Glossary of Terms

### **A**

**AgentGPT**A cloud-based system for training and deploying reinforcement learning agents, optimized for efficiency and seamless integration with AWS SageMaker.

### **B**

**Batch Size**The number of samples processed before the model updates. Used in training reinforcement learning models.

### **C**

**Causal Graphs**Graphical representation of causal relationships between variables (e.g., states, actions, and rewards) in a system.

**Causal Reinforcement Learning (CRL)**An approach to reinforcement learning that integrates causal inference to improve decision-making, sample efficiency, and generalization.

**CloudEnvLauncher**A utility for automating the deployment of environments on the cloud using Docker, Amazon ECR, and EC2.

**Configurations**Predefined settings such as SageMakerConfig and Hyperparameters that define the parameters for model training, environment hosting, and inference.

**Counterfactual Reasoning**The ability to simulate and analyze the outcome of alternative actions (“What if I had taken a different action?”).

### **D**

**Docker**A platform for containerizing applications and their dependencies, ensuring consistent deployment across environments.

**Domain Knowledge**Specific insights or expertise used to design or improve causal models or algorithms.

### **E**

**ECR (Elastic Container Registry)**A Docker container registry service by AWS that simplifies storing, managing, and deploying container images.

**EC2 (Elastic Compute Cloud)**A web service by AWS that provides resizable compute capacity in the cloud.

**Episode**A sequence of states, actions, and rewards from the start to the termination of an agent’s task in reinforcement learning.

**Environment**The system or simulation in which an RL agent operates, such as a game or robot simulation.

### **F**

**FastAPI**A high-performance web framework for building APIs, used for hosting local environments.

**Final Observation**The last observation of an agent before the environment resets at the end of an episode.

### **G**

**Gymnasium API**A standardized interface for reinforcement learning environments, with methods like reset() and step().

### **H**

**Hyperparameters**Configuration values that control training processes, such as batch\_size, max\_steps, and exploration strategies.

### **I**

**Info Dictionary**A dictionary used in Gymnasium environments to provide additional information, which is optionally returned during reset() and step().

### **J**

**JSON Serialization**The process of converting data into a JSON-compatible format for HTTP communication between systems.

### **L**

**Local Environment Hosting**Hosting the RL environment locally, often with tools like FastAPI and tunnels (e.g., ngrok or localtunnel) for external access.

### **M**

**Max Steps**The maximum number of steps an RL agent can take in an episode or across training.

**Missing Observations**Instances where an agent has no valid observation data; typically handled using None.

### **O**

**Observation**Data representing the state of the environment as seen by the RL agent.

**One-Click Training Process**A simplified training workflow requiring minimal configuration and setup.

### **P**

**Policy Optimization**The process of improving an RL agent’s policy using techniques like policy gradient and Q-learning.

### **R**

**Rewards**Numerical values indicating the success or failure of an agent’s actions in achieving its goal.

**Role ARN (Amazon Resource Name)**An identifier for an AWS IAM role that grants permissions for specific actions, such as accessing SageMaker resources.

### **S**

**SageMaker**An AWS service for building, training, and deploying machine learning models at scale.

**Sample Efficiency**The ability to learn effective policies using fewer training samples.

**SCMs (Structural Causal Models)**Mathematical frameworks used to describe causal relationships in reinforcement learning environments.

**Step Function**The method step(action) in Gymnasium, which advances the environment by one time step based on an agent’s action.

### **T**

**Terminated**A flag indicating that the episode has ended due to task completion.

**Truncated**A flag indicating that the episode has ended prematurely, often due to reaching a step limit.

### **U**

**Unity ML-Agents**A toolkit for developing RL environments in Unity, compatible with Gymnasium API standards.

### **W**

**Weights & Biases (W&B)**A platform for tracking machine learning experiments and visualizing training metrics in real-time.