**Supervised Learning — Quick Notes**

**Definition:**  
Machine learning approach where models learn from **labeled data** (input + correct output) to make predictions on unseen data.

**Process:**

1. **Training** — Feed the model input–output pairs; model learns patterns.
2. **Prediction** — Model predicts labels/values for new inputs.
3. **Evaluation & Adjustment** — Test on unseen data, measure accuracy, fine-tune.

**Types:**

* **Classification** — Predict discrete categories (e.g., spam/not spam, cat/dog).
* **Regression** — Predict continuous values (e.g., house price, temperature).

**Common Algorithms:**

* **Linear Regression** — Continuous value prediction.
* **Logistic Regression** — Binary classification.
* **Decision Trees** — Works for classification & regression.
* **SVM (Support Vector Machine)** — Classification with clear separation.
* **KNN (K-Nearest Neighbors)** — Predicts based on closest data points.

**Real-world Applications:**

* Email spam filters
* Medical diagnosis
* Fraud detection
* Recommendation systems (Netflix, Amazon)

**Key takeaway:**  
Supervised learning is fundamental to AI, enabling accurate predictions in many everyday technologies by learning from past labeled examples.