

## **Machine Learning - Q&A**

### **1. What is Machine Learning (ML)?**

Machine Learning (ML) is a part of Artificial Intelligence (AI) that allows computers to learn from data and make decisions without being explicitly programmed. It helps in finding patterns and making predictions.

### **2. How is Machine Learning different from traditional programming?**

In traditional programming, we give specific instructions to the computer to follow. But in ML, the computer learns from data and figures out the patterns on its own to make predictions.

### **3. What are the three main types of Machine Learning?**

The three main types of ML are:

- Supervised Learning (learns from labeled data)
- Unsupervised Learning (finds patterns in unlabeled data)
- Reinforcement Learning (learns by trial and error with rewards and penalties)

### **4. What is supervised learning? Give an example.**

Supervised learning is when a model is trained using labeled data, meaning each input has a correct output. For example, predicting house prices based on past data of house prices and features.

### **5. Name two common algorithms used in supervised learning.**

Two commonly used supervised learning algorithms are:

- Linear Regression (used for predicting continuous values)
- Decision Trees (used for making decisions by splitting data)

### **6. What is the difference between linear regression and logistic regression?**

Linear regression is used for predicting continuous values (like predicting temperature), while logistic regression is used for classification tasks (like determining if an email is spam or not).

### **7. Where is supervised learning used in real life?**

It is used in many places, such as:

- Email spam detection (classifies emails as spam or not)
- Credit scoring (banks check if someone is eligible for a loan)

- Medical diagnosis (AI predicts diseases based on patient records)

### **8. What is unsupervised learning?**

Unsupervised learning is when the model is given unlabeled data and it finds patterns or structures on its own, without knowing the correct answers.

### **9. Name three important algorithms used in unsupervised learning.**

Three common unsupervised learning algorithms are:

- K-Means Clustering (groups data into clusters)
- Principal Component Analysis (PCA) (reduces the number of variables while keeping important information)
- Apriori Algorithm (finds relationships between items in large datasets, like market basket analysis)

### **10. What is clustering in unsupervised learning? Give an example.**

Clustering is when similar data points are grouped together. For example, businesses use clustering to group customers based on buying behavior for targeted marketing.

### **11. How does dimensionality reduction help in Machine Learning?**

It helps by reducing the number of features in a dataset while keeping important information. This makes models run faster and avoids unnecessary complexity.

### **12. What is Reinforcement Learning (RL)?**

Reinforcement Learning is when a model learns by interacting with an environment and receiving rewards or penalties. It's like how a child learns to walk by trying and getting feedback.

### **13. Explain the terms "Agent," "Environment," and "Rewards" in RL.**

- Agent: The one making decisions (like a robot or AI program).
- Environment: The surroundings where the agent operates.
- Rewards: Feedback given to the agent to tell if it made the right or wrong decision.

### **14. Where is reinforcement learning used in real-world applications?**

It is used in:

- Self-driving cars (learning to drive safely)
- Game AI (AI beating humans in chess or Go)
- Stock market trading (AI learning to make profitable trades)

