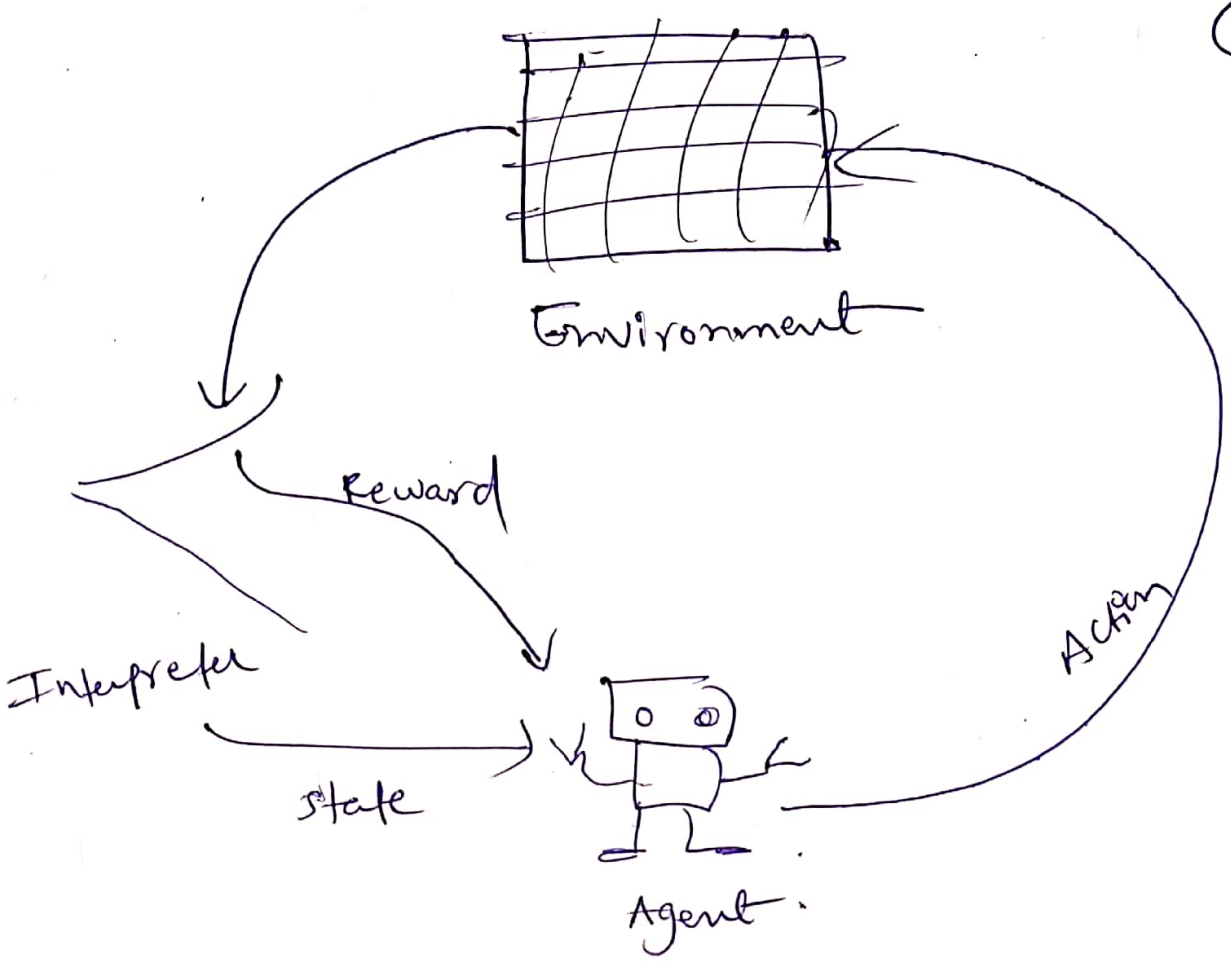
Reinforcement Learning

— Reinforcement Learning (RL) is an area of machine learning Concerned with how Software agents ought to take actions in an environment in order to maximize the notion of cumulative reward.

— Reinforcemat learning is one of three basic machine learning paradigms, alongside Supervised & unsupervised.

Other disciplines applicable RL

— Game theory
— Control theory
— Operations research
— Information theory
— Simulation based optimization
— multi-gent-system
— Swarm Intelligence
— Statistics
— gentic Algo.



The typical framing of a Reinforcement Learning (RL) scenario; an agent takes actions in an environment, which is interpreted into a reward and a representation of the state, which are fed back into the agent.

Basic reinforcement is modeled as a Markov decision process :-

- a set of environment and agent states S;
- a set of actions, A of the agent.
- $P_a(s, s') = Pr(s_{t+1} = s' \mid s_t = s, a_t = a)$ is the probability transition (at time t) from state s to state s' under action a.
- $R_a(s, s')$ is the immediate reward after transition from s to s' with action a.

main points

Input : It should be an initial state which the model will start.

Output :- there are many possible output as there are variety of solution to a particular problem.

Training :- The training is based upon input, the model will return a state and the user will decide to reward or punish the model based on its output.

- The model keeps continues to learn.
- The best solution is decided based on the maximum reward.

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Reinforcement VS supervised

- Reinforcement learning is all about making decisions sequentially. output depends on the state of current i/p and next i/p depends on the output of previous input
- In Reinforcement learning decision is dependent, so we give labels to sequences of dependent decisions.

Ex: Chess game

- decision is made on the initial input
- decisions are independent of each other labels are given to each decision.

Ex: object recognisation.