**Key Concepts**

**1. Supervised Learning vs. Reinforcement Learning**

* **Supervised Learning**: Focuses on predicting future stock prices based on historical data. However, it requires additional strategies to make trading decisions.
* **Reinforcement Learning**: Not only predicts future stock prices but also makes trading decisions (buy, sell, or hold) to maximize profits.

**2. Reinforcement Learning Framework for Stock Trading**

The RL framework for stock trading involves the following key components:

* **State Space**: Represents the current state of the market (e.g., past stock price movements).
* **Action Space**: The possible actions the agent can take (e.g., buy, sell, or hold).
* **Reward Function**: Defines the reward for each action, typically based on profit or return.
* **RL Model**: The algorithm used to learn the optimal policy (e.g., DQN, PPO, A2C, DDPG).

**3. DQN (Deep Q-Network)**

DQN is a popular RL algorithm that combines Q-learning with deep neural networks. The key components of DQN include:

* **Q-Network**: A neural network that approximates the Q-value function, which estimates the expected return for each action in a given state.
* **Experience Replay**: A buffer that stores past experiences (state, action, reward, next state) to train the network.
* **Target Network**: A separate network used to stabilize training by providing consistent target Q-values.

**4. Soft Update**

Soft update is a technique used to gradually update the target network's parameters, ensuring stable training. The formula for soft update is:

θtarget←τθlocal+(1−τ)θtarget*θ*target​←*τθ*local​+(1−*τ*)*θ*target​

where:

* θtarget*θ*target​: Parameters of the target network.
* θlocal*θ*local​: Parameters of the local network.
* τ*τ*: A small coefficient (e.g., 0.001) that controls the rate of update.