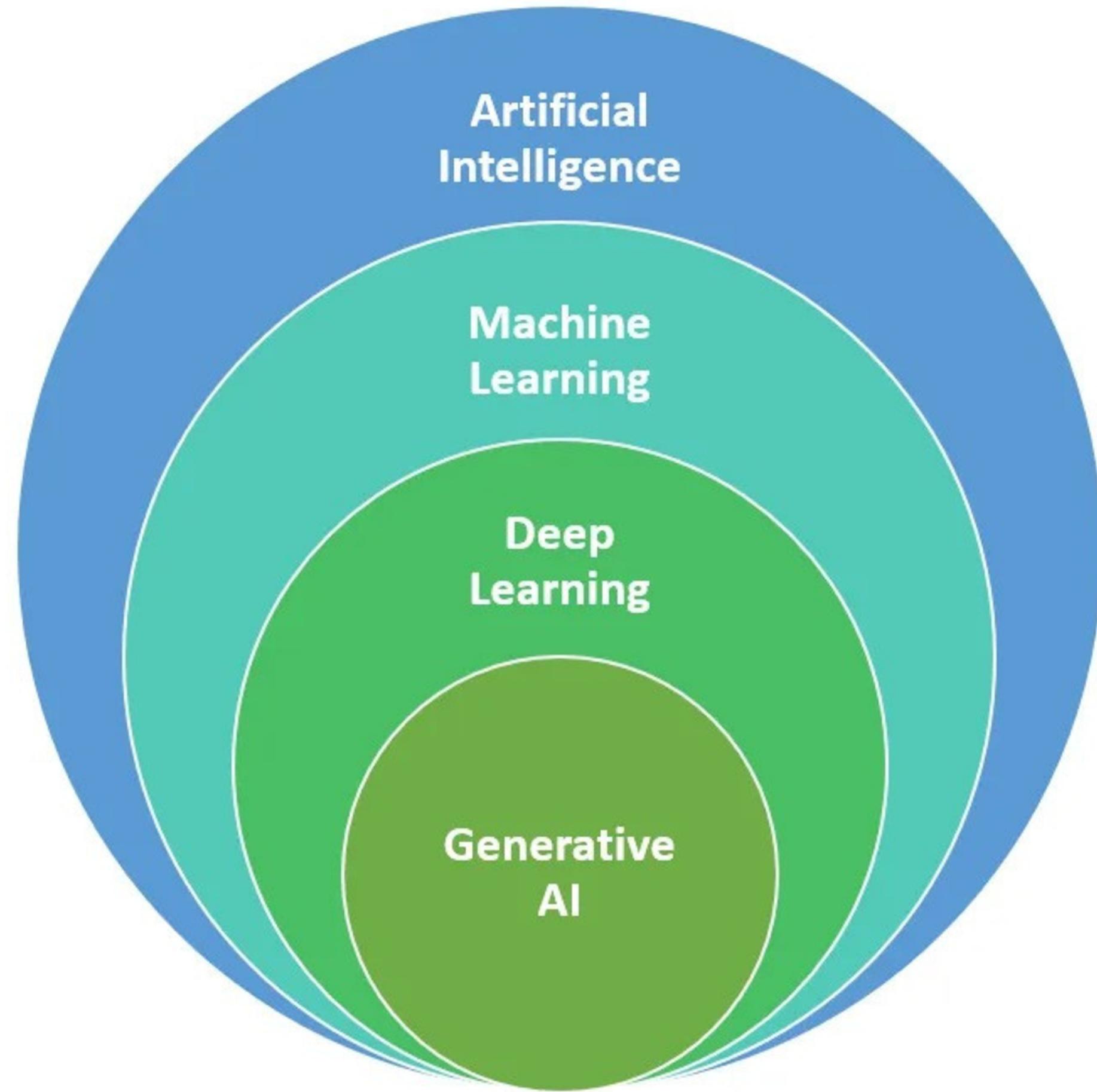


Supervised Learning

AIML Club



What is AI, ML and DL?

Artificial Intelligence (AI): *The simulation of human intelligence in machines. Eg: Chatbot*

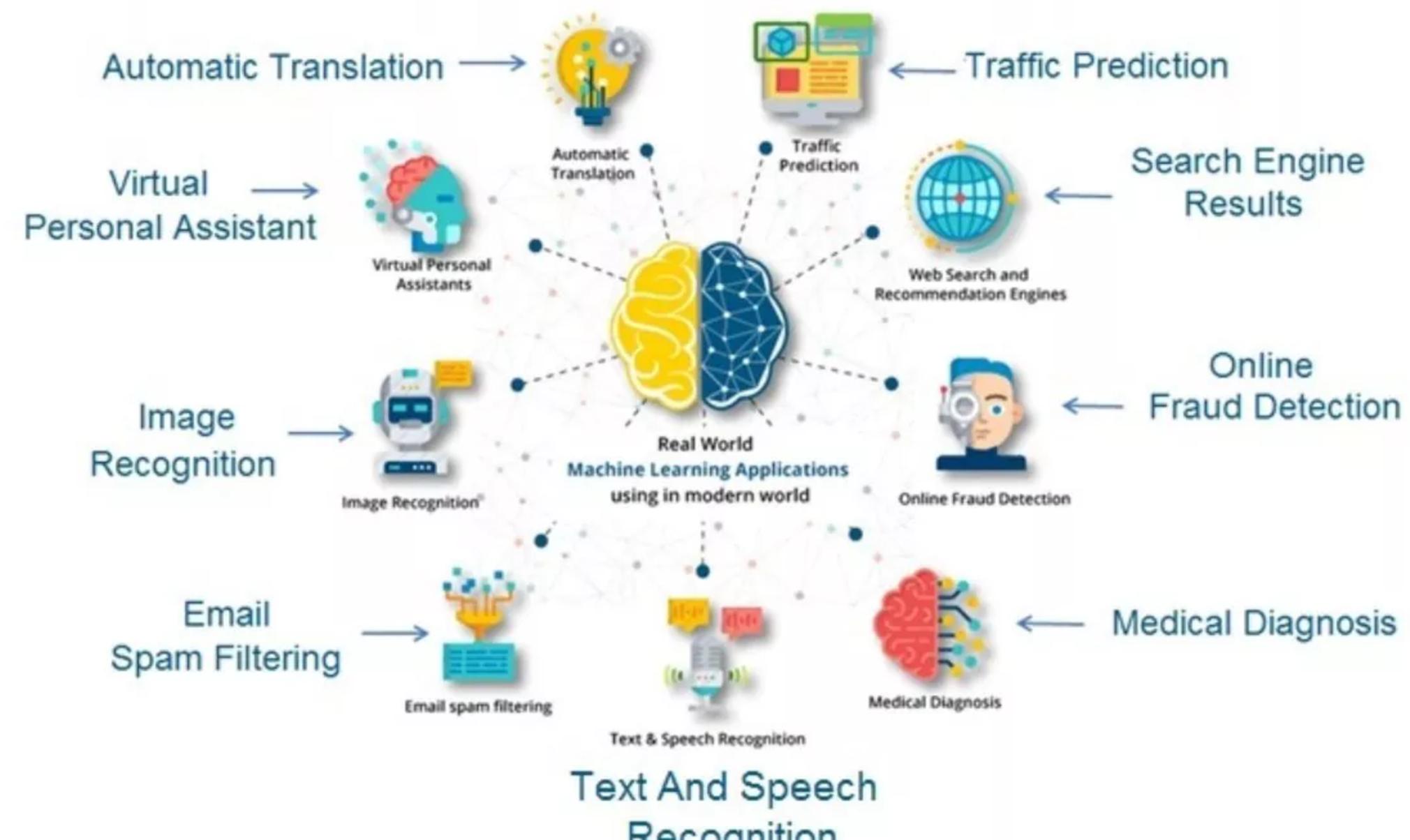
Machine Learning (ML) : *A subset of AI that enables systems to learn from data. Eg: Netflix*

Deep Learning (DL): *A subset of ML that uses neural networks to mimic human cognition. Eg: Face Recognition*

Diff between AI, ML & DL

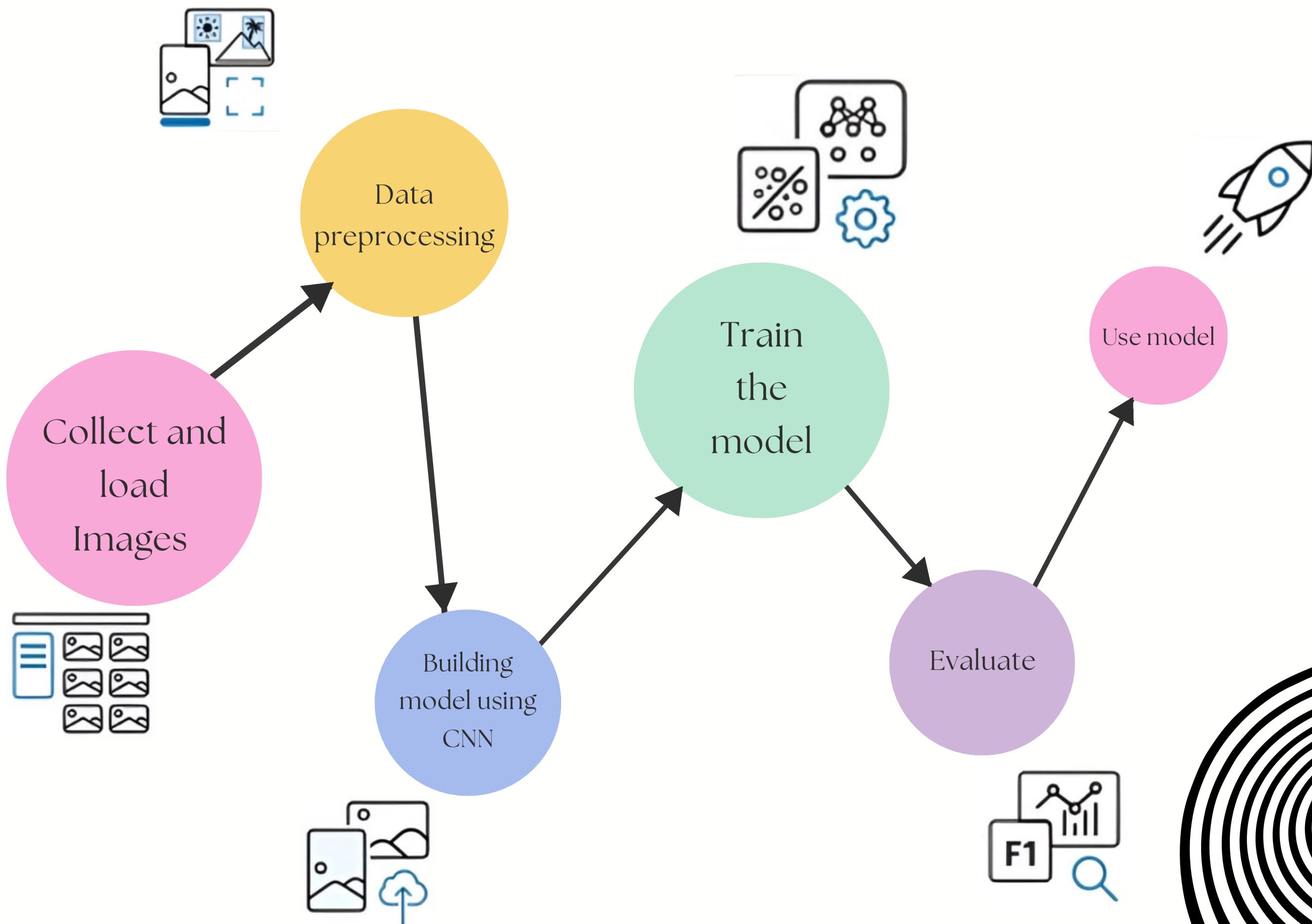
Feature	AI (Artificial Intelligence)	ML (Machine Learning)	DL (Deep Learning)
Definition	Broad field enabling machines to mimic human intelligence.	Subset of AI where machines learn from data.	Subset of ML using deep neural networks.
Data Needs	Works with limited data.	Needs structured data.	Requires large-scale data.
Human Involvement	Rule-based systems.	Requires feature engineering.	Learns features automatically.
Computational Power	Very High	Moderate.	High (needs GPUs/TPUs).
Examples	Chatbots, robotics.	Spam filtering, fraud detection.	Image recognition, NLP.

Applications of AI and ML



- 
- 1. MODEL**
 - 2. DATA**
 - 3. DATASET**
 - 4. DATA CLEANING**
 - 5. DATA PREPROCESSING**
 - 6. TESTING**
 - 7. TRAINING**
 - 8. VALIDATION**
 - 9. EVALUATION MEASURES**
 - 10. STRUCTURED DATA**
 - 11. UNSTRUCTURED DATA**
 - 12. FEATURES**
 - 13. LABELS**

CAT AND DOG





What is Supervised Learning?

Supervised Learning is a type of machine learning where the algorithm learns from labeled data to make predictions or decisions based on new, unseen data.



Types of Supervised Learning

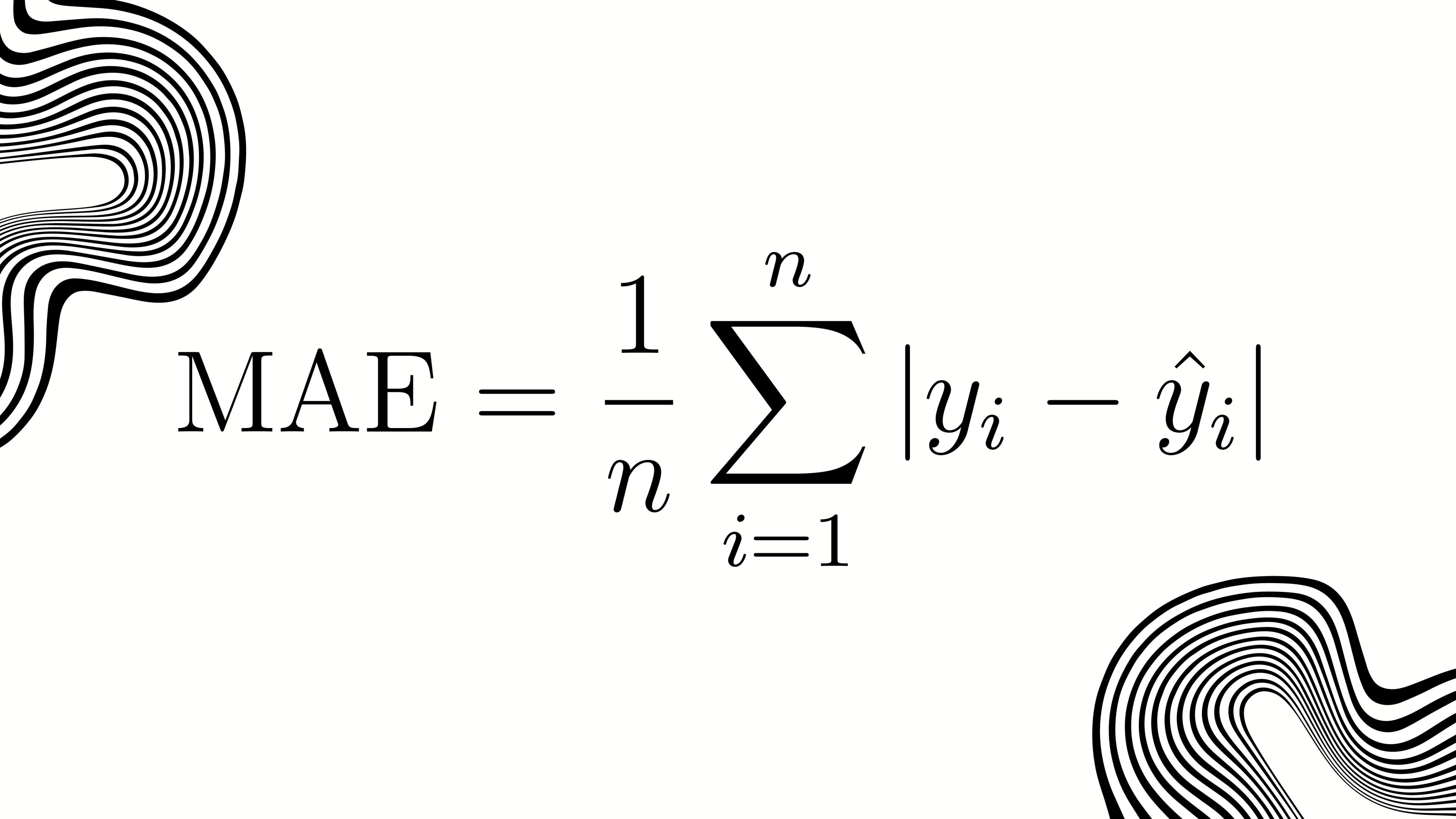
01 Regression

02 Classification



Regression Metrics

- **Mean Absolute Error (MAE)** – Measures the average error in absolute terms.
Example: If $MAE = 5 \rightarrow$ You usually miss by ± 5 marks.
- **R² Score (Coefficient of Determination)** – Measures how well the model explains the data (0 to 1).
Example: If $R^2 = 0.90 \rightarrow$ Your guesses explain 90% of the score variations!


$$\text{MAE} = \frac{1}{n} \sum_{i=1}^n |y_i - \hat{y}_i|$$

$$R^2 = 1 - \sum_{i=1}^n \frac{(y_i - \hat{y}_i)^2}{(y_i - \bar{y})^2}$$