User Friendly Reinforcement Learning

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

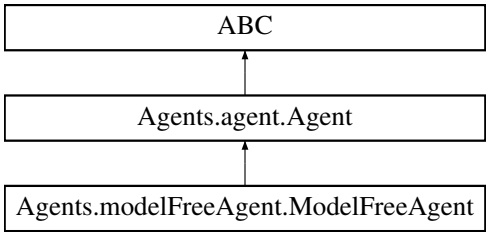
Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

Class Documentation

3.1 Agents.agent.Agent Class Reference

Inheritance diagram for Agents.agent.Agent:



Classes

- class Parameter

Public Member Functions

- def __init__ (self, state_size, action_size, gamma)
- def choose_action (self, state)
- def save (self, filename)
- def load (self, filename)
- def memsave (self)
- def memload (self, mem)
- def **__deepcopy__** (self, memodict={})

Public Attributes

- **state_size**
- **action_size**
- **gamma**
- **time_steps**

Static Public Attributes

- **parameters**

3.1.1 Detailed Description

```
This is a parameter class that defines a parameter of an extended agent
```

3.1.2 Constructor & Destructor Documentation

3.1.2.1 __init__()

```
def Agents.agent.Agent.__init__ (
              self,
              state_size,
              action_size,
              gamma )
```

```
The constructor method
:param state_size: the shape of the environment state
:type state_size: tuple
:param action_size: the number of possible actions
:type action_size: int
:param gamma: the discount factor
:type gamma: float
```

3.1.3 Member Function Documentation

3.1.3.1 choose_action()

```
def Agents.agent.Agent.choose_action (
              self,
              state )
```

```
Returns the action chosen by the agent's current policy given a state
:param state: the current state of the environment
:type state: tuple
:return: the action chosen by the agent
:rtype: int
```

3.1.3.2 load()

```
def Agents.agent.Agent.load (
              self,
              filename )
```

```
Loads the agent's Q-function from a given file location
:param filename: the name of the file location from which to load the Q-function
:type filename: str
:return: None
:rtype: None
```

3.1.3.3 memload()

```
def Agents.agent.Agent.memload (
              self,
              mem )
```

```
Loads a passed Q-function
:param mem: the Q-function to be loaded
:return: None
:rtype: None
```

3.1.3.4 memsave()

```
def Agents.agent.Agent.memsave (
              self )
```

```
Returns a representation of the agent's Q-function
:return: a representation of the agent's Q-function
```

3.1.3.5 save()

```
def Agents.agent.Agent.save (
              self,
              filename )
```

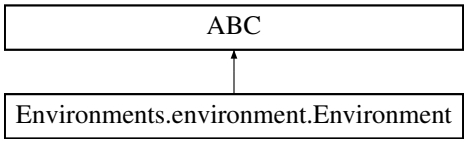
```
Saves the agent's Q-function to a given file location
:param filename: the name of the file location to save the Q-function
:type filename: str
:return: None
:rtype: None
```

The documentation for this class was generated from the following file:

- Agents/agent.py

3.2 Environments.environment.Environment Class Reference

Inheritance diagram for Environments.environment.Environment:



Public Member Functions

- def **__init__** (self)
- def step (self, action)
- def reset (self)
- def sample_action (self)
- def render (self)
- def close (self)

Public Attributes

- **action_size**
- **state_size**
- **state**
- **done**

Static Public Attributes

- string **displayName** = 'Environment'

3.2.1 Member Function Documentation

3.2.1.1 close()

```
def Environments.environment.Environment.close (
              self )
```

```
Closes the environment, freeing any resources it is using
:return: None
:rtype: None
```

3.2.1.2 render()

```
def Environments.environment.Environment.render (
              self )
```

```
Renders the environment as an image
:return: an image representing the current environment state
:rtype: PIL.Image
```

3.2.1.3 reset()

```
def Environments.environment.Environment.reset (
              self )
```

```
Resets the environment to an initial state
:return: the state of the reset environment
:rtype: tuple
```

3.2.1.4 sample_action()

```
def Environments.environment.Environment.sample_action (
              self )
```

```
Samples an action from the environment
:return: some action the agent can take in the environment
:rtype: int
```

3.2.1.5 step()

```
def Environments.environment.Environment.step (
              self,
              action )
```

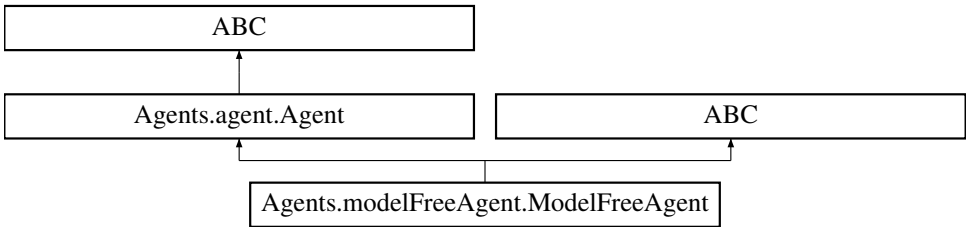
```
Advances the state of the environment one time step given the agent's action
:param action: the action the agent will take before taking the step
:type action: int
:return: the reward the agent obtains by taking the action and the time step advancing
:rtype: number
```

The documentation for this class was generated from the following file:

- Environments/environment.py

3.3 Agents.modelFreeAgent.ModelFreeAgent Class Reference

Inheritance diagram for Agents.modelFreeAgent.ModelFreeAgent:



Public Member Functions

- def __init__ (self, ∗args)
- def remember (self, state, action, reward, new_state, episode, done)
- def reset (self)

Public Attributes

- **decay_rate**

Static Public Attributes

- string **displayName** = 'Model Free Agent'
- list **newParameters**
- list **parameters** = agent.Agent.parameters + newParameters

3.3.1 Constructor & Destructor Documentation

3.3.1.1 __init__()

```
def Agents.modelFreeAgent.ModelFreeAgent.__init__ (
              self,
             * args )
```

```
Constructor method
:param args: the parameters associated with the agent
:type args: tuple
```

3.3.2 Member Function Documentation

3.3.2.1 remember()

```
def Agents.modelFreeAgent.ModelFreeAgent.remember (
              self,
              state,
              action,
              reward,
              new_state,
              episode,
              done )
```

```
'Remembers' the state and action taken during an episode
:param state: the original state of the environment
:param action: the action the agent took in the environment
:param reward: the reward the agent observed given its action
:type reward: number
:param new_state: the new state that the agent found itself after taking the action
:param episode: the episode number
:type episode: int
:param done: whether the episode was finished after taking the action
:type done: bool
:return: the MSE loss for the predicted q-values
:rtype: number
```

3.3.2.2 reset()

```
def Agents.modelFreeAgent.ModelFreeAgent.reset (
              self )
```

```
Resets the agent to its original state, removing the results of any training
:return: None
:rtype: None
```

3.3.3 Member Data Documentation

3.3.3.1 newParameters

```
list Agents.modelFreeAgent.ModelFreeAgent.newParameters  [static]
```

Initial value:

```
=  [agent.Agent.Parameter('Min Epsilon', 0.00, 1.00, 0.01, 0.1, True, True),
                    agent.Agent.Parameter('Max Epsilon', 0.00, 1.00, 0.01, 1.0, True, True),
                    agent.Agent.Parameter('Decay Rate', 0.00, 0.20, 0.001, 0.018, True, True)]
```

The documentation for this class was generated from the following file:

- Agents/modelFreeAgent.py

3.4 Agents.agent.Agent.Parameter Class Reference

Public Member Functions

- def **__init__** (self, name, min, max, resolution, default, hasSlider, hasTextInput)

Public Attributes

- **name**
- **min**
- **max**
- **resolution**
- **default**
- **hasSlider**
- **hasTextInput**

The documentation for this class was generated from the following file:

- Agents/agent.py

Index