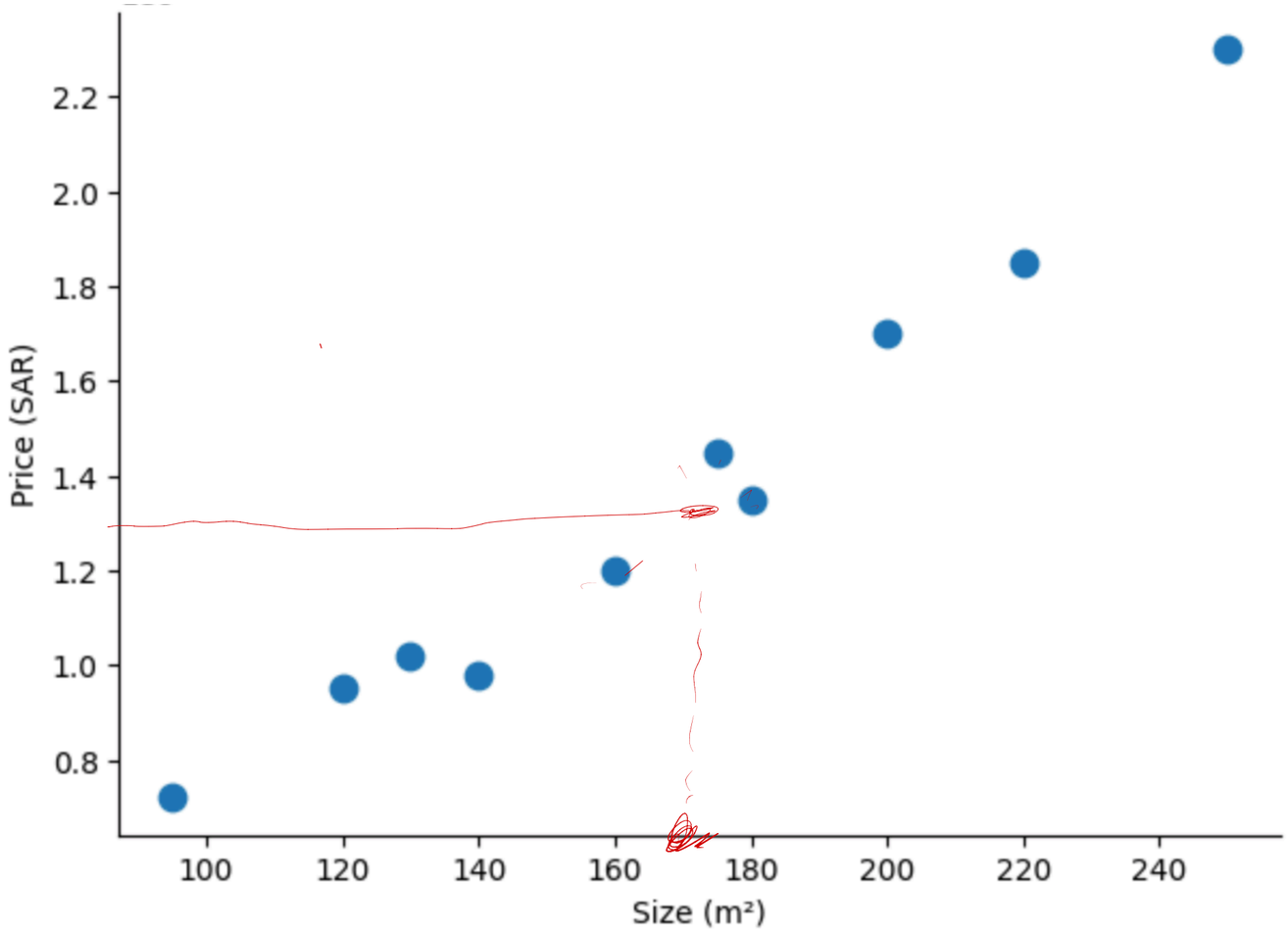

Machine Learning

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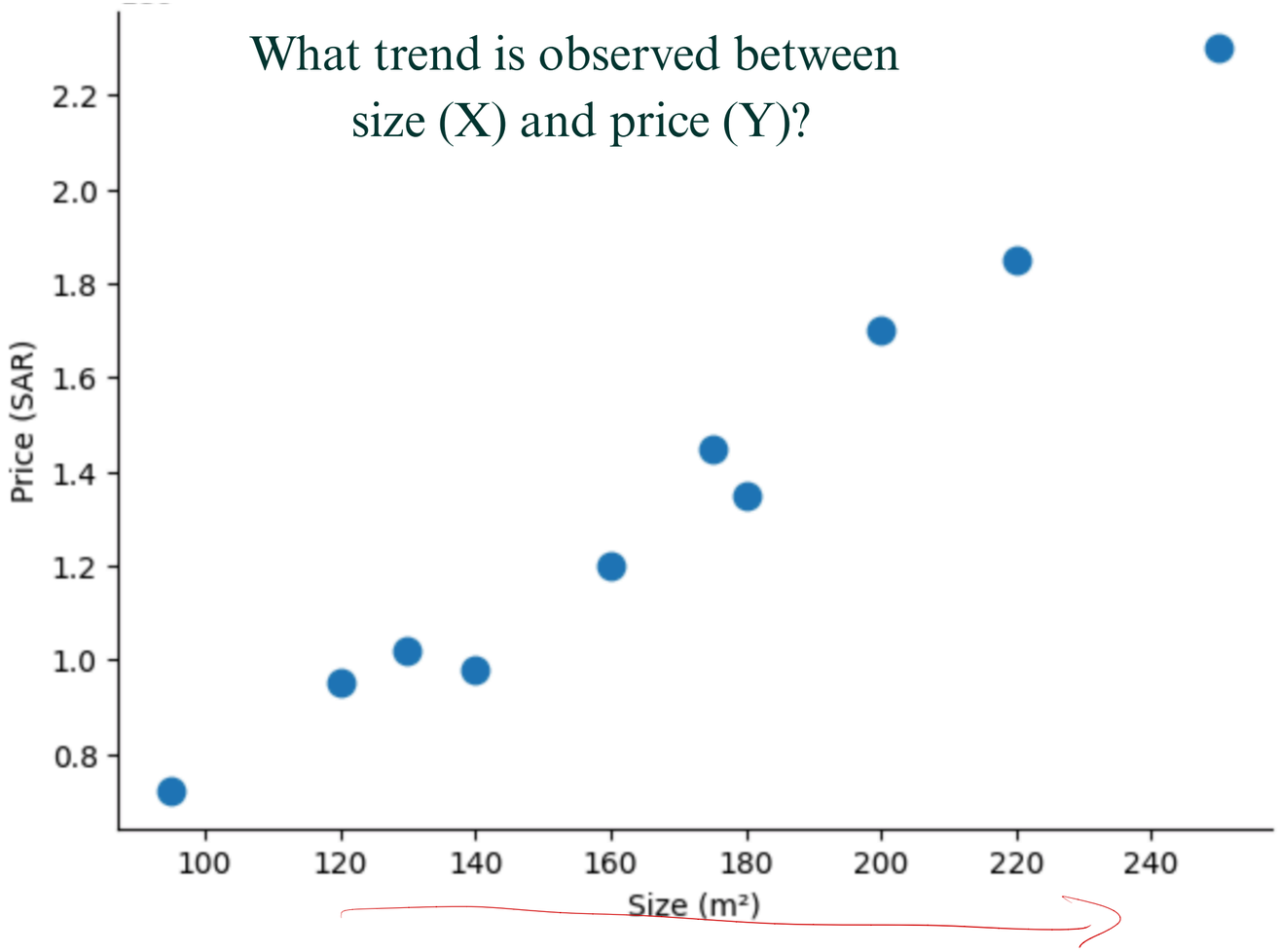
What trend is observed between size (X) and price (Y)?



Machine Learning

Size (m²)	Price (SAR)
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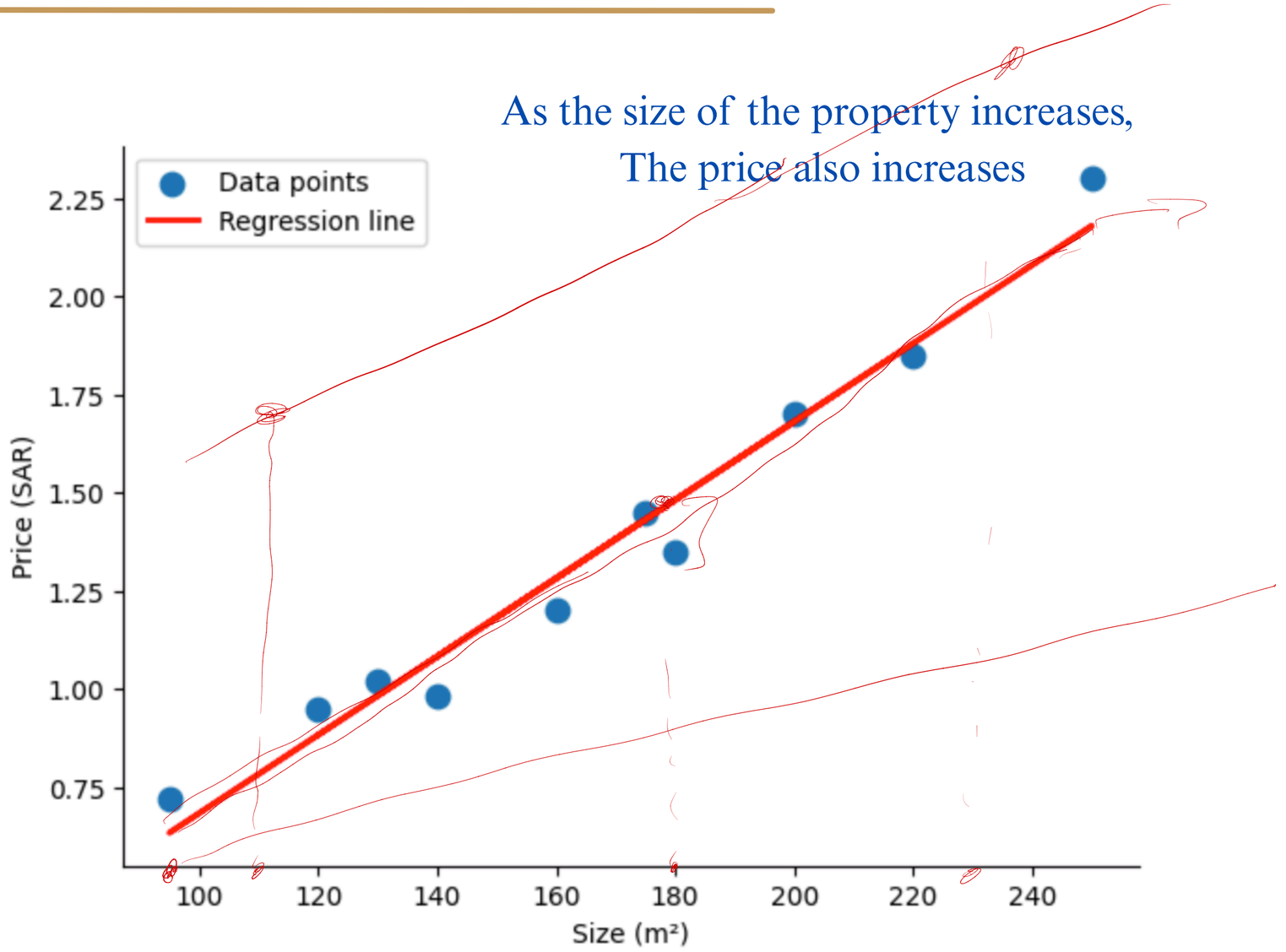
130	1,020,000
175	1,450,000

As the size of the property increases,
The price also increases



Machine Learning

- Old programming takes input and rules to generate output.

Machine Learning

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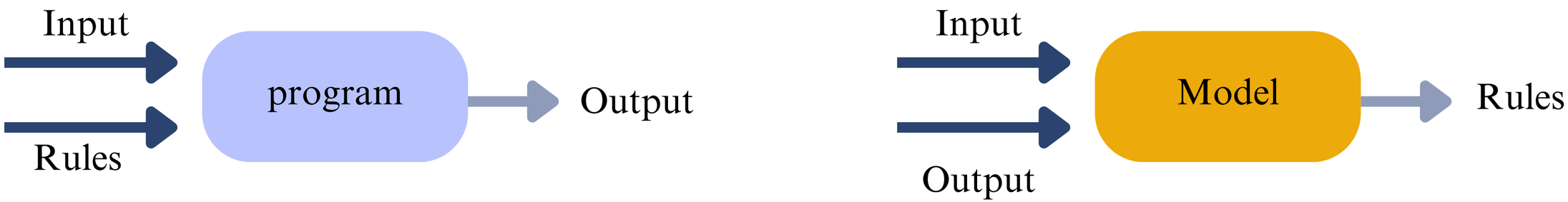
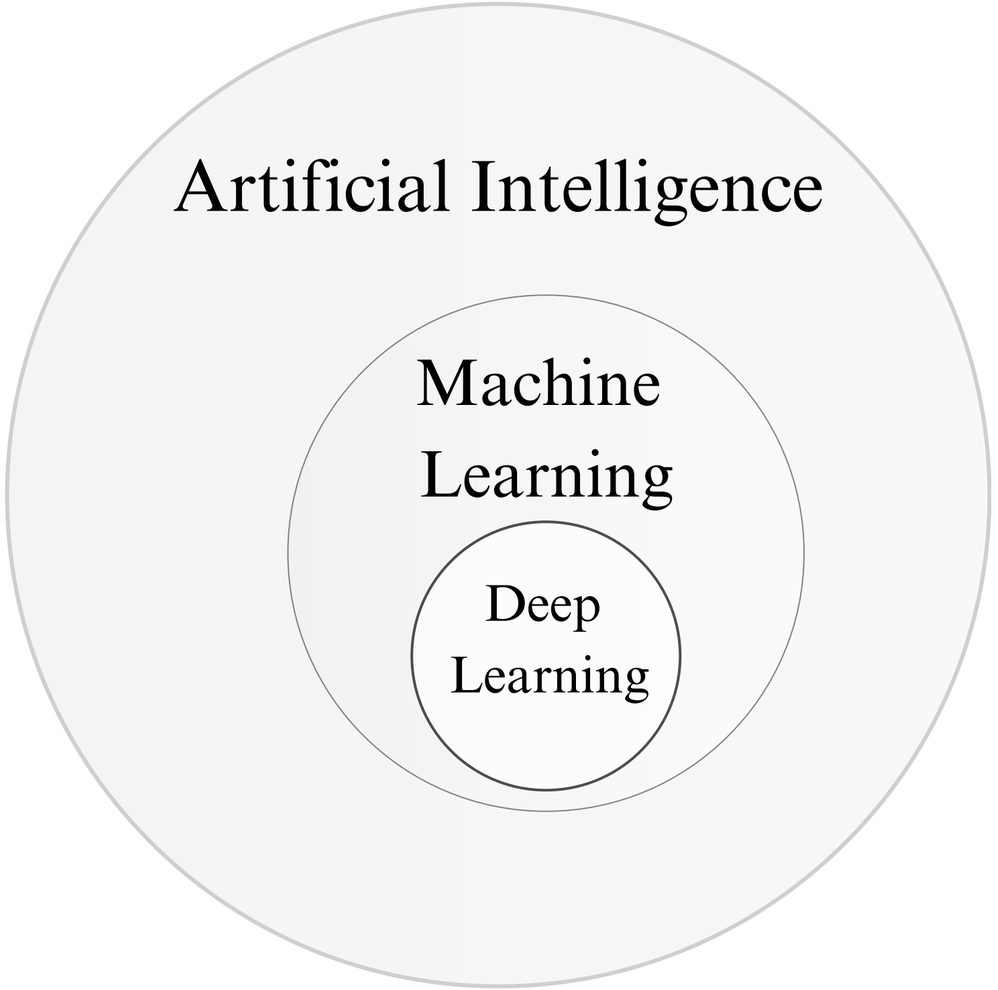


- Machine Learning takes input and output examples to **learn** the rules

Machine Learning

Machine Learning is a branch of Artificial Intelligence that enables computers to learn patterns from data and make predictions or decisions without being explicitly programmed.



Problem 2:

ROSHN wants to know which customer segment to target for each unit.

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Why?

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Why?

- To match each unit with the right buyer group.

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Why?

- To match each unit with the right buyer group.
- Avoid offering budget homes to high-income buyers.

Problem 2:

ROSHN wants to know which customer segment to target for each unit.

Why?

- To match each unit with the right buyer group.
- Avoid offering budget homes to high-income buyers.
- Avoid offering expensive homes to budget buyers.

Machine Learning

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Label

Customer Segment
Economy
Mid
Economy
Luxury
Mid
Luxury
Economy
Luxury
Mid
Mid

Machine Learning

What's different about the label?

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Label

Machine Learning

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Machine Learning

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Label

Customer Segment
Economy
Mid
Economy
Luxury
Mid
Luxury
Economy
Luxury
Mid
Mid

Machine Learning

It's categorical now, not numerical.

ID	Size (m²)	Rooms	Type	Parking	View	Distance to Masjed(km)	Year Built	Price (SAR)
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Label

Customer Segment
Economy
Mid
Economy
Luxury
Mid
Luxury
Economy
Luxury
Mid
Mid

Machine Learning

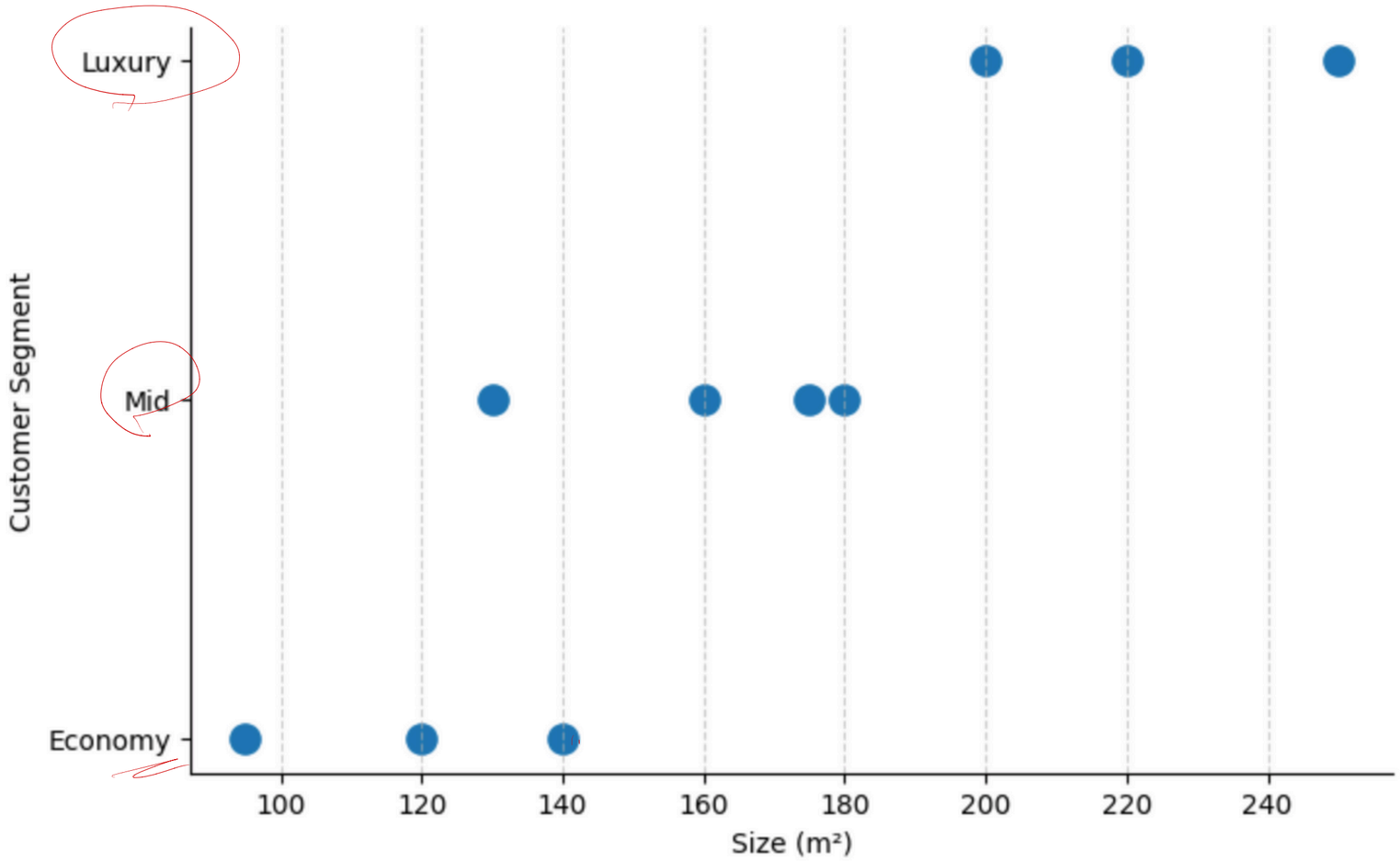
Size (m^2)	Customer Segment
120	Economy
180	Mid
140	Economy
220	Luxury
160	Mid
200	Luxury
95	Economy
250	Luxury
130	Mid
175	Mid

Machine Learning

Size (m²)
120
180
140
220
160
200
95
250
130
175

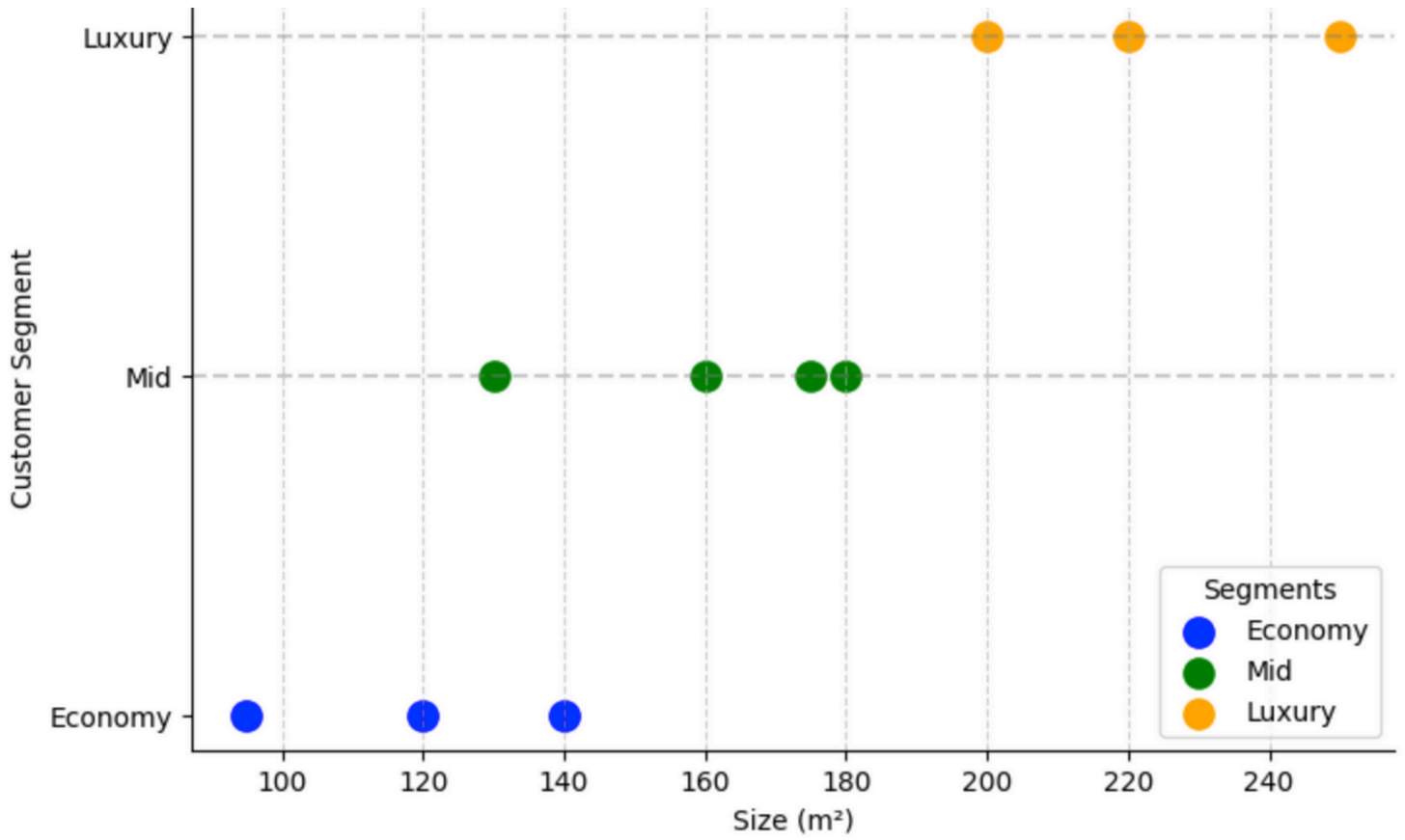
Customer Segment
Economy
Mid
Economy
Luxury
Mid
Luxury
Economy
Luxury
Mid
Mid

What does size tell us about the segment?



Machine Learning

Size (m²)	Customer Segment
120	Economy
180	Mid
140	Economy
220	Luxury
160	Mid
200	Luxury
95	Economy
250	Luxury
130	Mid
175	Mid



Machine Learning

Size (m²)	Customer Segment
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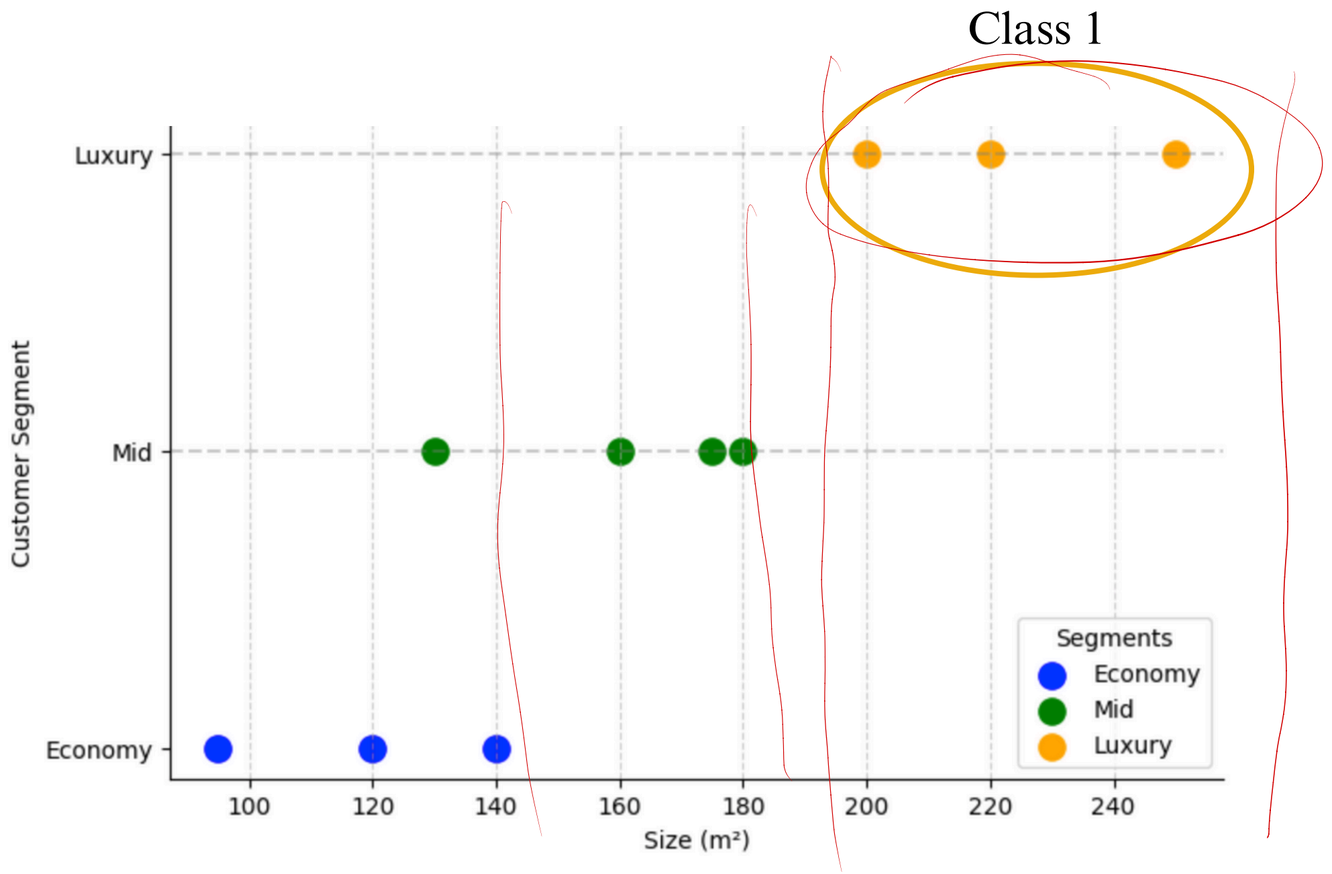
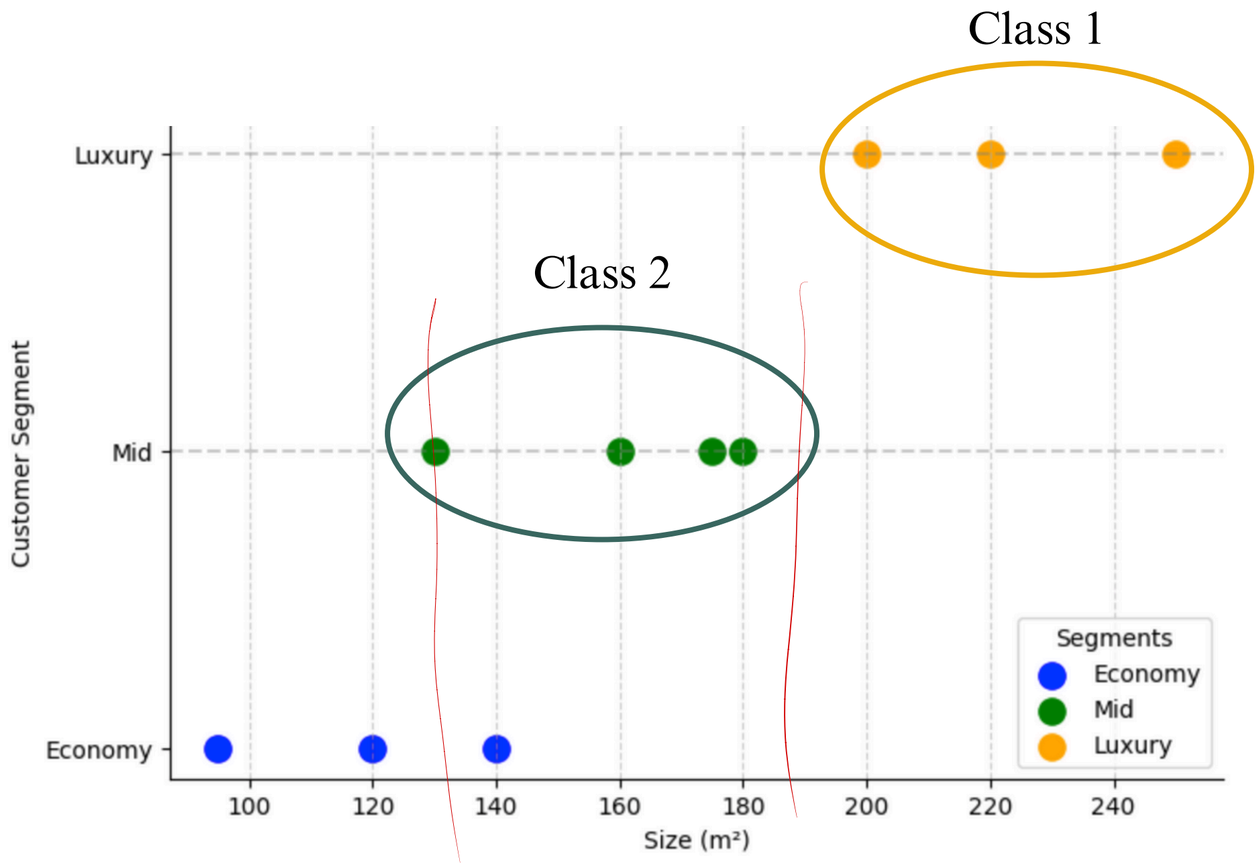
95	Economy
250	Luxury
130	Mid
175	Mid



Machine Learning

Size (m²)	Customer Segment
120	Economy
180	Mid
140	Economy
220	Luxury
160	Mid
200	Luxury
95	Economy
250	Luxury
130	Mid
175	Mid



Machine Learning

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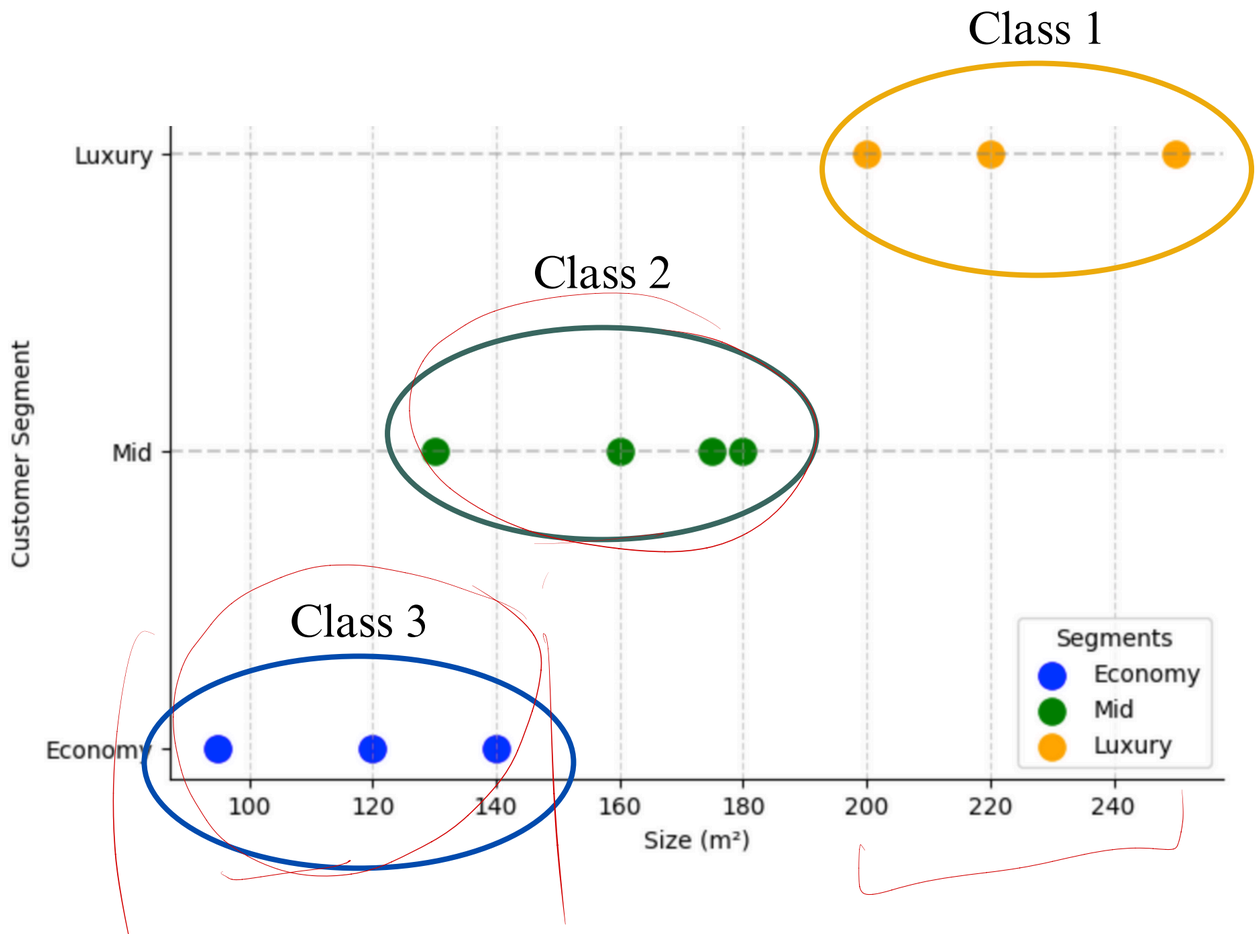

Problem 1:

Predicting home price

An ML task where the goal is to predict a continuous numerical value.

Machine Learning

Problem 1:

Predicting home price

Regression

An ML task where the goal is to predict a continuous numerical value.

Problem 2:

Classify the customer segment

Classification

An ML task where the goal is to assign each input to a predefined category.

Problem 3:

ROSHN wants to minimize the energy consumption of its buildings

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Why?

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ROSHN wants to minimize the energy consumption of its buildings

Why?

- Improve sustainability and meet green targets.

Problem 3:

ROSHN wants to minimize the energy consumption of its buildings

Why?

- Improve sustainability and meet green targets.
- Increase building efficiency and performance.

Problem 3:

ROSHN wants to minimize the energy consumption of its buildings

Why?

- Improve sustainability and meet green targets.
- Increase building efficiency and performance.
- Reduce long-term maintenance and utility expenses.

Machine Learning

Building ID	Electricity Use	Water Use (L/day)	Waste Output	Solar Coverage	Building Age
1	320	900	14	10	8
2	180	600	8	40	3
3	450	1200	20	5	15
4	200	700	9	35	5
5	150	500	6	60	2
6	380	1000	15	20	12
7	520	1300	22	0	18
8	240	650	10	30	4
9	130	480	5	70	1
10	410	1100	17	15	10

Machine Learning

Multiple features

Building ID	Electricity Use	Water Use (L/day)	Waste Output	Solar Coverage	Building Age (years)
1	320	900	14	10	8
2	180	600	8	40	3
3	450	1200	20	5	15
4	200	700	9	35	5
5	150	500	6	60	2
6	380	1000	15	20	12
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Machine Learning

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7	520	1300	22	0	18
8	240	650	10	30	4
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10	410	1100	17	15	10

Label
?
?
?
?
?
?
?
?
?
?

Can a model learn from data without labels

Machine Learning

Building ID	Electricity Use (kWh/day)	Water Use (L/day)	Waste Output (kg/day)	Solar Coverage (%)	Building Age (years)
1	320	900	14	10	8
2	180	600	8	40	3
3	450	1200	20	5	15
4	200	700	9	35	5
5	150	500	6	60	2
6	380	1000	15	20	12
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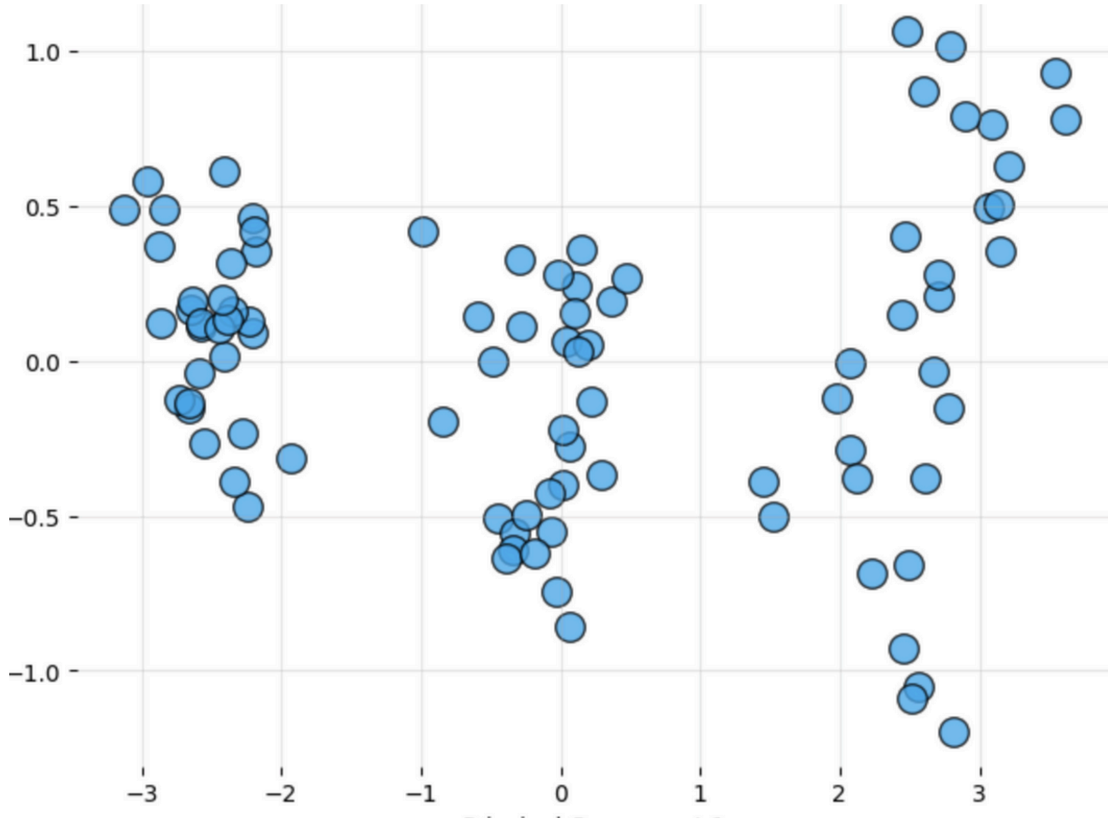
8	240	650	10	30	4
9	130	480	5	70	1
10	410	1100	17	15	10

What does this plot tell us?



Machine Learning

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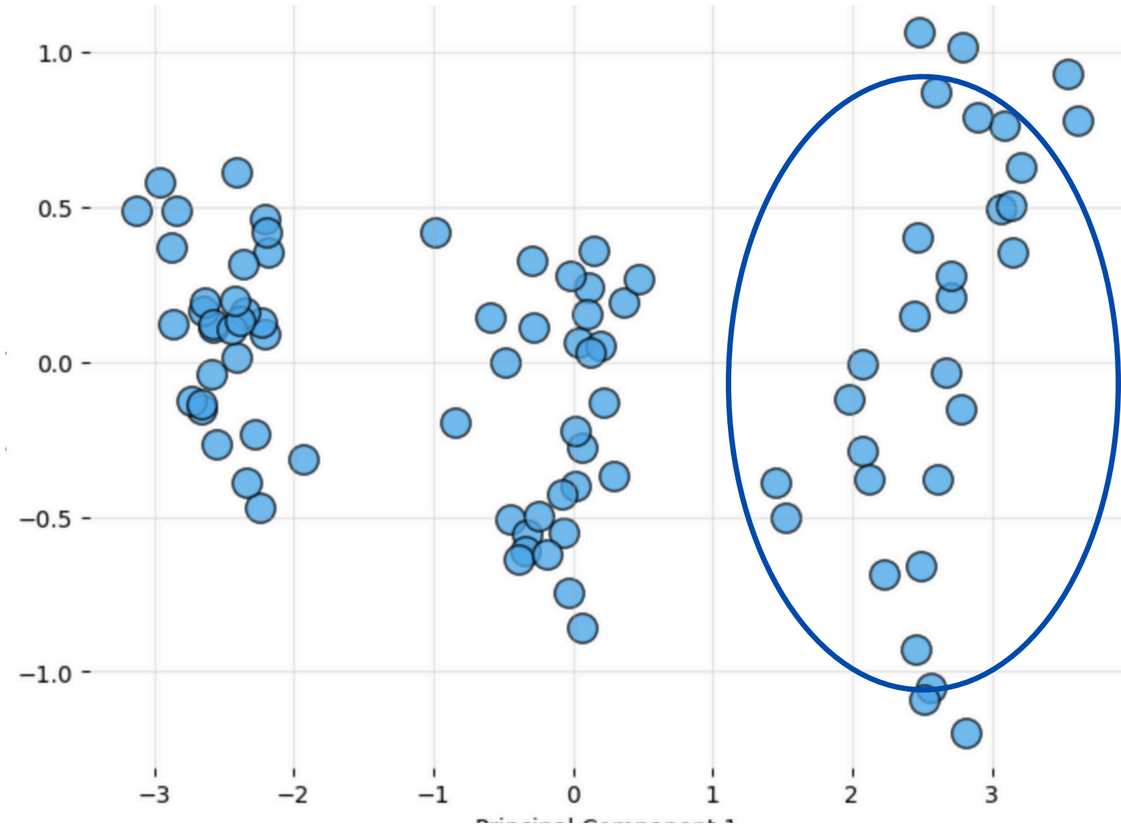
7	520	1300	22	0	18
8	240	650	10	30	4
9	130	480	5	70	1
10	410	1100	17	15	10

Buildings that appear close together have similar resource usage patterns



Machine Learning

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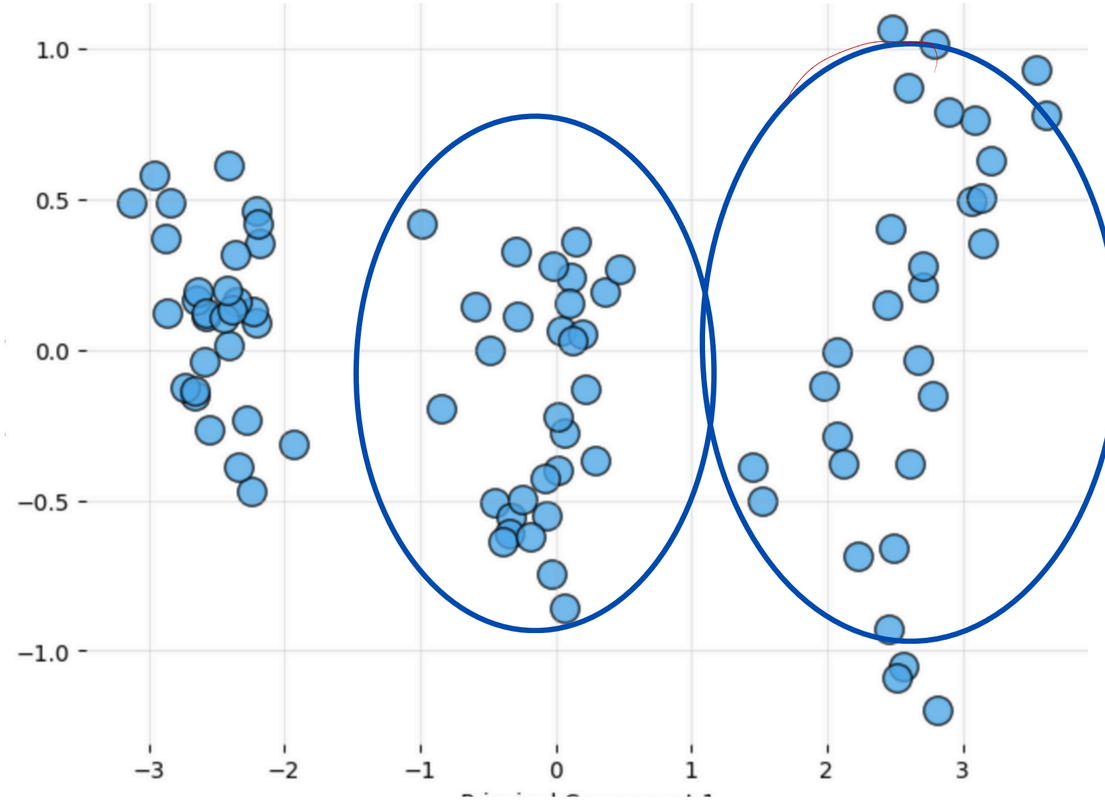

Machine Learning

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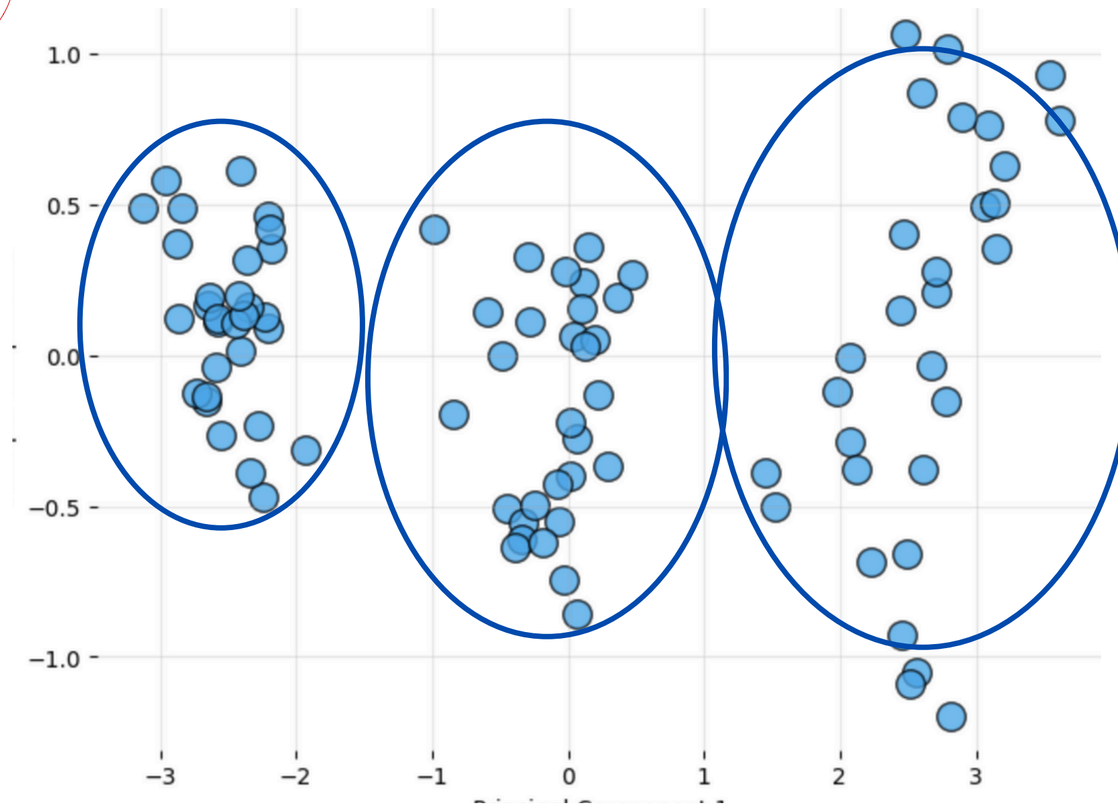

Machine Learning

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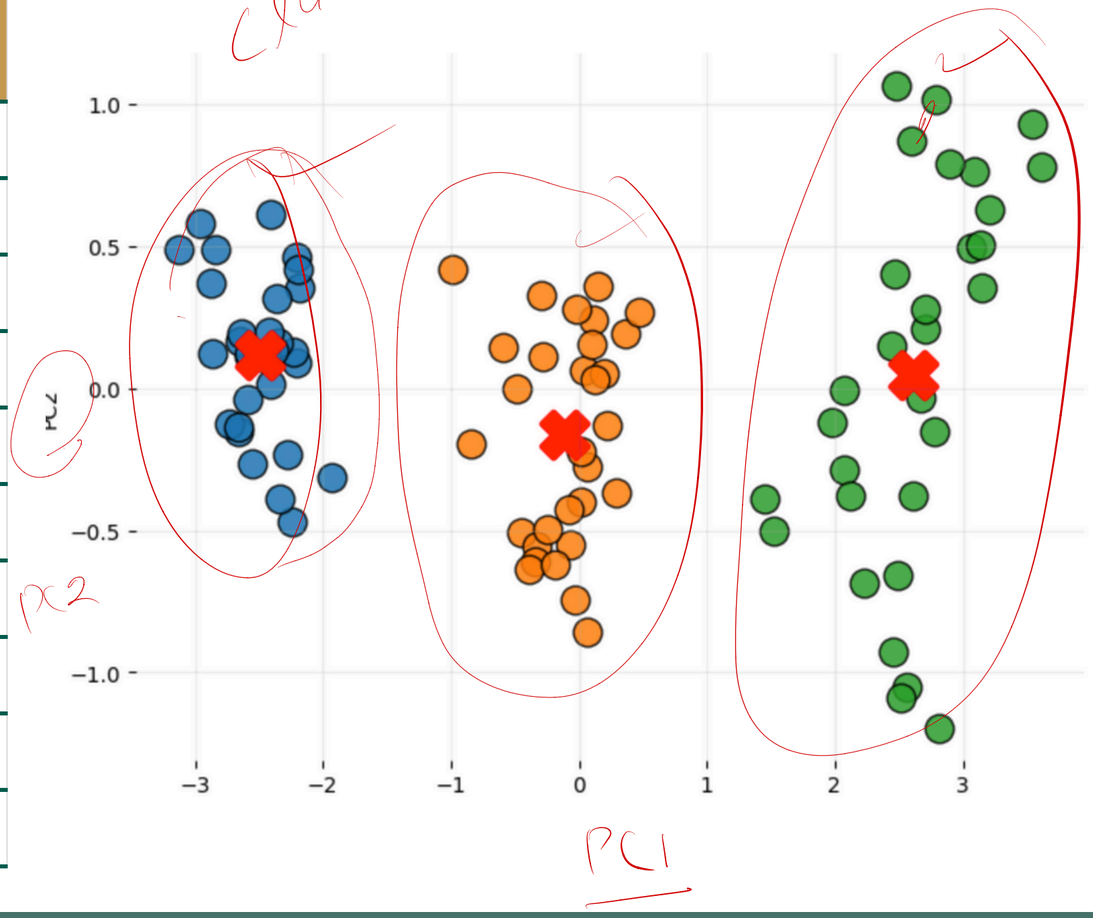


Machine Learning

Supervised Machine Learning

Problem 1:

Predicting home price

Regression

An ML task where the goal is to predict a continuous numerical value.

Problem 2:

Classify the customer segment

Classification

An ML task where the goal is to assign each input to a predefined category.

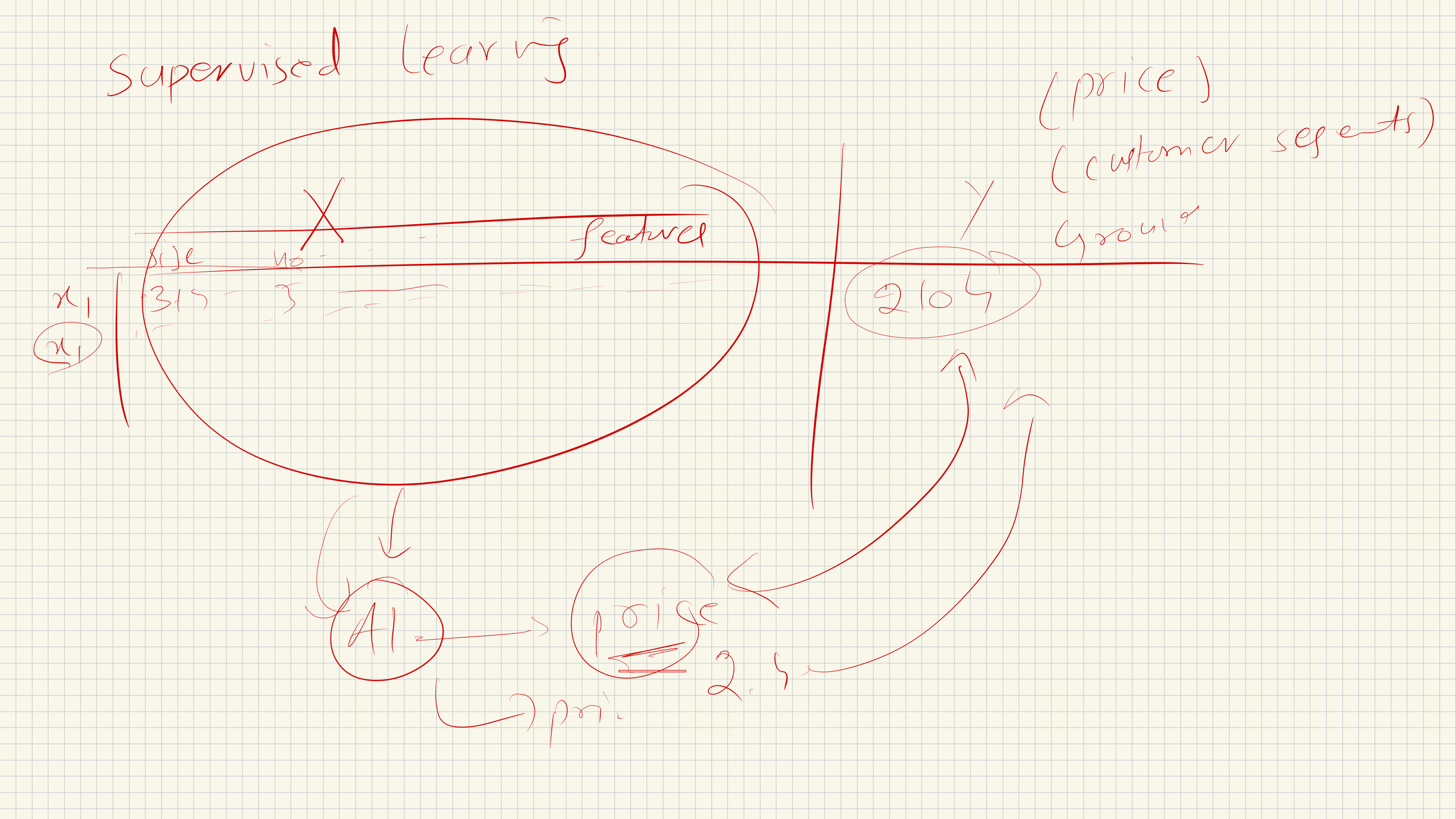
Unsupervised Machine Learning

Problem 3:

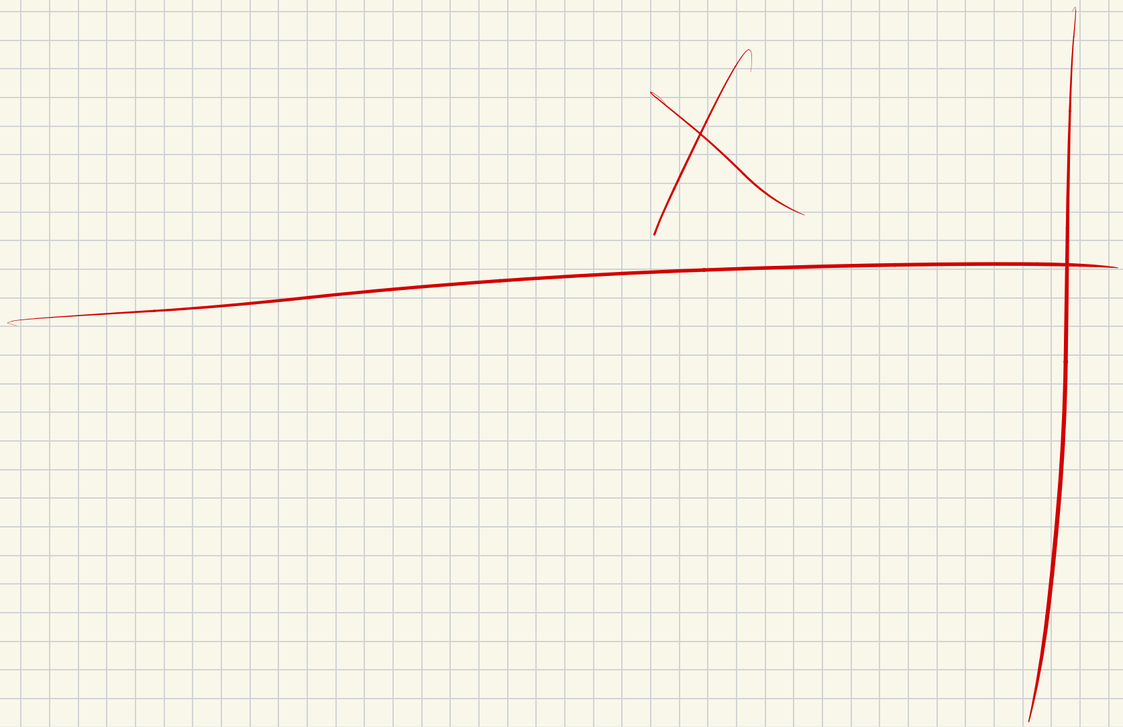
Discovering groups of buildings based on sustainability usage

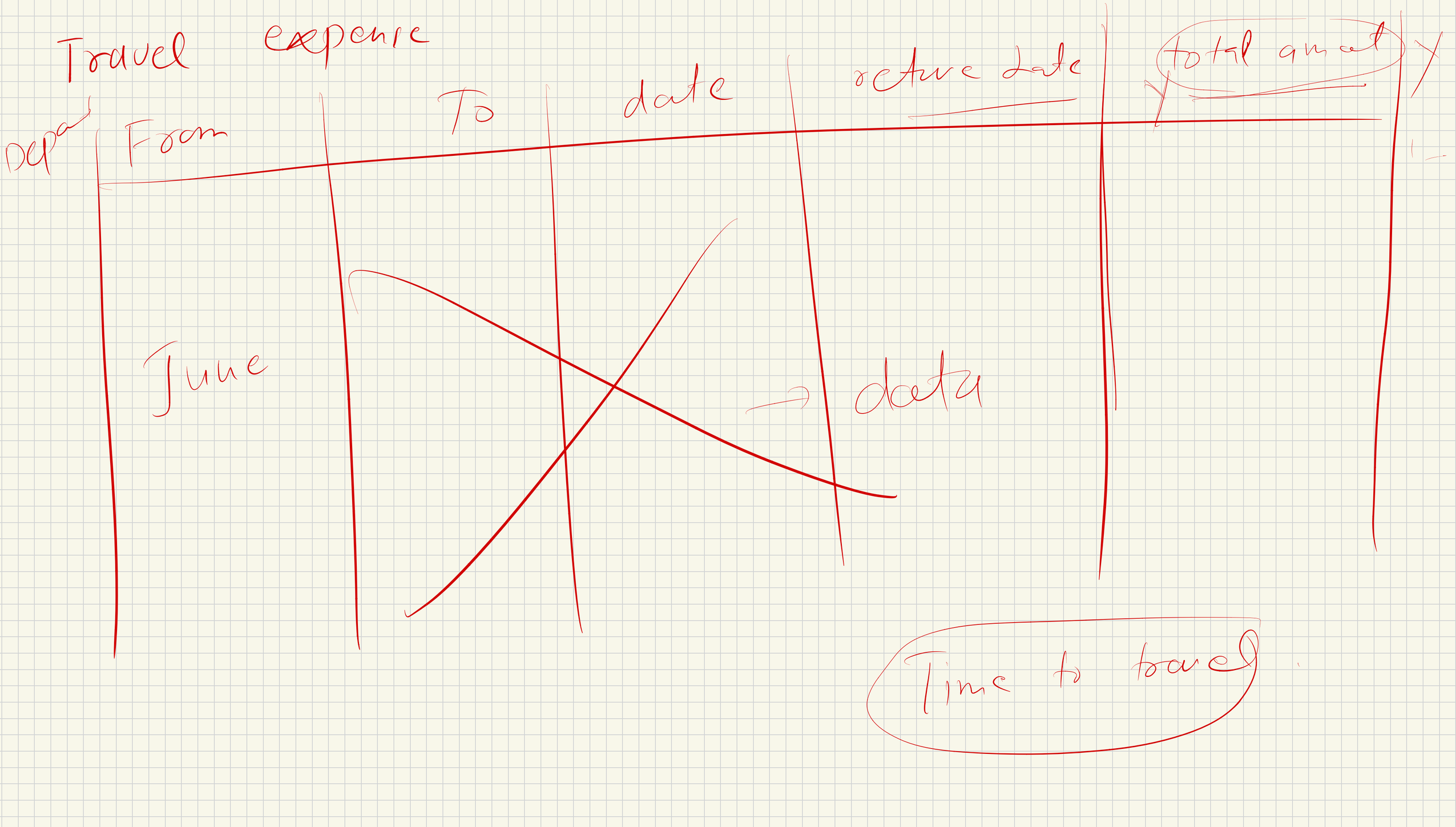
Clustering

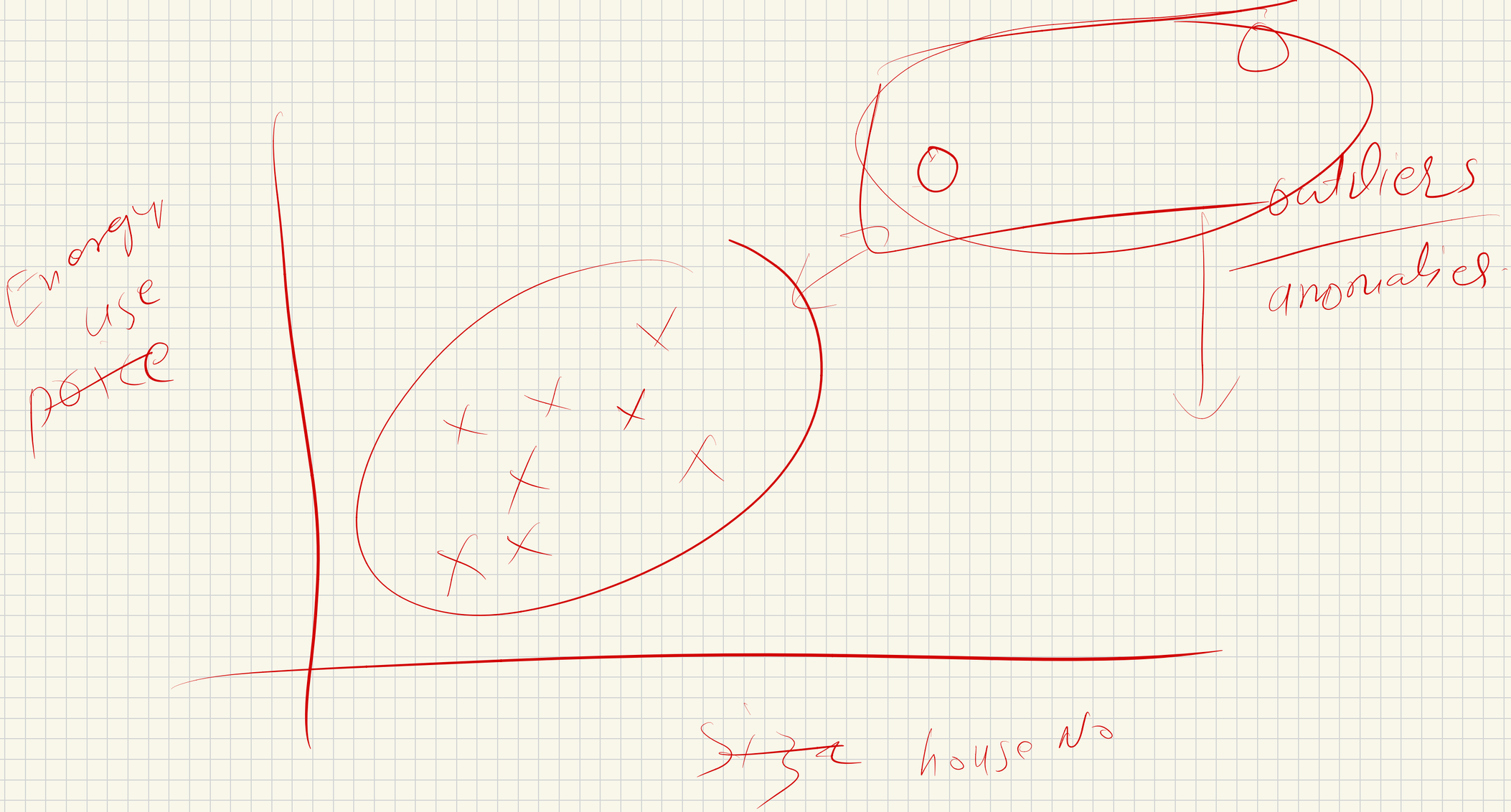
An ML task where the goal is to discover natural patterns or groups


Supervised learning
(price)
(customer segments)
X
Y
Features
price
No.
x_1
x_1
2104
AI
price
2.4
pri.

Unsupervised learning




Travel expense
Dept
From
To date
return date
total amount
June
date
Time to travel


Energy use
outliers
anomalies
house No

Artificial Intelligence

Hands-On Activity

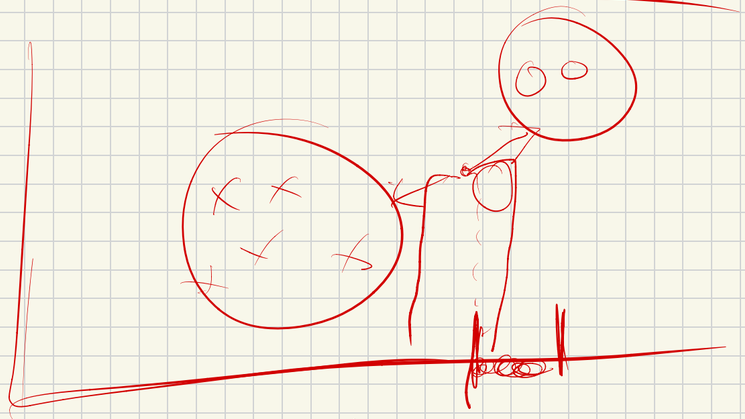
Group 1 a) supervised learning | financing value.

b) regression

c)

2) a) unsupervised | defaulters

b) clustering



3) a) Unsuper | b) discover patter

c) arr /

4) a) unsupervised b) loan acc / rej. def

(5) Supervised (b) predict income

(6) unsupervised b)

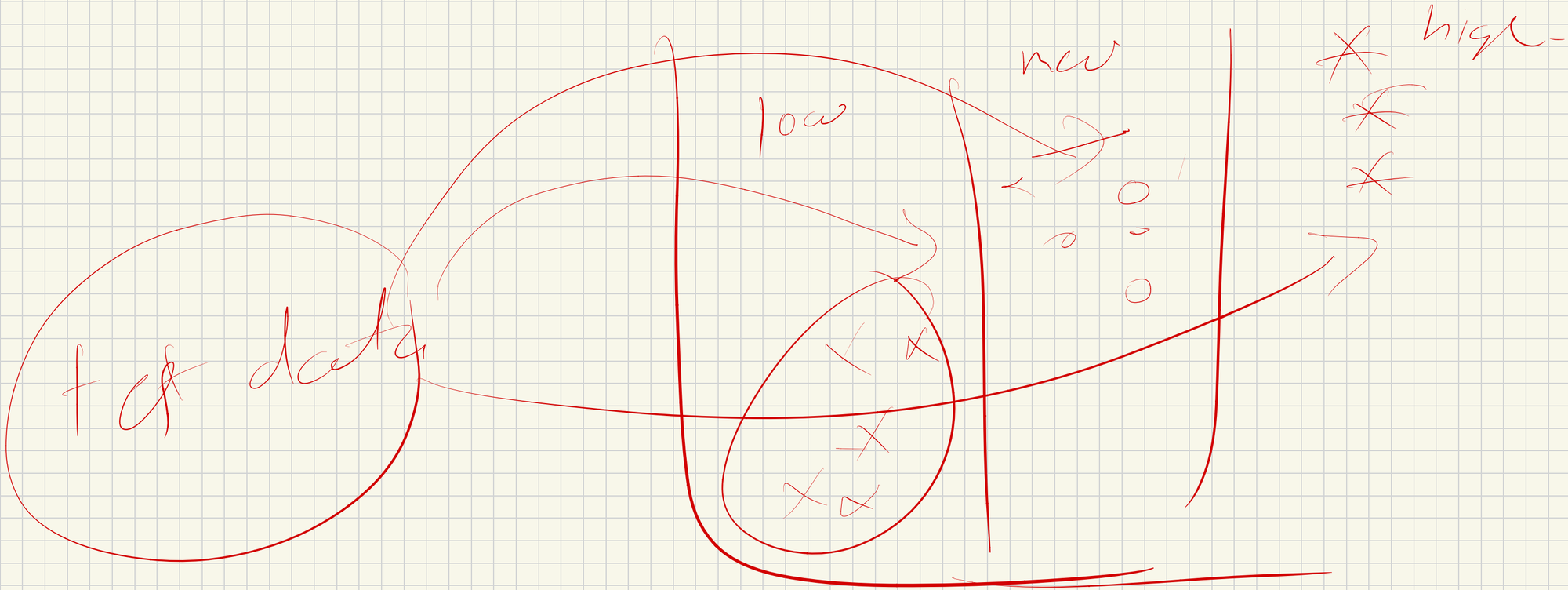
clustering → 3 clusters

3

2000

7500

7


fat daddy
low
new
high

① Data ↘

→ unsupervised

② Model ↘

③ Loss (Objective function)

④ Optimisation

BERT

hyperparameters

sentence ——→ positive

Hands-On Activity

[Saudi Arabia Social Development Bank Loans 2019]

Hands-On Activity

[Work-Life Balance and Longevity Dataset]


Q
A

Thank You