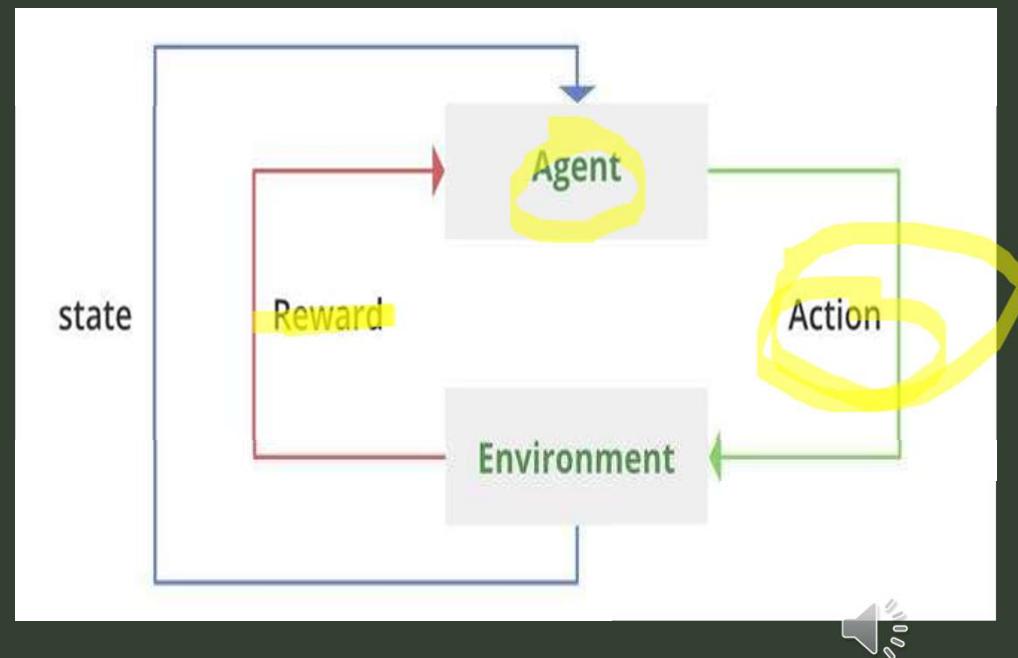


Reinforcement Learning

- Reinforcement Learning is a type of machine learning in which an **agent** learns to make decisions by interacting with an **environment** and receiving **rewards or penalties** for its actions.



Reinforcement Learning

Basic Components of Reinforcement Learning

- **Agent** – The learner or decision maker
- **Environment** – The system the agent interacts with
- **State (S)** – Current situation of the agent
- **Action (A)** – Choice made by the agent
- **Reward (R)** – Feedback from the environment



Reinforcement Learning

Example : Training a Dog

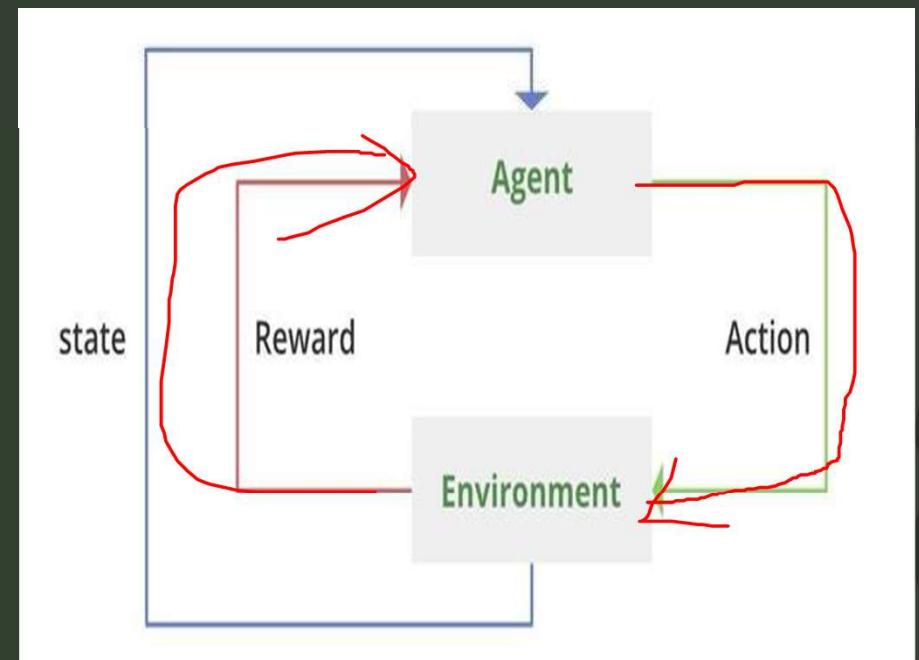
- Agent → Dog
- Environment → Home
- Action → Sit / Jump
- Reward → Biscuit (positive)
- Goal → Learn correct behavior



Reinforcement Learning

Working of Reinforcement Learning

- Agent observes the **current state**
- Agent selects an **action** using a policy
- Environment gives a **reward** and next state
- Agent updates its knowledge
- Steps repeat until optimal behavior is learned



Reinforcement Learning

Types of Reinforcement Learning

- **Positive Reinforcement**
 - Reward increases desired behavior
 - Example: Bonus for correct move
- **Negative Reinforcement**
 - Penalty discourages bad behavior
 - Example: Losing points



Reinforcement Learning

Applications of Reinforcement Learning

- Game AI (AlphaGo, Chess)
- Robotics
- Self-driving cars

