Supervised vs Unsupervised v
Reinforcement Learnin

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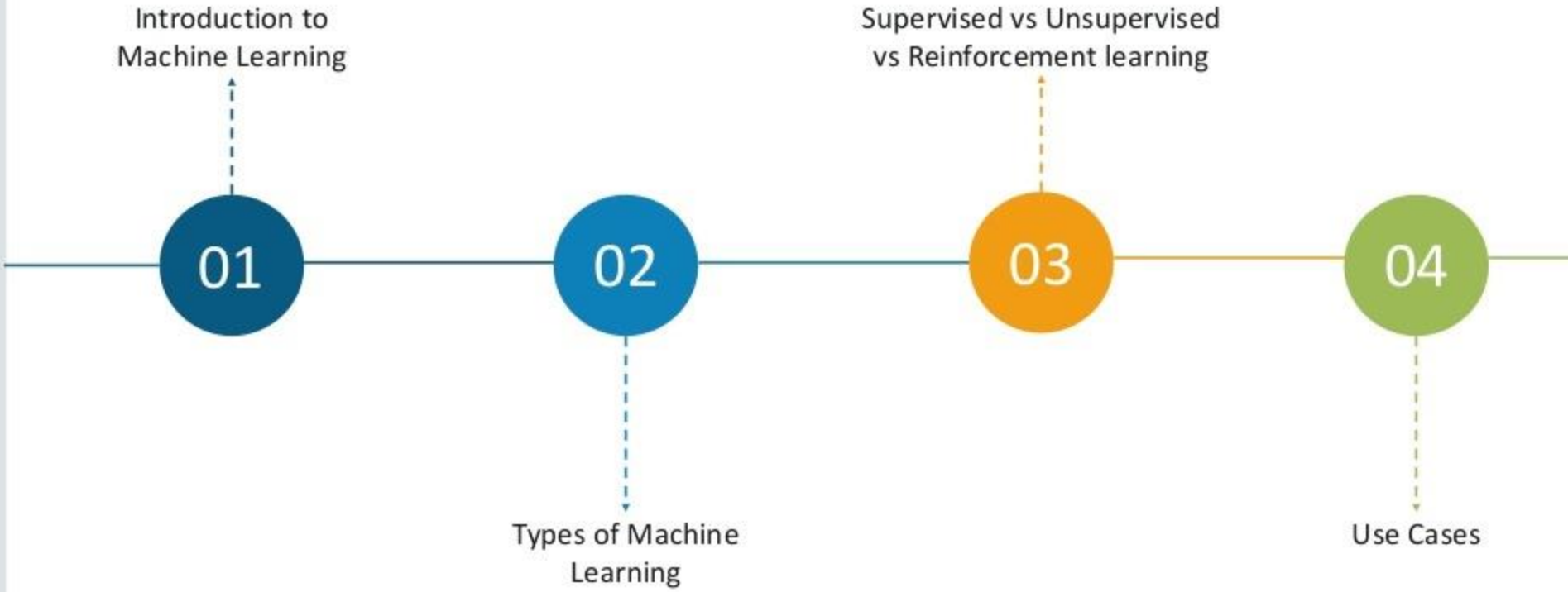
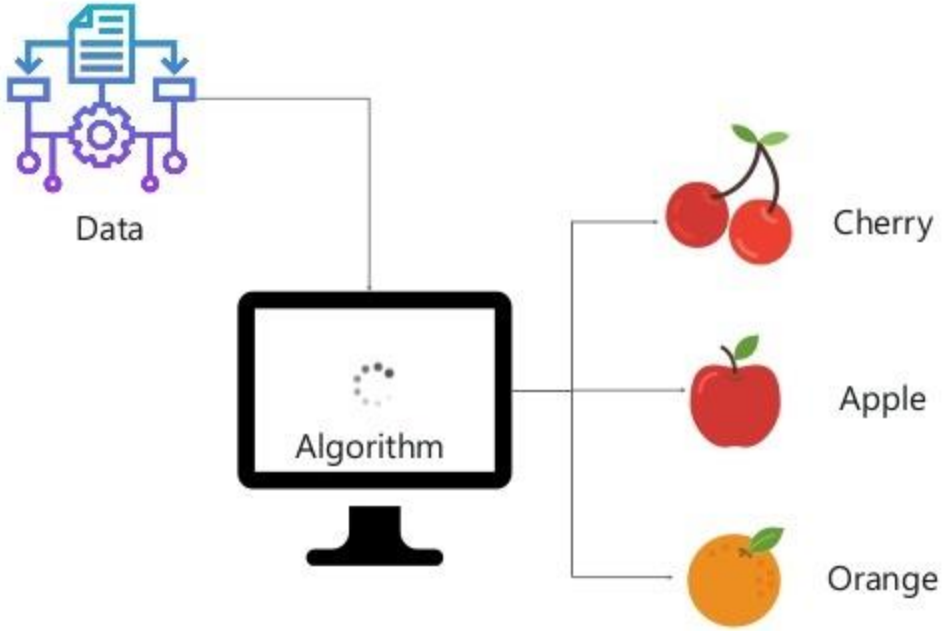
Agenda


Introduction to Machine Learning
01
Types of Machine Learning
02
Supervised vs Unsupervised vs Reinforcement learning
03
Use Cases
04

Introduction To Machine Learning

What Is Machine Learning?

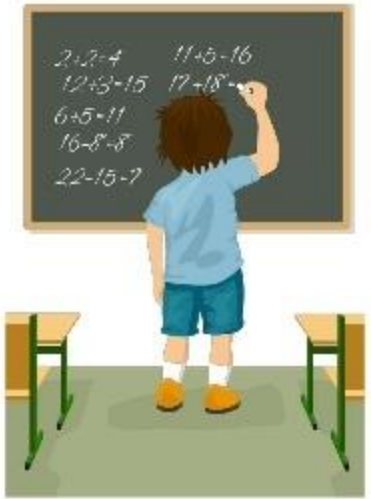
Machine learning is a subset of artificial intelligence (AI) which provides machines the ability to learn automatically & improve from experience without being explicitly programmed.



Types Of Machine Learning

Types Of Machine Learning

Supervised Learning



Unsupervised Learning

Reinforcement Learning

Supervised vs Unsupervised vs Reinforcement

Definition

- Definition
- Type of Problems
- Type of data
- Training
- Aim
- Approach
- Output Feedback
- Popular Algorithms
- Applications

Supervised learning is a method in which we teach the machine using labelled data

In unsupervised learning the machine is trained on unlabelled data without any guidance

In Reinforcement learning an agent interacts with its environment by producing actions & discovers errors or rewards

Problem Type

- Definition
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Supervised Learning

Regression

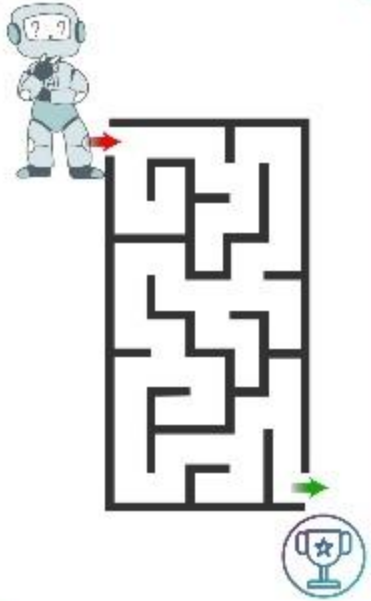
Classification

Unsupervised Learning

Association

Clustering

Reinforcement Learning



Type of data

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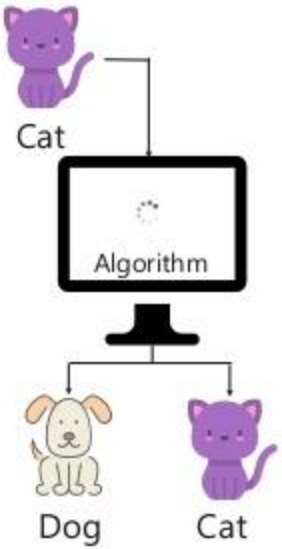
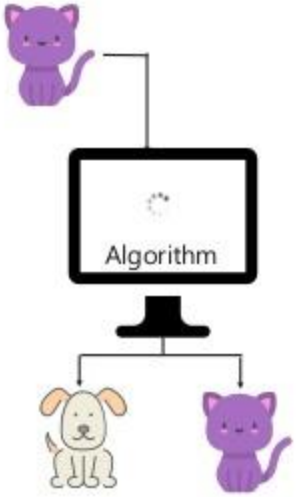
Supervised Learning

Labelled Data



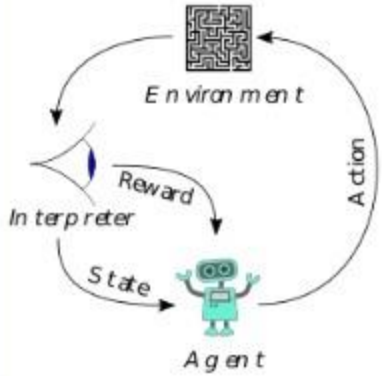
Unsupervised Learning

Unlabelled Data



Reinforcement Learning

No Predefined Data



Training

- Definition
- Type of Problems
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Supervised Learning

External supervision

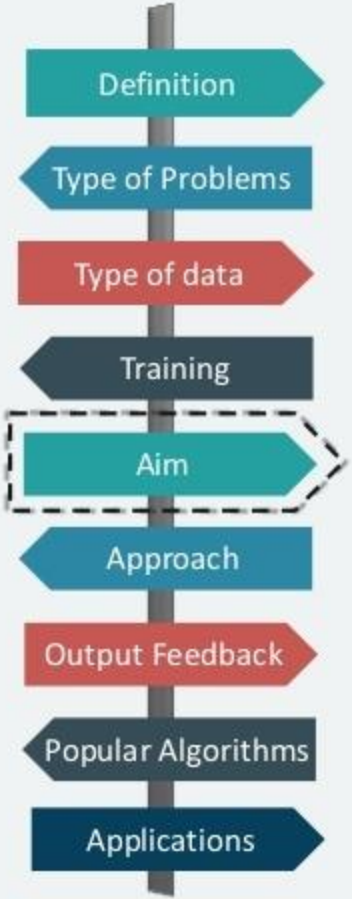
Unsupervised Learning

No supervision

Reinforcement Learning

No supervision

Aim



Supervised Learning

Forecast outcomes

Unsupervised Learning

Discover underlying patterns

Reinforcement Learning

Learn series of action

Approach

- Definition
- Type of Problems
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Supervised Learning

Map labelled input to known output

Labelled Input

Training

Algorithm

Known Output

Unsupervised Learning

Understand patterns and discover output

Unlabelled Input

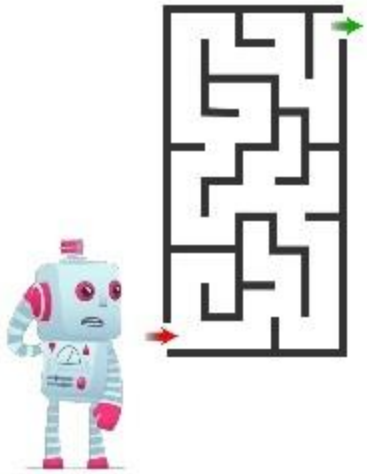
Explore patterns & trends

Algorithm

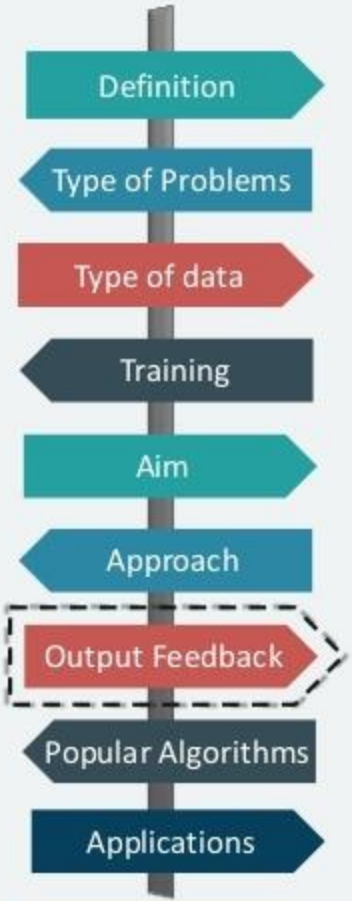
Output

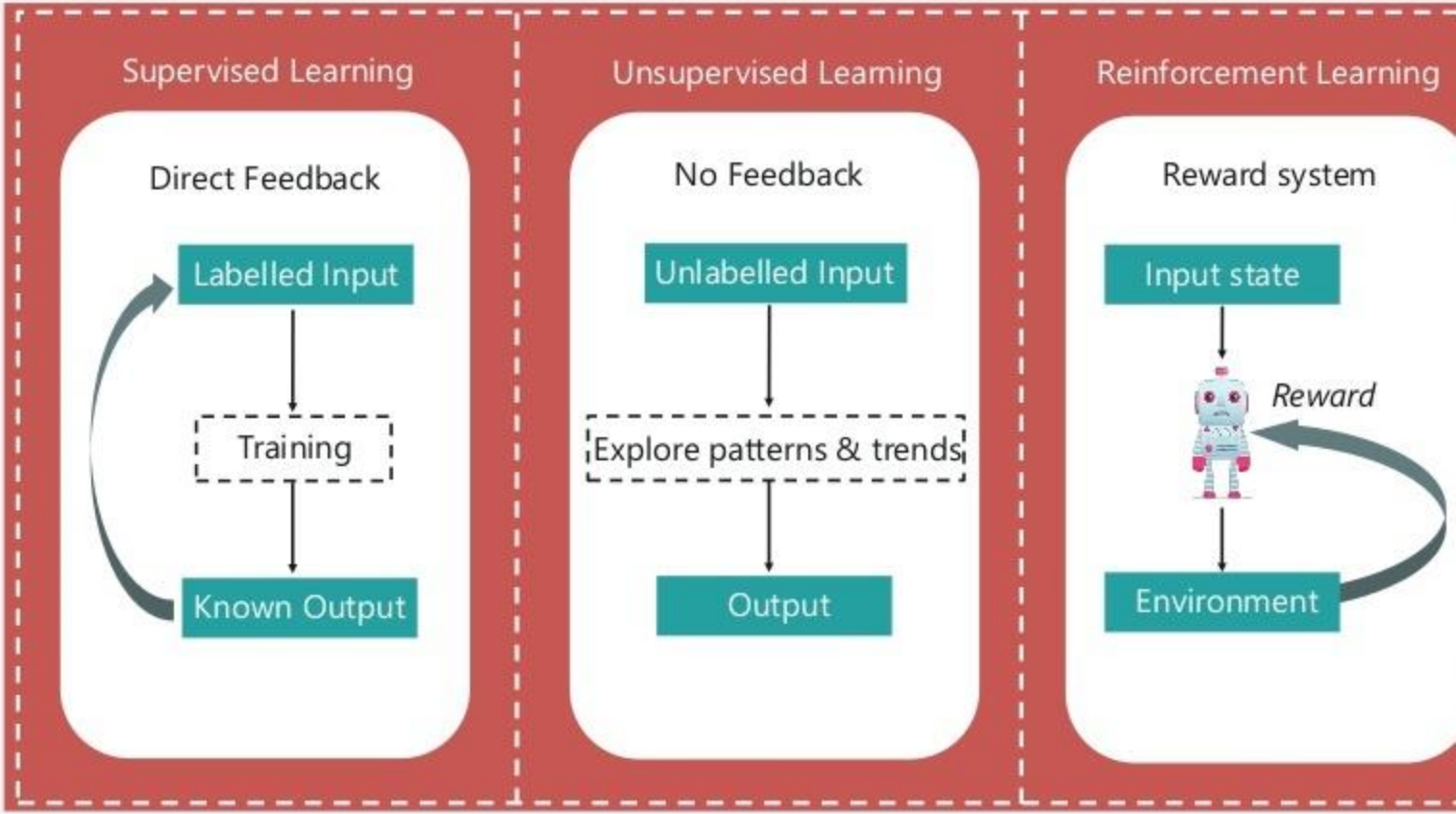
Reinforcement Learning

Follow Trail and Error method



Output Feedback





Popular Algorithms

Supervised Learning

- Linear Regression
- Logistic Regression
- Support Vector Machine
- K Nearest Neighbour
- Random Forest

Unsupervised Learning

- K- Means
- Apriori
- C- Means

Reinforcement Learning

- Q- Learning
- SARSA

Applications

Supervised Learning

Risk Evaluation

Forecast Sales

Unsupervised Learning

Recommendation Systems

Anomaly Detection

Reinforcement Learning

Self driving cars

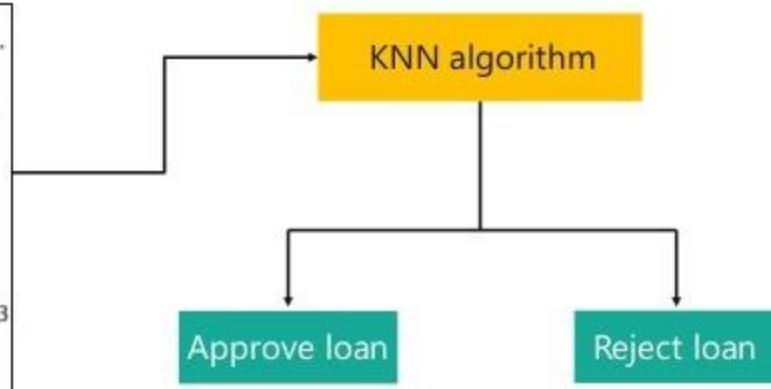
Gaming

Use Cases

Use Case 1

Problem Statement: Study a bank credit dataset and make a decision about whether to approve the loan of an applicant based on his profile

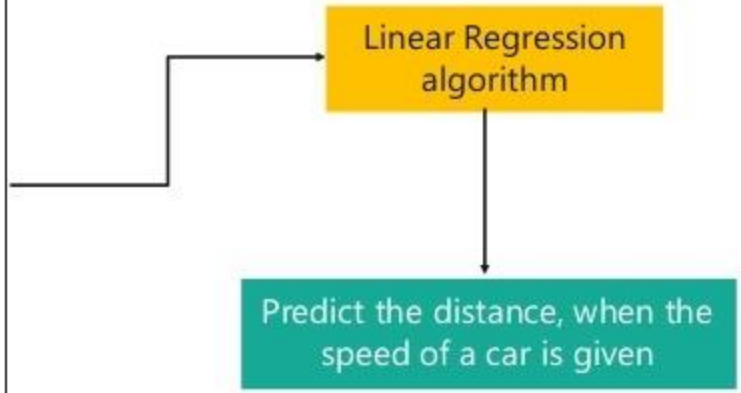
```
$ Account.Balance                  : int  1 1 2 1 1 1 1 1 4 2 ...
$ Duration.of.Credit..month.       : int  18 9 12 12 12 10 8 6 18 24 ..
$ Payment.Status.of.Previous.Credit: int  4 4 2 4 4 4 4 4 4 2 ...
$ Purpose                          : int  2 0 9 0 0 0 0 0 3 3 ...
$ Credit.Amount                    : int  1049 2799 841 2122 2171 2241
$ Value.Savings.Stocks             : int  1 1 2 1 1 1 1 1 1 3 ...
$ Length.of.current.employment     : int  2 3 4 3 3 2 4 2 1 1 ...
$ Instalment.per.cent              : int  4 2 2 3 4 1 1 2 4 1 ...
$ Sex...Marital.Status             : int  2 3 2 3 3 3 3 3 2 2 ...
$ Guarantors                       : int  1 1 1 1 1 1 1 1 1 1 ...
$ Duration.in.Current.address      : int  4 2 4 2 4 3 4 4 4 4 ...
$ Most.valuable.available.asset    : int  2 1 1 1 2 1 1 1 3 4 ...
$ Age..years.                      : int  21 36 23 39 38 48 39 40 65 23
$ Concurrent.Credits               : int  3 3 3 3 1 3 3 3 3 3 ...
$ Type.of.apartment                : int  1 1 1 1 2 1 2 2 2 1 ...
$ No.of.Credits.at.this.Bank       : int  1 2 1 2 2 2 2 1 2 1 ...
$ Occupation                       : int  3 3 2 2 2 2 2 2 1 1 ...
$ No.of.dependents                 : int  1 2 1 2 1 2 1 2 1 1 ...
$ Telephone                        : int  1 1 1 1 1 1 1 1 1 1 ...
$ Foreign.Worker                   : int  1 1 1 2 2 2 2 2 1 1 ...
```



Use Case 2

Problem Statement: To establish a mathematical equation for **distance** as a function of **speed**, so you can use it to predict **distance** when only the **speed** of the car is known.

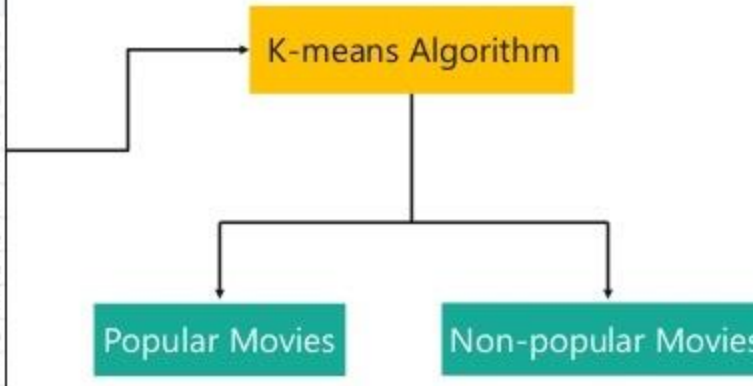
```
> cars
   speed dist
1      4    2
2      4   10
3      7    4
4      7   22
5      8   16
6      9   10
7     10   18
8     10   26
9     10   34
10    11   17
11    11   28
12    12   14
13    12   20
14    12   24
15    12   28
```



Use Case 3

Problem Statement: To cluster a set of movies as either good or average based on their social media out reach

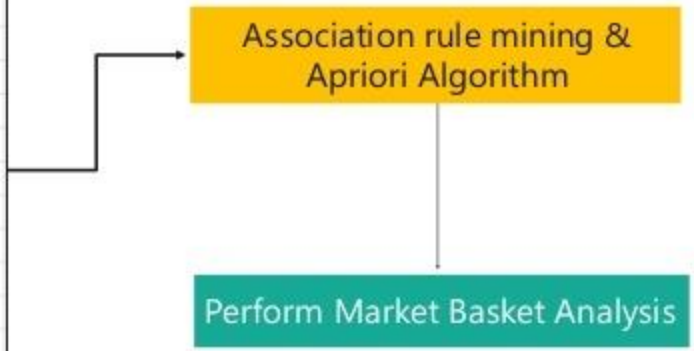
	director_facebook_likes	actor_3_facebook_likes	actor_1_facebook_likes	cast_total_facebook_likes
AvatarÂ	0	855	1000	4834
Pirates of the C...	563	1000	40000	48350
SpectreÂ	0	161	11000	11700
The Dark Knigh...	22000	23000	27000	106759
John CarterÂ	475	530	640	1873
Spider-Man 3Â	0	4000	24000	46055
TangledÂ	15	284	799	2036
Avengers: Age ...	0	19000	26000	92000
Harry Potter an...	282	10000	25000	58753
Batman v Super...	0	2000	15000	24450
Superman Retur...	0	903	18000	29991
Quantum of Sol...	395	393	451	2023
Pirates of the C...	563	1000	40000	48486



Use Case 4

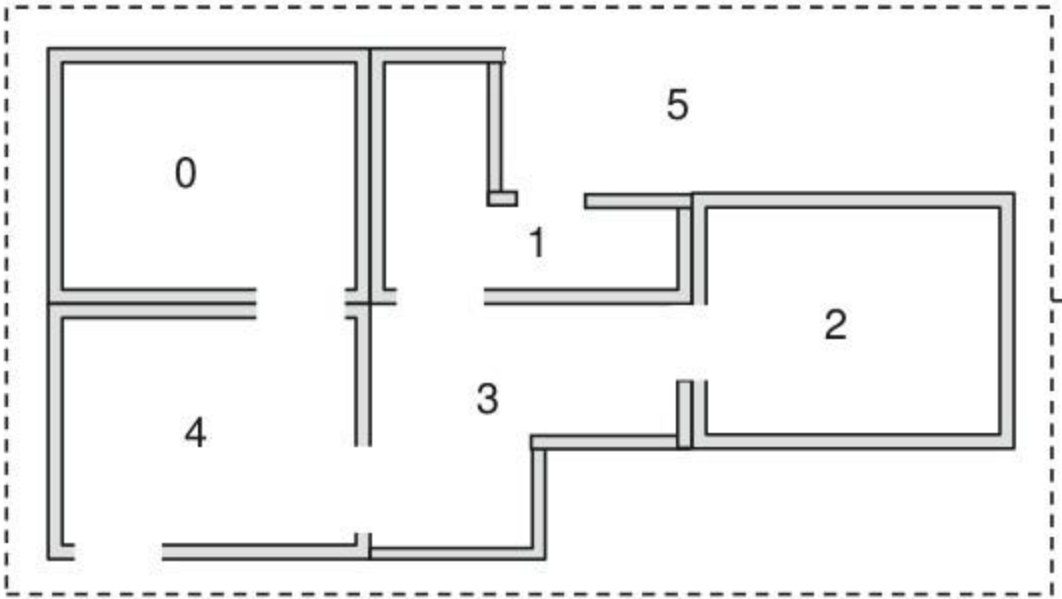
Problem Statement: To perform Market Basket Analysis by finding association between items bought at the grocery store

	A	B	C	D	E	F	G	H
1	citrus fruit	semi-finisl	margarine	ready soups				
2	tropical fr	yogurt	coffee					
3	whole milk							
4	pip fruit	yogurt	cream che	meat spreads				
5	other vege	whole mil	condensec	long life bakery product				
6	whole mil	butter	yogurt	rice	abrasive cleaner			
7	rolls/buns							
8	other vege	UHT-milk	rolls/buns	bottled be	liquor (appetizer)			
9	pot plants							
10	whole mil	cereals						
11	tropical fr	other vege	white brea	bottled wa	chocolate			
12	citrus fruit	tropical fr	whole mil	butter	curd	yogurt	flour	bottled wa
13	beef							
14	frankfurte	rolls/buns	soda					
15	chicken	tropical fruit						



Use Case 5

Problem Statement: Place an agent in any one of the rooms (0,1,2,3,4) and the goal is to reach outside the building (room 5)



Q-learning Algorithm

Reach room #5

YouTube Video Link in the Description

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