

# Machine Learning Algorithms



## SPEAKER

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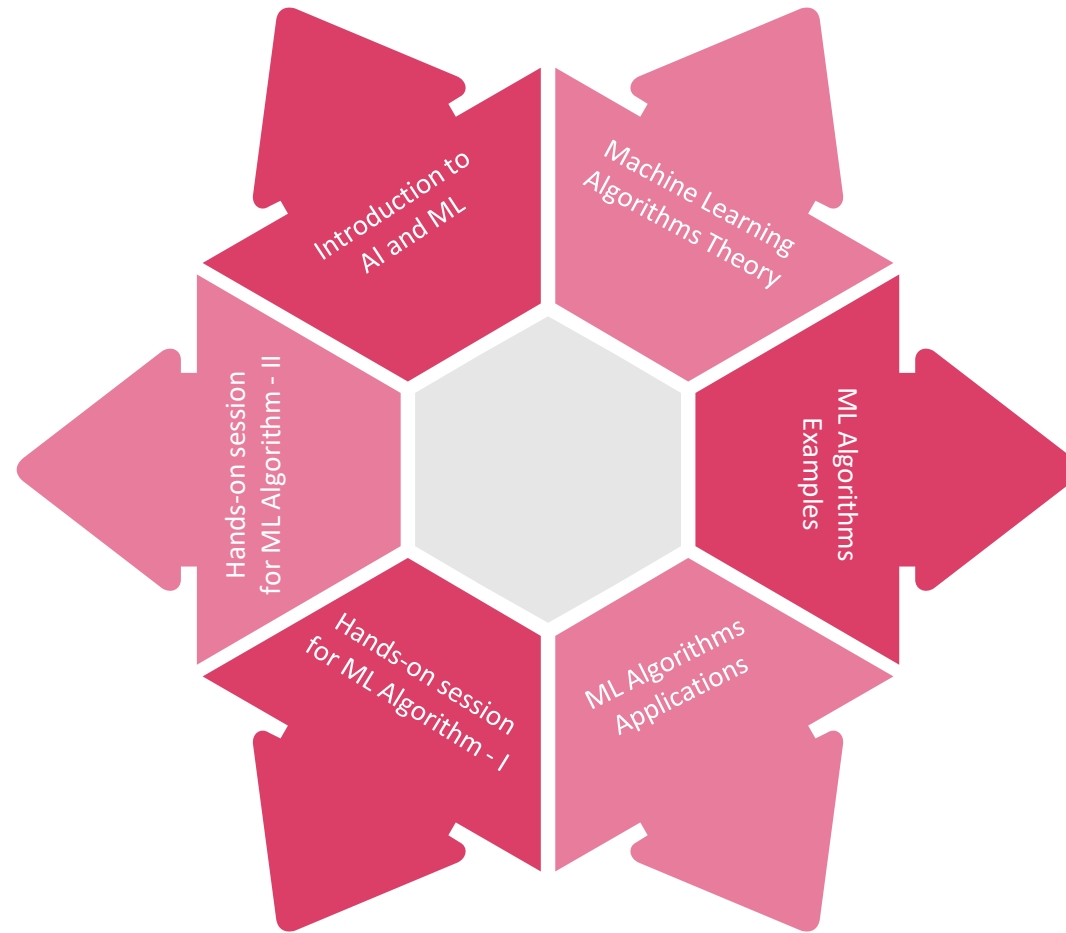
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# AGENDA

## Topics to be covered

These are the topics that we will be going through in our event today pertaining to Artificial Intelligence and Machine Learning.



# What is AI and ML ?



## ARTIFICIAL INTELLIGENCE

It refers to any intelligence exhibited by a computer, robot, or other machine that can mimic the perception, learning, problem-solving, and decision-making capabilities of the human mind.

## MACHINE LEARNING

Machine learning (ML) is a branch of artificial intelligence (AI) focused on building applications that learn from data, experience and improve their decision-making or predictive accuracy over time without being programmed to do so.



# Why do we need AI and ML ?

The need for AI and ML has never been of such extensive importance like today, thanks to exponential increase in data generation and need for solving highly perplexed problems!

1

**Increase in data generation**

2

**Discover patterns and trends**

3

**Solve complex problems**



# Major ML ALGORITHMS

## Regression:

- Linear Regression (LR)
- Logistic Regression (LogR)

## Clustering:

- K Means Clustering (KMC)

## Instance:

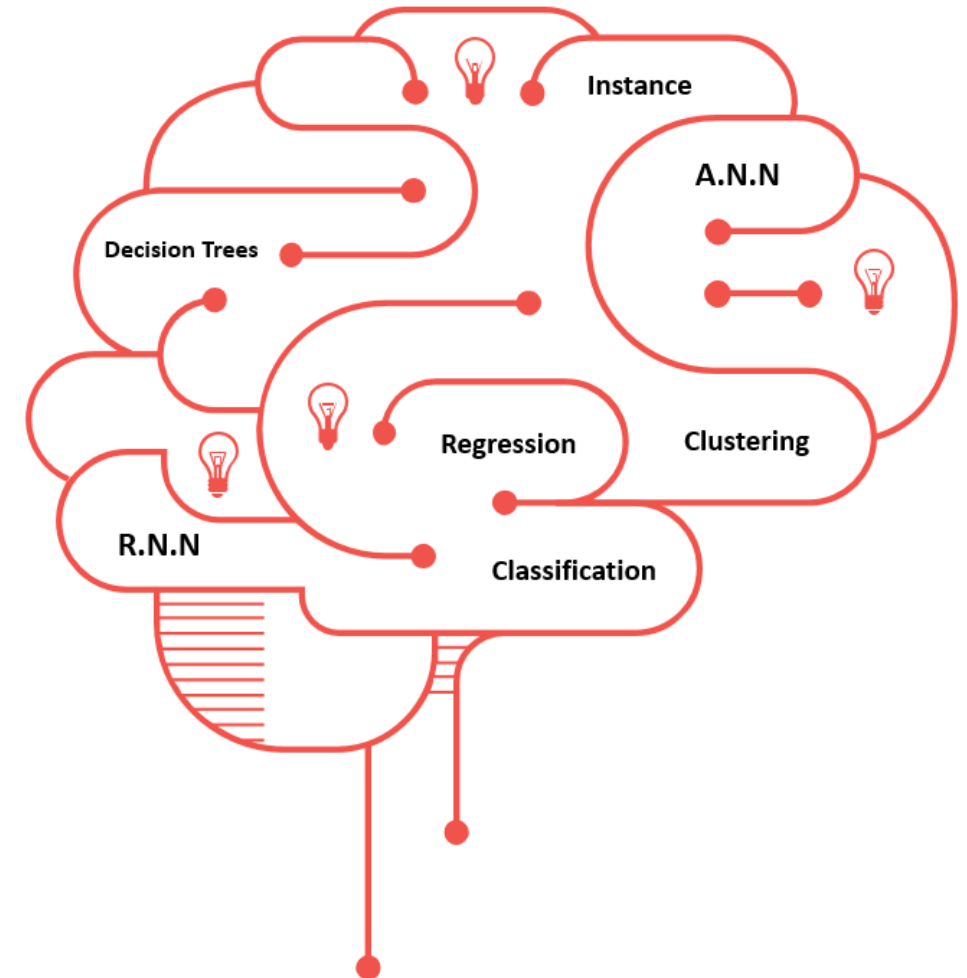
- Support Vector Machines (SVM)

## Neural Network:

- Artificial Neural Network (ANN)
- Recurrent Neural Network (RNN)

## Decision Tree:

- Random Forest Decision Tree (RFDT)

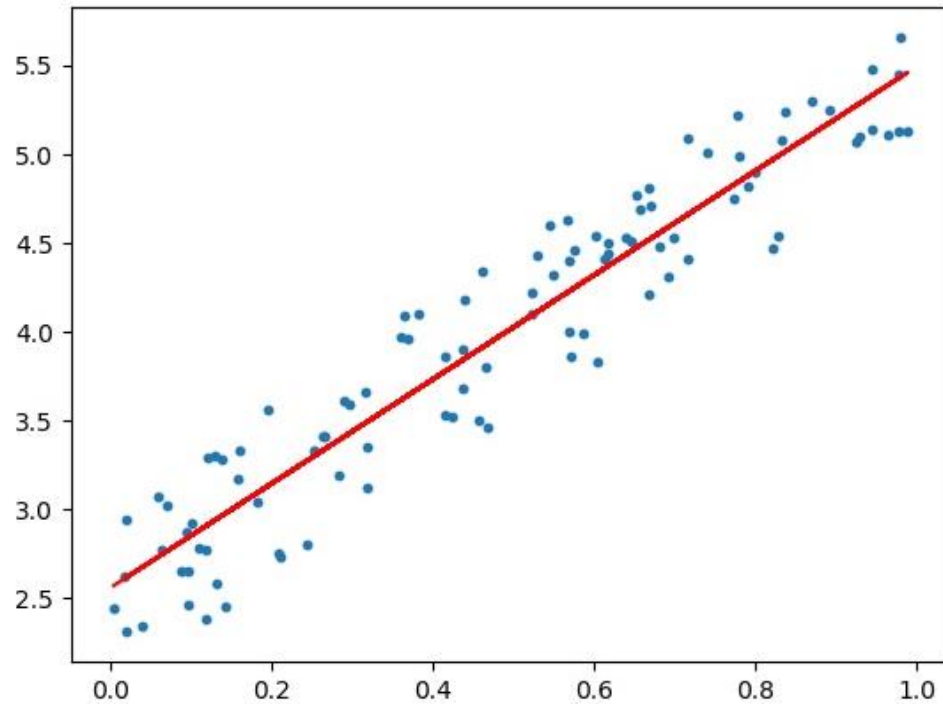


# REGRESSION



# Algorithm: Linear Regression

Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. One variable is considered to be an explanatory variable, and the other is considered to be a dependent variable.





# Applications of Linear Regression

The applications of linear regression include Marketing, Healthcare, Agriculture, Sports, Retail and Banking!

## Examples:

### HEALTHCARE

Among various examples of linear regression in healthcare, one is to find the relationship between drug dosage and blood pressure of the patients!

### AGRICULTURE

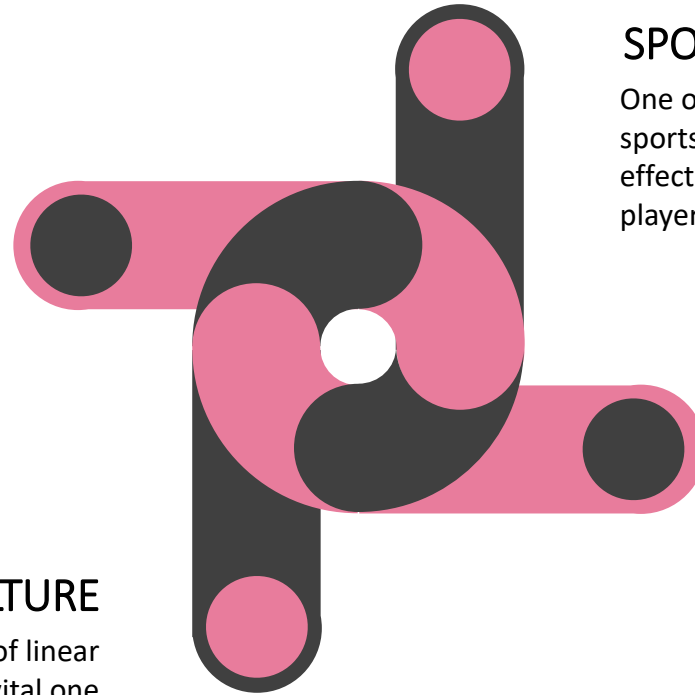
Of several examples of linear regression in agriculture, a vital one is to simply understand the effect of fertilizer and water on crop yields!

### SPORTS

One of the major examples of linear in sports domain is to figure out the effects of different regimens on players' performance!

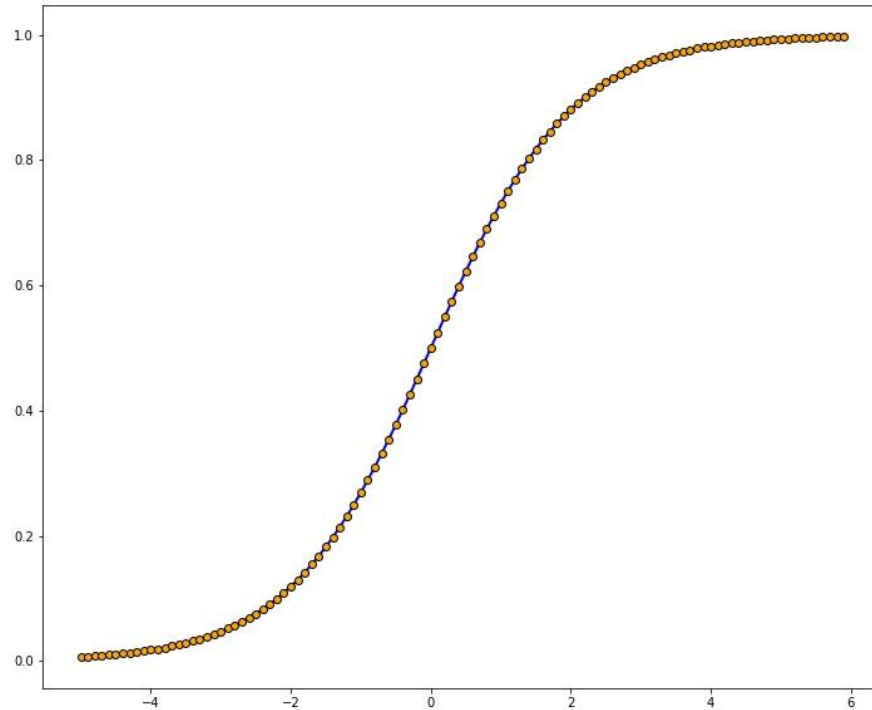
### MARKETING

Marketing uses linear regression for various purposes, including the relation between advertising spending and revenue as well!



# Algorithm: Logistic Regression

Alike linear regression, logistic regression attempts to model the relationship between two variables by fitting a linear equation (based on sigmoid function) to observed data.



# Applications of Logistic Regression

The applications of logistic regression include Banking, Hospitality, Marketing, Gaming Healthcare, and Agriculture!

## Examples:

### GAMING

Gaming companies use logistic regression based prediction to recommend in-app purchases that might tempt users to spend money!

### HOSPITALITY

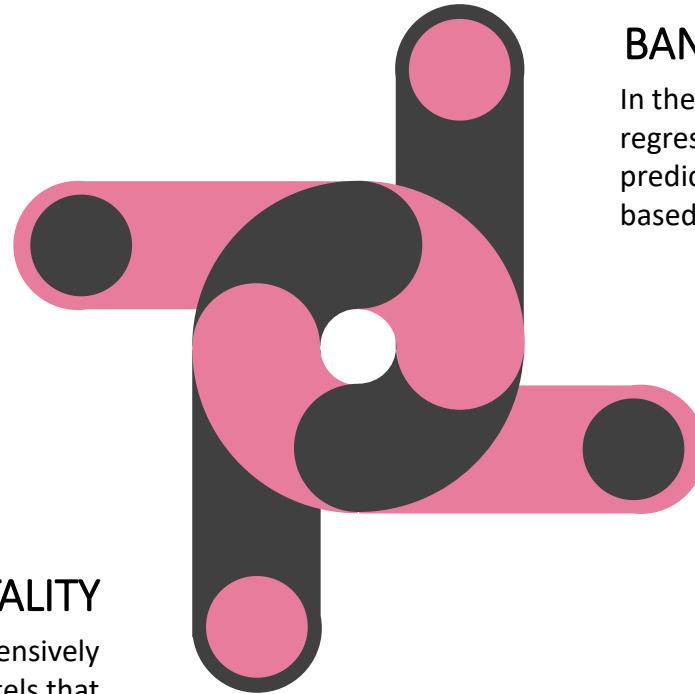
Logistic regression is used extensively in hospitality domain via hotels that aim to predict and understand users' intentions and recognize entities!

### BANKING

In the banking industry, logistic regression is frequently used for predicting the credit score of users based on various factors (data).

### HEALTHCARE

Among various other examples, logistic regression is used in healthcare to predict possible diseases based on patient's blood test data.

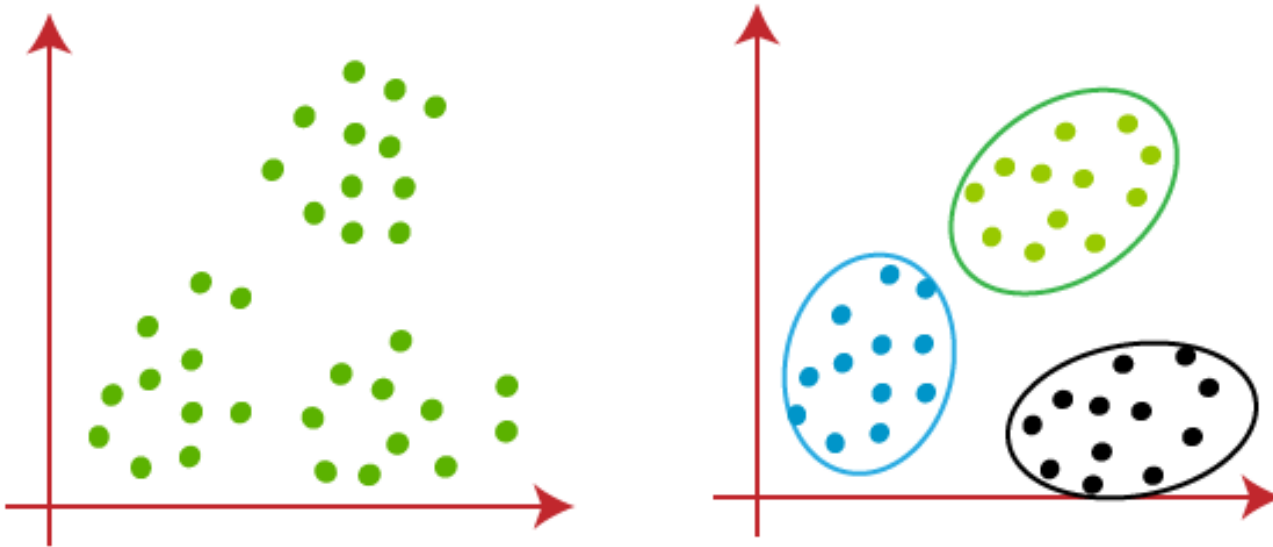


# CLUSTERING



## Algorithm: K Means Clustering

K-means clustering is a centroid-based or a distance-based clustering algorithm, where the distances of data points are calculated to assign a location to a cluster.



# Applications of K-Means Clustering

The applications of KMC include Banking, Hospitality, Marketing, Journalism, Government and Tech Services!

## Examples:

### JOURNALISM

Media companies use clustering algorithms (like KMC) based prediction to spot and differentiate fake news and reviews!

### TECH SERVICES

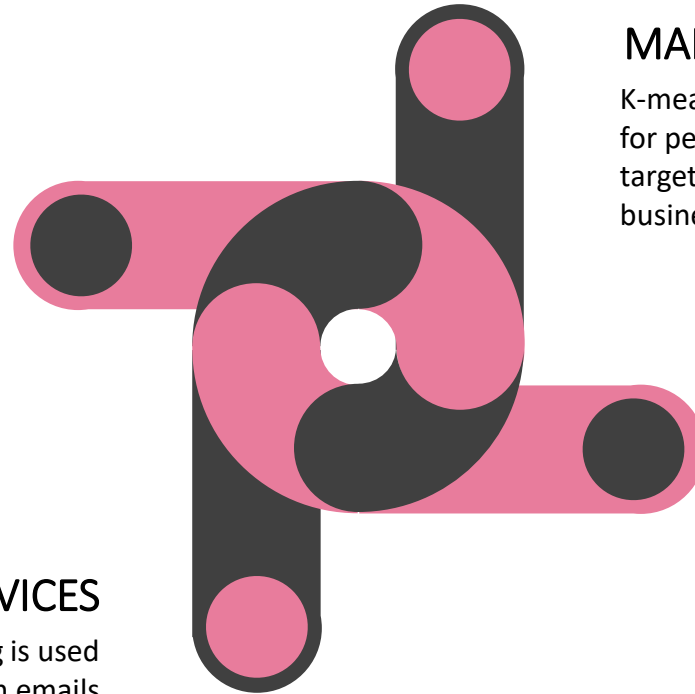
K Means Clustering is used extensively in filtering spam emails in mailing services by companies including Google and Microsoft.

### MARKETING

K-means clustering is generally used for personalization and individualized targeting in marketing by the big business firms.

### GOVERNMENT

Among various other examples, KMC is used by governments to predict and classify criminal activity through various sources of data!

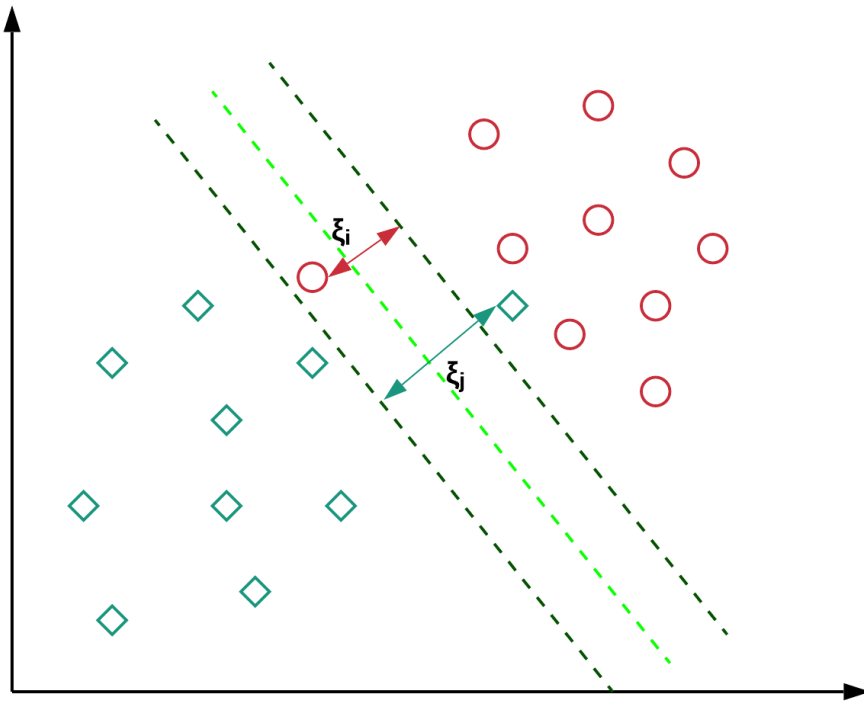


# INSTANCE



# Algorithm: Support Vector Machine

SVM is a supervised machine learning model that uses classification algorithms for two-group classification problems with the help of separation hyperplane.





# Applications of Support Vector Machine

The applications of SVM include Banking, Hospitality, Healthcare, Security, Social Media, and Government!

## Examples:

### SOCIAL MEDIA

Social media giants such as Facebook use Support Vector Machines for effective facial expression detection based on the humongous amount of data!

### SECURITY

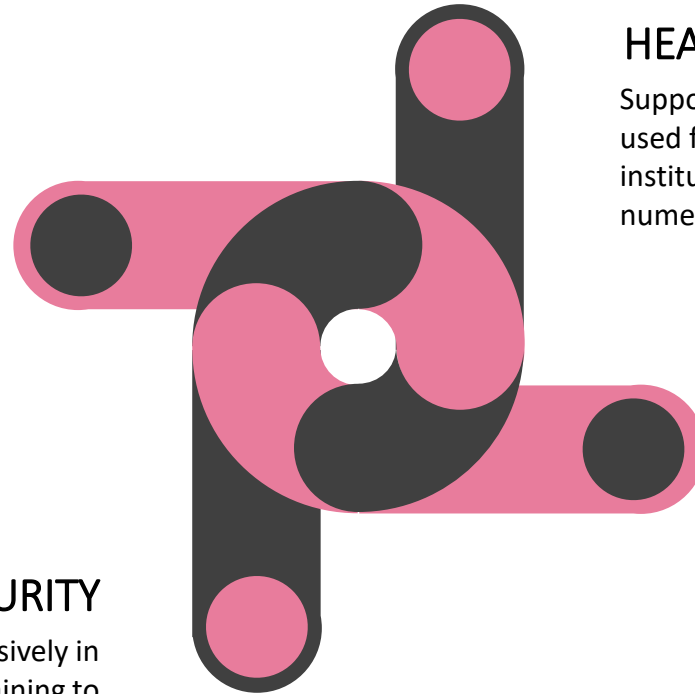
SVMs are used extensively in security firms for tasks pertaining to basic encryption, decryption and security (such as image integrity).

### HEALTHCARE

Support Vector Machines are generally used for disease detection by medical institutions through visual and numerical patient data!

### GOVERNMENT

Among various other examples, SVM is used by governments to understand details in a voice conversation through speech recognition!

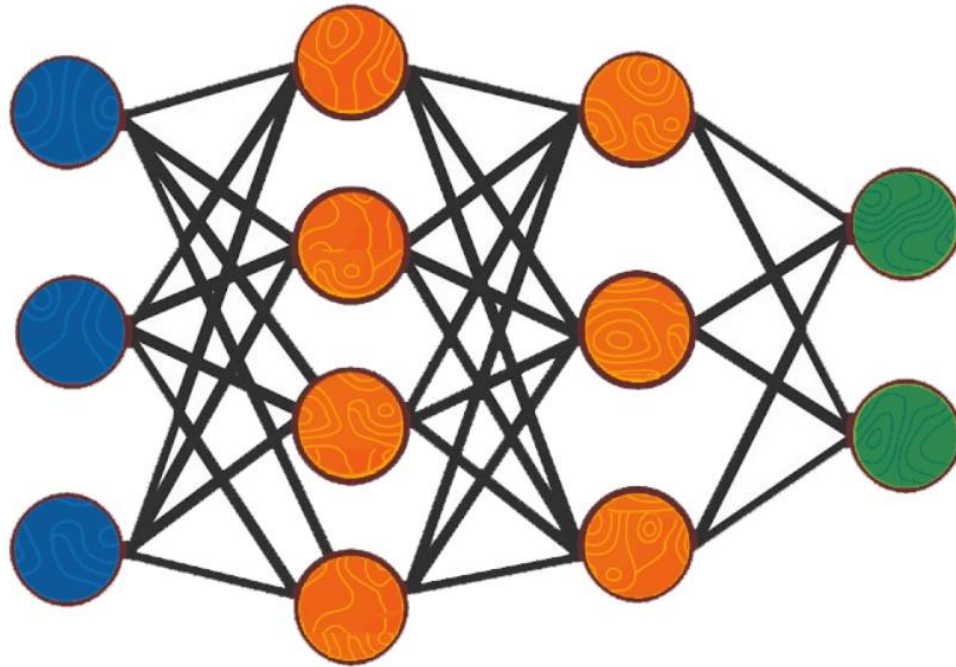


# NEURAL NETWORK



# Algorithm: Artificial Neural Network

ANN is a machine learning model designed to simulate the way the human brain analyzes and processes information for prediction purposes.



# Applications of Artificial Neural Network

The applications of ANN include Electronics, E-Commerce, Finance, Tech Services, Social Media, and Government!

## Examples:

### FINANCE

Artificial Neural Networks have a long history of implementation for algorithmic trading by financial institutions due to their high accuracy predictions on stocks.

### Electronics

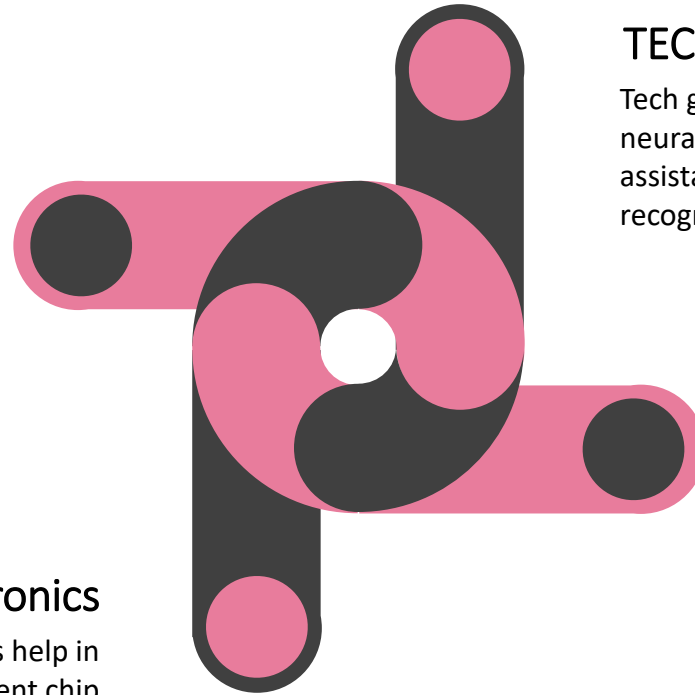
Artificial neural networks help in designing effective and efficient chip design / architecture at a fraction of time compared to humans.

### TECH SERVICES

Tech giants like Google use artificial neural networks in their voice assistants as an accurate speech recognition system.

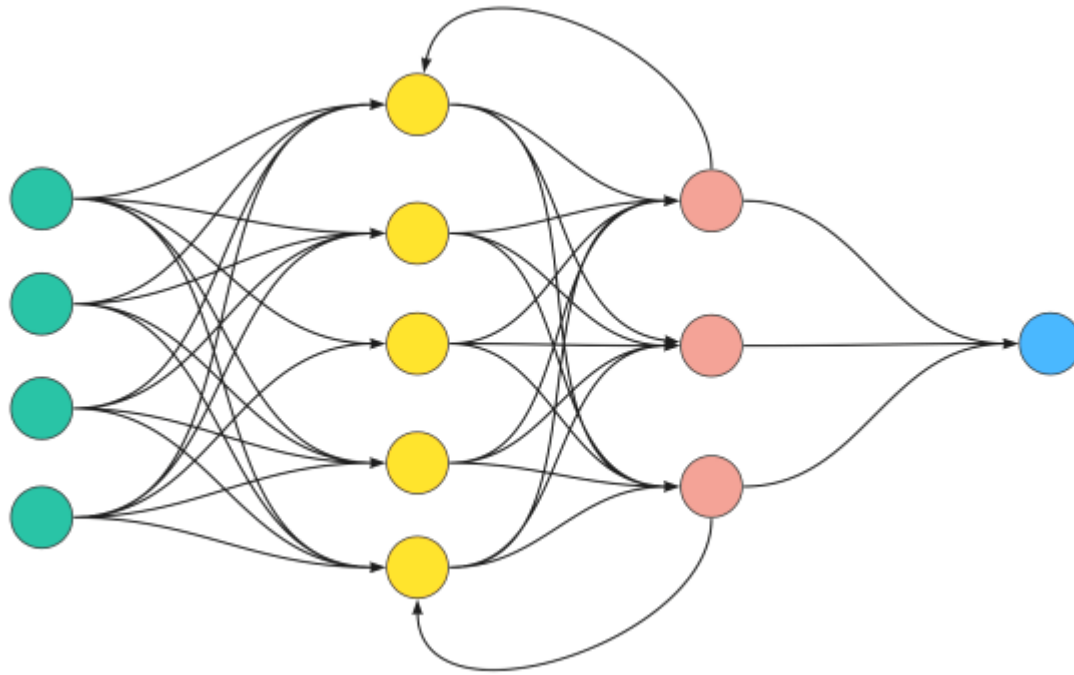
### GOVERNMENT

Among various other examples, ANNs are used by governments for computer vision based tasks (object detection and classification) as well!



## Algorithm: Recurrent Neural Network

RNN is also a machine learning model designed to simulate the way the human brain analyzes and processes information, with backward flow of information as well.



# Applications of Recurrent Neural Network

The applications of RNN include Hospitality, E-Commerce, Banking, Healthcare, Security, Social Media, and Government!

## Examples:

### TECH SERVICES

Tech giants such as Google use recurrent neural network for effective image recognition and search by identifying features in the image's data!

### E-Commerce

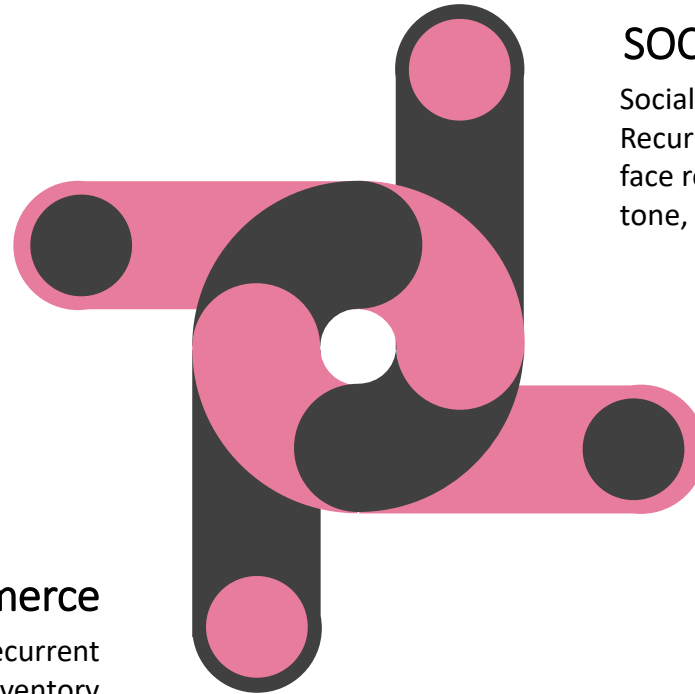
E-commerce giants use recurrent neural networks for various inventory and detection purposes like object detection and visual search tasks.

### SOCIAL MEDIA

Social media giants such as Facebook use Recurrent Neural Networks for effective face recognition by using shape, skin tone, hair, etc., from faces in the data!

### GOVERNMENT

Recurrent neural networks are also used by governments to understand details in a voice conversation through speech recognition when the data is complex!



# Decision Tree



# Algorithm: Random Forest Decision Tree

RFDT is a supervised machine learning model that creates forests (of decision trees) based on bagging method of using different learning models.





# Applications of Random Forest Decision Tree

The applications of RFDT include Banking, E-commerce, Hospitality, Healthcare, Finance, Security, and Social Media!

## Examples:

### FINANCE

Random Forest Decision Trees are usually used for understanding and predicting a stock's future price and behavior with high accuracy!

### HEALTHCARE

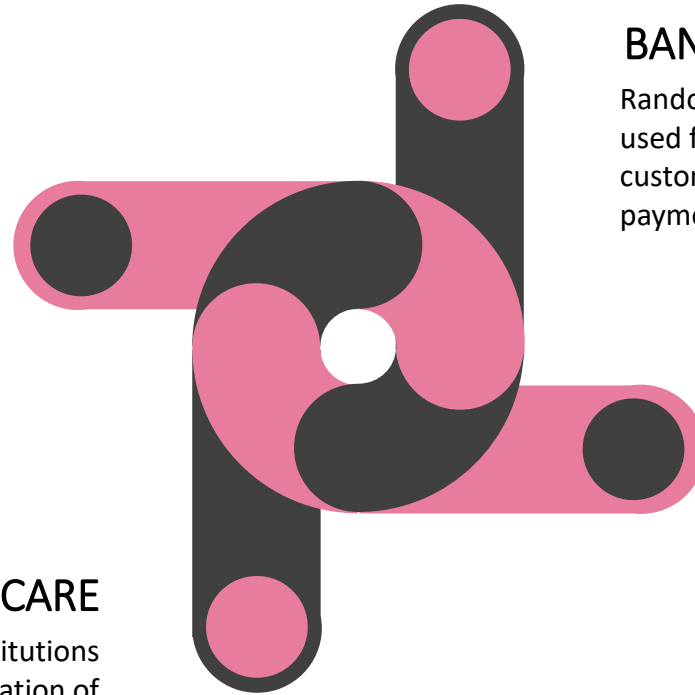
RFDT is also used in medical institutions to find the correct combination of components in medicine and analyze a patient's medical history.

### BANKING

Random Forest Decision Trees are also used for predicting whether a customer is likely to default on their payment and fall under debt or not!

### E-COMMERCE

RFDT is also used by e-commerce giants like Amazon and Flipkart to predict whether a user will like a particular product/service or not!



# Let's move to Google Colab!





THANK YOU!

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ML Algorithms

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