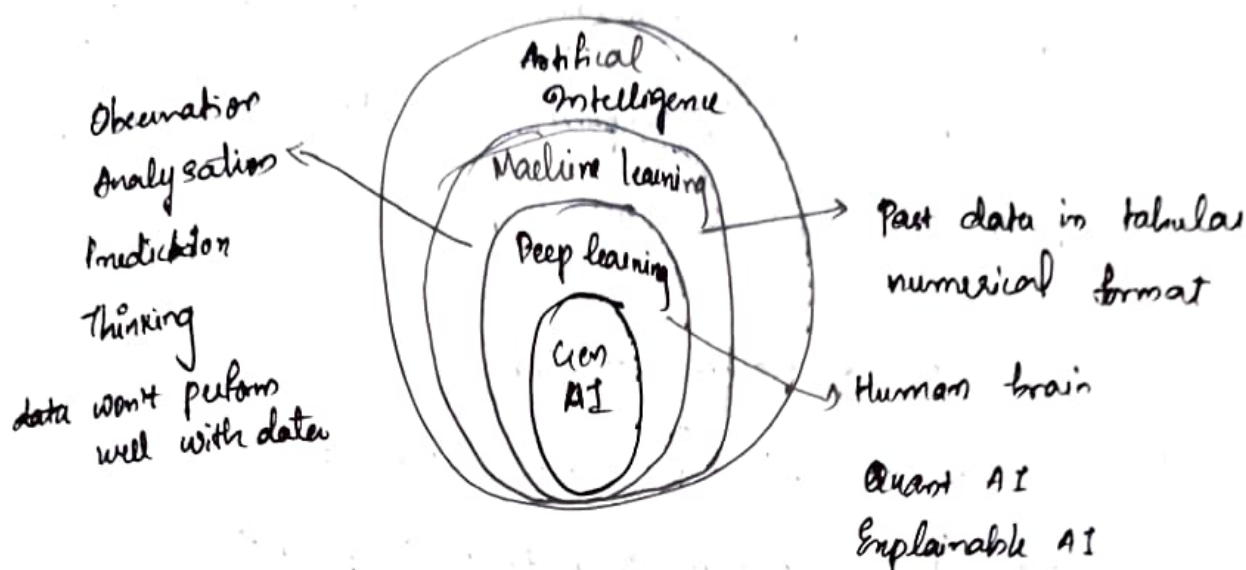


Machine learning



What is ML?

ML is branch/subject of AI that enables computer to learn from data and make predictions or decisions without being explicitly programmed.

Instead of writing code to solve ^{a specific} problems, we feed the machine with data and examples and it learns patterns from them.

Example

* Traditional programming

Programmer writes rules → Computer applies them → output is generated.

Ex: Writing an if-else program

Spam.

* Machine learning

We give the computer thousands of emails labeled "spam" or "not spam" → The computer learns the rules automatically.
It predicts if a new email is a spam.

key components of machine learning

- 1) Data: The information the machine learns from
- 2) Features: Input variables used to make prediction
- 3) Model: The algorithm that learns from data
- 4) Training: The process of teaching the model using data
- 5) Prediction: Using the trained model on new unseen data

Types of Machine learning

Supervised learning

unsupervised learning

Reinforcement learning

* labeled data

* unlabeled data

* Deep learning

□ ○ △
square circle triangle



Supervised

unsupervised

Regression

* if prediction

Point is continuous
we use Regression

Ex: MPG.

classification

* if prediction

Point is categorical/
classes we use
classification

Ex: Y/N

clustering

Pure Regression algorithms

- 1) Simple linear Regression
- 2) multi linear Regression
- 3) Polynomial Regression
- 4) Lasso and Ridge Regression

Pure classification algorithms

- 1) Logistic Regression
- 2) KNN (k nearest neighbour)
- 3) Naive Bayes (probability based)

Both regression and classifications

- 1) Decision Tree

Regression

classifier

- 2) Support vector machine (SVM)

Regression

classifier

Ensemble Techniques

Regression

Classification

1) Bagging

Random Forest

2) Boosting

Adaptive Boosting Machine (Ada Boost)

Gradient Boosting Machine (GBM)

Extreme Boosting Machine (XGBM)

Light Boosting Machine (LGBM)

3) Stacking